From the Desk of Editor-in-Chief

Understanding Health Care Delivery System in India

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Health is a fundamental human right. Health care is a public right. Hence it implies that the state authority has a responsibility for the health of its people. Also we are aware that social, economic, political, environmental factors have impact on the health care delivery system of any country because it influences growth and development of that particular country. National governments of all countries around the globe are striving to improve and expand their health care delivery services. Nearly all governments of the world have recognized these principles. The current drawbacks and criticism against health care services is that they are: Urban oriented, curative in nature and it is accessible only to a limited population.

In both developed and developing countries currently the aim is not only to reach the whole population with sufficient & adequate health care services, but also to secure an acceptable level of health for all through the application of primary health care programmes.

In country like India, health care is completely a governmental affair. Since independence, India has created a vast public health infrastructure comprising of several Sub-centres, Public Health Centres (PHCs) and Community Health Centres (CHCs). It is estimated that this vast infrastructure is only benefitted by 20% of the population, while 80% of healthcare needs are still being provided by the private sector. Poor access to health leads to avoidable incidence of morbidity, mortality and out-of-pocket expenses, often leading to indebtedness. In rural areas especially, there are pockets of under-served populations where the vicious circle of poverty, malnutrition and poor health reinforce each other. Moreover WHO has identified inequalities in access for health care will be one of the future’s major public health problems. Hence health care delivery system should be organized in such a manner that it can meet the needs of entire population. Primary health care is best way to provide health services to the community. Public health infrastructure should be strengthened to address the systemic issues in the Health Sector, so as to ensure that the Outlays earmarked for Health Sector are efficiently utilized, and can be translated into outcomes, which can stand public scrutiny. Hence all the possible necessary actions and attempts should be made to improve quality of life of the entire population by improving education, research sectors and also implementing and promoting health related policy and in order to improve a system within a country, it is utmost important to acquire knowledge of various policies, health projects running internationally.
Study of Minimal Invasive Surgical Procedure of Liver Abscesses in Western Uttar Pradesh - A Hospital Based Study

S C Sharma, Sameer Jain¹, S P Sinha², S K Jain³, Akanksha Singh⁴

Introduction: Liver is a vital organ of the body, anatomically situated mostly in right hypochondrium with small extension into left hypochondrium also. Liver is the organ subjected to systemic infections by various microorganisms. Pyogenic and amebic liver abscess are the two common types of hepatic abscess. Pyogenic liver abscess are less common than amebic liver abscess. Right lobe of the liver is most commonly involved in both types of abscesses. Radio-imaging techniques like US and CT are the modalities of choice for investigation purposes. Treatment modalities of these abscesses, first emphasizes on medical treatment, but if it is unsuccessful then only the surgical intervention should be taken up.

Aims & Objectives: The aim of this study is to use that modality of treatment for hepatic abscesses which are successful, economical and reduces the hospital stay of patients.

Methods: 62 patients belonging to different socio-economic status, age range from (18-70 yrs) were included in this study. All routine investigations like haemogram, culture/sensitivity, pathological tests were done. Later on diagnosis was confirmed by US and CT scan. Patients were treated keeping them under treatment of three groups (vide infra).

Results: Based on the size of cyst and type of abscess different modalities of treatment were applied. Hospital stay of patients varied from single day to three to four days or even more for 10 days in which laprotomy was tried for management.

Conclusion: We concluded the study with the fact, that draining the abscess under US guidance is the best minimal invasive method of treatment, which on one hand is economical to patients and also reduces the hospital stay, so that proper medical care to other admitted patients is imparted.

Keywords: Laprotomy, Minimal Invasive, Hepatomegaly, Abscess
patients with pyogenic liver abscess and those with very large amoebic abscesses, may not recover with antibiotics alone and need drainage guided by ultrasonography or CT. Percutaneous aspiration can be carried out for small abscesses although catheter drainage has become the standard of care. Larger abscesses may also need catheter drainage which is also CT- or ultrasound-guided. Drainage should also be carried out if there is impending rupture.

MATERIAL AND METHODS

Out of all patients admitted in the department of Surgery TMMC&RC and associated Hospital from (September 2012 to October 2013), 62 patients were found to have liver abscess in a period of 12 months. Age of patients ranged between 18 to 70 years and out of that 32% were in 25-36 years age group and 68% were above that age group. Males were 74%. Three patients had previous history of abdominal surgery. Routine investigations were done including hemogram, liver function tests, blood sugar, HIV, hepatitis B, X-ray chest and abdomen. Diagnosis was confirmed by ultrasonographic scanning and computerized tomography.

Patients not responding to the medical treatment were put on surgical intervention as soon as possible and study was conducted in three groups.

Group 1: Included in this group the patients in whom aspiration of liver abscesses was done under ultrasound guidance and in these patients about 50cc of pus was aspirated.

Group 2: In this group we included those patients in whom moderate to large amount of pus filled abscesses were found and a minimal invasive surgery was done under ultrasound guidance.

Group 3: In this group were included those patients who had large pus filled cavities and were drained by laparotomy through right subcostal incision. Pus evacuated in all patients was sent for bacteriological examination and for culture and sensitivity.

Post operative antibiotics and IV fluids were given in all groups of patients.

Treatment modalities used

Group 1: Analgesics, Antibiotic Metronidazole
Group 2: P/C Aspiration, Analgesics, Antibiotic, Metronidazole
Group 3: Irrigation with Saline with Metronidazole, Analgesics Antibiotic
Group 4: Laprotomy.

RESULTS

Table 1: Treatment modality of patients ranging 18-25 yrs

<table>
<thead>
<tr>
<th>Age group</th>
<th>18-25 yrs</th>
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</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>14</td>
</tr>
<tr>
<td>Size of cavity</td>
<td>CS&lt;2 cm 5 pt, CS&gt;2 cm 8 pt, CS&gt;5 cm 1 pt</td>
</tr>
<tr>
<td>Treatment Group-1</td>
<td>Treated by group-1</td>
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<tr>
<td>Treatment Group-2</td>
<td>Treated by group-2</td>
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<tr>
<td>Treatment Group-3</td>
<td>Treated by group-3</td>
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<tr>
<td>Treatment Group-4</td>
<td>Treated by group-4</td>
</tr>
<tr>
<td>Result</td>
<td>4 pts treated by group-1 with one day hospital stay and 1 pt didn’t respond to group-1 treatment and treated by group-2 treatment with hospital stay 3 days</td>
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<td></td>
<td>6 pts treated by group-2 with hospital stay 3 days</td>
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<td></td>
<td>2 pts didn’t respond group-2, treated by group-3 with hospital stay 4 days</td>
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<tr>
<td></td>
<td>Successful t/t by laprotomy with hospital stay 10 days</td>
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</table>

Table 2: Treatment modality of patients ranging 25-35 yrs

<table>
<thead>
<tr>
<th>Age group</th>
<th>25-35 yrs</th>
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<tbody>
<tr>
<td>Number of patients</td>
<td>37</td>
</tr>
<tr>
<td>Size of cavity</td>
<td>CS&lt;2 cm 11 pts, CS&gt;2 cm 14 pts, CS&gt;5 cm 12 pts</td>
</tr>
<tr>
<td>Treatment Group-1</td>
<td>Treated by group-1</td>
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<tr>
<td>Treatment Group-2</td>
<td>Treated by group-2</td>
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<tr>
<td>Treatment Group-3</td>
<td>Treated by group-3</td>
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<tr>
<td>Treatment Group-4</td>
<td>Treated by group-4</td>
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<tr>
<td>Result</td>
<td>8 pts t/t by group-1 with hospital stay 1 day. 3 pts had no response by group-1 t/t . Treated by group-2.</td>
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<td></td>
<td>11 pts successful t/t by group-2 with hospital stay 3 days</td>
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<td></td>
<td>3 pts unsuccessful t/t by group-2 treated by group-3. Hospital stay 4 days</td>
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<td></td>
<td>8 pts respond to t/t by group-4 with hospital stay 4 days</td>
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<td></td>
<td>4 pts didn’t respond by group-3 t/t by group-4 with hospital stay 10 days</td>
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Table 3: Treatment modality of patients ranging 35-70 yrs

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number of patients</th>
<th>Size of cavity</th>
<th>Treatment Group-1</th>
<th>Treatment Group-2</th>
<th>Treatment Group-3</th>
<th>Treatment Group-4</th>
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<tr>
<td>35-70 yrs</td>
<td>11</td>
<td>CS&lt;2cm 3pts</td>
<td>Treated by group-1</td>
<td>Treated by group-2</td>
<td>Treated by group-3</td>
<td>No pt responded</td>
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<td></td>
<td></td>
<td>CS&gt;2cm 4pts</td>
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<td>to group-1 t/t</td>
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<td></td>
<td></td>
<td>CS&gt;5cm 4pts</td>
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<td>stay of one day</td>
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<td>stay of 10 days</td>
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The average recovery period was very short in Group I, where as in moderate to large abscesses it was two to four days. Patients with simple aspiration were discharged from the hospital on next day in satisfactory condition, while in others with pig tail drainage maximum of four days was the stay. Recovery period in contrast to the patients who underwent laparotomy for drainage, was about 10 days.

Overall result is shown in table-4.

Table 4: Patient response to different treatment modalities

<table>
<thead>
<tr>
<th>Age group</th>
<th>t/t by Group I</th>
<th>t/t by Group II</th>
<th>t/t by Group III/IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25 years</td>
<td>04</td>
<td>09</td>
<td>01</td>
</tr>
<tr>
<td>25-35 years</td>
<td>08</td>
<td>25</td>
<td>04</td>
</tr>
<tr>
<td>35-70 years</td>
<td>00</td>
<td>08</td>
<td>03</td>
</tr>
<tr>
<td>Total no of pts</td>
<td>12</td>
<td>42</td>
<td>08</td>
</tr>
</tbody>
</table>

DISCUSSION

Liver abscesses are life-threatening with mortality rate as high as 80 to 90% if left untreated.\(^4\)

In earlier times when antibiotics were not available open surgical drainage was the treatment of choice.\(^5\)

Treatment by aspiration followed by antibiotics was described by\(^6\) and recently in last few years percutaneous drainage under US has largely replaced surgical drainage.\(^7,8\)

PYOGENIC LIVER ABSCESS

In half of the cases no identifiable cause of pyogenic liver abscess cannot be ascertained.\(^9,10\) With US initially the abscess is hyperechoic but with maturation it becomes hypoechoic. Computed tomography is more specific and sensitive than US.\(^12\) Staphylococcus and Streptococcus being the commonest but abscesses originating from intra-abdominal infection, however, usually contain aerobic gram negative rods especially \textit{E. coli}. Treatment of PLA should individualize. The choice of antibiotic should cover most of common microorganisms cultured from liver abscess. This therapy should consist of a combination of aminoglycosides either with metronidazol or clindamycin or beta-lactam antibiotic. Antibiotic therapy should alone be reserved only for patients in good clinical condition and those who have solitary abscess lesser than 2 cm in diameter, patients must receive antibiotic for 4-6 weeks. “Source control” is essential in surgical treatment of P LA. In recent series Bertel et al, (1996)\(^13\) have reported an overall 87% and Herman et al (1997)\(^14\) 91.5% success rate in percutaneous surgical drainage.\(^3,8\)

Although there are various reports comparing these modalities in the treatment of liver abscess, there are no prospective randomized studies comparing different treatment modalities.

Gerzof et al, 1985\(^15\) compared the medical treatment, percutaneous and surgical drainage in the retrospective study reporting better result with surgical drainage in total of 26 patients.

AMEBIC LIVER ABSCESS

US findings are good for radiological evaluation of amebic liver abscess which shows peripheral rim with homogeneity.\(^16,17\)

The first line of treatment in Amoebic liver abscesses is Metronidazole. The size of abscesses is important factor in determining the response of drug. PCD and Catheter drainage offer other modalties of treatment as in Pyogenic abscesses. Metranidazol is given 750 mg 3 times a day for 7-10 days.

Surgical open drainage is indicated only in those patients with complicated Amoebic abscesses e.g. secondary infection or peritonitis with large Pyogenic and Amoebic Liver abscesses.
CONCLUSION

This study revealed that draining the abscesses under ultrasound guidance either by simple aspiration or with pig tail drainage or with any other drainage tube is best surgical minimally invasive method of treatment. It not only reduces the sufferings of patients, hospital stay but also is economical to poor patients as compared to laparotomy or any other major surgical procedure. Thus authors recommends ultrasonic guided aspiration of liver abscesses as far as possible in expert hands of surgeon and ultrasonologist.

REFERENCES

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Dental Rubber Dam as a Barrier Membrane in the Treatment of Infrabony Defects

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Abstract

Background: The ideal goal of periodontal therapy has been the regeneration of the periodontium, resulting in the complete restoration of lost periodontal tissues. This study was taken up so as to evaluate the efficacy the Dental Rubber Dam as a barrier membrane in the treatment of infrabony defects.

Methods: Fifteen patients who were diagnosed to have mild to moderate periodontitis having at least one angular defect was taken up for the study. After the routine basic periodontal therapy these sites were treated with dental rubber dam as a barrier in accordance with the principle of guided tissue regeneration. All membranes were removed after 4 weeks of membrane placement.

Results: The results showed a significant improvement in all clinical parameters including reduction in periodontal probing depth and gain in clinical attachment level after six-nine months post-operatively. Radiographic measurements also showed a mean reduction in osseous defect depth of 0.94 mm. The sites however, showed an increase in gingival recession amounting to a mean of 1.46 mm.

Conclusion: It can be concluded that dental Rubber dam is a barrier membrane with great potential in treatment of periodontal osseous defects provided the limitations brought to light in this study are addressed in the future. At present it can only be recommended for the treatment of osseous defects in the posterior teeth aesthetics is not a prime concern.

Keywords: Barrier membranes, Rubber dam, Periodontal regeneration, Infrabony defect

INTRODUCTION

Barrier membrane helps in periodontal regeneration by preventing the migration of epithelial cells and cells from the gingival connective tissue onto the root surface. There are different types of membranes that can be used to regenerate periodontal tissues. Most of the commercially available regenerative materials are very expensive and not within the reach of the common man especially in developing countries. Investigations have still to be undertaken to find more materials that are cost effective and possess all the required characteristics, as stated above, of an ideal barrier membrane.

The ideal goal of periodontal therapy has been the regeneration of the periodontium, resulting in the complete restoration of lost periodontal tissues.¹ Periodontal regeneration is the regeneration of the tooth’s supporting tissues including cementum periodontal ligament and bone.²

The methods currently employed to obtain periodontal regeneration are the use of osseous grafts (including autografts, allografts and alloplasts),³⁻⁵ chemical mediators (citric acid, tetracycline, polypeptide growth and differential factors and enamel matrix proteins), interdental denudation,⁶ coronally positioned flaps and the use of tissue guiding membranes. Combination of one or more of the above had been tried and tested with favorable results.

While reports of successful periodontal regeneration can be found throughout the periodontal literature there can be little doubt that traditional surgical or non-surgical approaches to periodontitis do not generally lead to regeneration.⁷⁻¹⁰

Guided tissue regeneration (GTR) is based on principles of wound healing as espoused by Melcher.¹¹ He hypothesized that the cells that repopulate the periodontal wound determine the nature of attachment at the tooth-soft tissue
interface. Melcher originally felt that the progenitor cells to produce the regenerated cementum, periodontal ligament and bone are derived from periodontal ligament cells.

Besides the use of the common commercially available membranes, unusual regenerative materials have been used as a barrier in guided tissue regeneration technique in both animals and humans. Studies using silicon rubber, periosteum, connective tissue membranes as well as dura mater allografts have also been reported. More recently studies have presented the successful use of dental rubber dam in the treatment of periodontal infrabony defects. More recently Michele Paolantonio et al. (1998) carried out a clinical study to confirm the validity of dental rubber dam as a suitable material in regenerative procedures. They also compared the effectiveness of dental rubber dam-made membranes and ePTFE barrier membranes in the treatment of periodontal intra-bony defects. They found that in both test and control site, a statistically significant improvement of clinical and intra-surgical parameters occurred at the end of the study; however, a significantly greater improvement was observed in control sites for probing attachment level (+4.0 mm versus +3.0 mm; p<0.01) and vertical bone gain (3.9 mm versus 2.9 mm; p<0.05) although at the time of membrane removal, newly formed tissue from the base of the defect was similar between the experimental sites (test: 5.8 mm; control: 5.6 mm; p>0.05). Conversely, test sites exhibited a statistically significant greater increase in gingival recession (+1.9 mm versus +1.2 mm; p<0.05) and alveolar crest resorption (−1.1 mm versus −0.3 mm; p<0.01) in comparison to controls.

Keeping the above factors in view an attempt has been made to evaluate the efficacy of dental rubber dam as a barrier membrane in the treatment of infrabony defects through clinical and radiological assessment and also to assess the advantages and disadvantages of the material as a prospective occlusive membrane. Clinical parameters include the measurements such as reduction in probing pocket depth, gain in clinical attachment level, change in level of gingival margin and mobility for the group of teeth selected for the study and indices to measure the gingival status and plaque percentage of the subjects. Radiographic assessment includes reduction from baseline osseous defect depth parameters and amount of bone fill as assessed six-months post-operatively.

**MATERIALS AND METHODS**

**Patient Selection and Pre-Surgical Procedure**

Fifteen patients (eight males and seven females) aged 20-50 years diagnosed as having moderate to severe
periodontitis presented themselves to the Department of periodontology, M.R.Ambedkar Dental College and Hospital. All subjects had a minimum of one infrabony defect as diagnosed clinically and confirmed radiographically. All patients were briefed of the surgical procedure, including the material to be used and a requirement of two surgical sittings, and an informed consent was obtained.

A special Performa was used consisting of a detailed case history, clinical examination and recordings of clinical parameters at baseline, three-month and six-month interval. The clinical parameters included plaque index (Silness and Loe),2 gingival index (Loe and Silness),18 periodontal probing depth (PPD), clinical attachment level, gingival recession and tooth mobility.

Radiographic measurements consisted of Intra-oral periapical (IOPA) radiographs utilizing the long cone extension methodology.19 Radiographic assessment was made by scanning the radiographs utilizing a transmissive scanner at 1200 dpi resolution. Measurement was being made using Adobe PhotoShop 5.5™ software.

Pre-surgical periodontal treatment consisting of infection control (mechanical and chemical), supra-gingival and sub-gingival scaling, elimination of plaque retentive factors, occlusal control, elimination of caries and endodontic treatment was performed.

Inclusion Criteria
1. Subjects with moderate to advanced periodontitis as assessed by clinical and radiographic findings.
2. Subjects presenting with two-walled or three-walled infrabony defect or combination defects were included.

Exclusion Criteria
1. Subjects with known history of systemic disease/s, allergies or drug usage that would alter the healing response of the oral tissues were excluded.
2. Subjects who had undergone periodontal treatment within six months prior to the present study were excluded.
3. Sites presenting with clinical/radiographic evidence of pulpal pathosis were excluded. One defect adjacent to an endodontically treated tooth was however included.
4. Furcation involved teeth were excluded.
5. One-wall defects and narrow three-walled defects were excluded from the study.

The study sites comprised of ten posterior and five anterior teeth and all cases showed a plaque percentage lesser than 10% at the time of surgery. Amongst the patients recalled, three patients did not return for revaluation.

SURGICAL PROCEDURE

Following anesthesia, Facial and palatal/lingual full thickness envelope flaps were raised utilizing intra-sulcular incisions to maintain the maximum amount of gingival tissue for membrane coverage. The flaps were extended one tooth mesial and one tooth distal to the defect site. Alveolar bone was exposed for at least 3 mm apical to the base of the defect and periosteal fenestration was made to assure complete membrane coverage at the time of suturing. The defects were thoroughly debrided and the roots were carefully planed with ultrasonic and hand instruments.

![Pre Operative measurement in relation to 34 35](image1)

Angular bony defect seen after flap reflection and debridement on buccal and lingual aspect

The rubber dam material (cispolisoprene)1* was cut into small pieces depending on the defect area. The dental rubber dam (DRD) was previously disinfected by carefully washing with distilled water and autoclaved at 120°C. Following which it was submerged in 0.2% chlorhexidine for 12 hours, and rinsed with saline solution before use.

The rubber dam material was positioned as the same way as when teeth are isolated for restorative procedures. One hole was punched in the dam for each tooth adjacent to the defect utilizing a rubber dam punch. The dam was then stretched over the teeth, to place it as a poncho over the denuded bone.

*Hygenic™ latex dental rubber dam-medium thickness (0.008 inch/0.2 mm)
It was then adapted and reshaped once in place to eliminate the excess peripheral portions including all sharp edges. The flaps were sutured to cover the rubber dam at the maximal possible extent, avoiding any compression of the area where the infrabony defect was located. Vertical mattress sutures were placed using a non-absorbable black braided silk suture at the defect site and simple interrupted sutures were placed wherever necessary.

A periodontal dressing (Coe-Pak™) was placed and the patients were dismissed with a prescription of 1 g of tetracycline hydrochloride per day during the first post-operative week and instructed to rinse twice daily with 0.2% chlorhexidine (Hexidine™). Professional tooth cleaning was performed weekly once while the membrane was in place and monthly once following membrane removal.

Four weeks after placement, the DRD was removed after elevation of a partial thickness flap. Following de-epithelialization of the inner walls of the flaps, it was positioned and sutured to obtain the best possible coverage of the newly formed tissue. Periodontal dressing was applied and the patients were re-instructed to rinse twice daily with 0.2% chlorhexidine.

The dressing and sutures were removed after 1 week and patients were instructed to resume tooth brushing in the area and discontinue the chlorhexidine mouthwash.
CLINICAL AND RADIOGRAPHICAL MEASUREMENTS

Clinical Measurements
- Probing depth (PD)
- Attachment level (AL)
- Recession

Radiographic Measurements
A unique method was employed to radiographically determine the amount of hard tissue changes. This was assessed by initially scanning the pre- and post-operative Radiographs at 1200 dpi resolution using a Hewlett Packard transmissive scanner. These images were then imported into a graphic programming software, Adobe Photoshop 7.0™. The images were then sharpened and the contrast adjusted so as to clearly de-mark the anatomical landmarks consisting of cementoenamel junctions, alveolar crest and base of the defect. These landmarks were then marked using a colored “pen” tool.

Following this, the “scale” tool was utilized to measure the distance from the respective points. The scale determined the distance to an accuracy of 0.01 cm. To further aid in measurements an alternative of grid lines was also utilized.

The measurements made include:
- CEJ to Base of the defect (BOD)
- CEJ to Alveolar crest (AC)
- Alveolar crest to base of the defect

It should be noted here that the CEJ of the tooth that is closest was considered, i.e. the CEJ considered to measure the distance to the BOD or AC is never the same.

The percentage of bone fill was calculated using the formula:

\[ \frac{\text{CEJ} - \text{BOD (pre-op)} - \text{CEJ} - \text{BOD (post-op)}}{\text{AC} - \text{BOD (pre-op)}} \times 100 \]

All the data obtained in this study were evaluated statistically by using student’s paired t-test.

RESULTS

Fourteen patients with presence of at least one vertical osseous defect as verified by clinical and radiographic evaluation were selected for this study. Four to six weeks after basic therapy, periodontal flap operations were carried out with placement of dental rubber dam in 15 experimental sites. All membranes were removed in the fourth week. The patients were recalled at regular intervals and were followed in the range of six-nine months. All the patients participated for the entire study period. All measurements were analyzed statistically using student’s paired “t” test. Baseline and six-month complete plaque and gingival scores were less than 10% in all of the patients. The level of gingival inflammation around the membrane ranged from mild to moderate.

General Findings
There were no post-operative complications of any kind in any of the patients. The rubber dam did not cause any objectively recorded adverse effects and none of
Clinical Assessment

Probing Pocket Depth and Attachment Gain

A significant reduction was observed in the probing pocket depth. The mean probing depth before surgery was 6.8±1.26 mm and six-month post-operative measurement was 2.4±0.90 mm. This was found to be statistically highly significant (p<0.001).

A highly significant gain in attachment level was also recorded (p<0.001). The mean attachment loss prior to surgery was 6.8±1.26 mm and six-month post-operative measurements showed an attachment loss of 3.93±1.03 mm.

Gingival Recession

Twelve of the fifteen subjects showed a significant shrinkage in the gingival margin, which was the most important and undesirable finding. While none of the sites showed recession pre-operatively, a mean average recession encountered at the end of the study period was 1.53±0.12 mm.

Radiographic Assessment

Bone-Fill

The sites that were treated with the barrier membrane showed a significant amount of bone fill. The mean distance from cementoenamel junction to base of defect prior to study was 10.49±2.72 mm and at six months there was a reduction to 9.33±2.72 mm. This was statistically significant. Some amount of resorption of alveolar crest was recorded at the end of study. A mean of 4.54±1.36 mm resolved to a height of 4.75±1.54 mm. The overall percentage of bone fill was 16 %, which was statistically significant.

DISCUSSION

Ever since Melcher\textsuperscript{11} formulated the hypothesis suggesting that selected cell population residing in the periodontium can produce new cementum, alveolar bone and periodontal ligament provided that these population are given an opportunity to occupy a periodontal wound a number of devices have been used to achieve this concept of GTR. Starting from a Millipore filter different types of barrier membranes both non-absorbable and absorbable have been used in periodontal therapy with different degree of success.

For a device to be effective it has to meet certain criteria based on organ and tissue properties and specific goals. These include bio-compatibility, cell exclusion, space maintenance, tissue interaction, ease of use and biological availability. Further, such a device must be cost effective.

Considering the above requisites many unusual materials have been tried as barrier membranes. One of which is dental rubber dam (DRD). The spectacular success reported in a couple of studies prompted its use in this study.

The results from this study shows that DRD used as a barrier membrane in guided tissue regeneration produces a significant reduction in probing depth, gain in clinical attachment level (CAL), and bone fill. In the present study a mean attachment gain of +2.9 mm and an average bone gain of +0.94 mm was recorded.

However, spectacular changes in the radiographs were probably not seen because of duration of short post-operative observation. More perceptible radiographic changes would perhaps become evident if these cases are observed for a longer duration of time.

Notwithstanding the significant gains in reduction of periodontal probing depth (PPD), gain in CAL and other clinical features, the use of DRD in this study resulted in changes, which could seriously limit the use of this material.

12 out of 15 defects treated developed post-operative gingival recession. Although many previous studies using ePTFE have reported gingival recession (GR) following the use of barrier membrane, this is nevertheless unwelcome sequelae. Some of the clinicians have tried coronal repositioning of the flap but some degree of GR always occurred.

Secondly, the exposure of the DRD starting from the second post-operative week despite maximum effort to approximate the flaps with sound suturing technique is of concern to the clinician. In every study using DRD as a barrier membrane, interproximal exposure of the dam has been reported including the present study. Although, this did not result in any infection, what effect such as exposure of the material had on the final outcome of the treatment is difficult to assess.\textsuperscript{10,20,21}

Perforation of the tissue with subsequent exposure of the dam seen in two cases of the study is an avoidable complication. This might have been probably because of sharp edges and folding of the DRD and might have
been prevented if the edges of the dam was sutured to the periosteum.

Because of GR seen at the time of removal of DRD there was always a chance of incomplete coverage of the newly formed granulation tissue, which is very vital for ensuring periodontal regeneration. In one study efforts were made to re-suture the flaps in order to protect the newly formed granulation tissue. All these procedures might place additional stress on the patient.

The lack of connective tissue integration into the membrane because of the smooth and non-porous nature of the DRD resulted in inadequate stabilization of the membrane and consequently made maintenance more demanding as it resulted in not only earlier exposure of the membrane but also enhanced epithelium migration down the inner aspect of the mucogingival flap compared with the other materials.

The limitation cited above not withstanding the DRD as a barrier membrane demonstrated important desirable characteristics. Its tight fitting and adherence to the root circumference along with its ability to be placed at a more coronal level compared to other ePTFE membrane could result in greater amount of newly formed tissue. Further, its ability to adapt to complex root morphology such as concavities is a distinct advantage.

Bacterial aggregation on the membranes has been mentioned as a major disadvantage in many studies prompting some clinicians resorting to use the use of local drug delivery systems to combat the same. However, this problem may not be seen in DRD as little bacterial aggregation can occur on the DRD due to its non-porous surface. Also, the dam protected the regenerative space from infiltration by epithelial cells as well as influences of saliva and bacterial and their byproducts.

The ability of the DRD to treat multiple adjacent infrabony defects simultaneously is a distinct advantage over other materials.

That there was no tissue reaction whatsoever in any of the cases shows the excellent bio-compatibility of the material which is a major advantage.

Most of the commercially available barrier membranes for guided tissue regeneration therapy in India are very expensive and therefore beyond the reach of most of the patients. The low price of DRD is certainly a major positive and desirable factor in the periodontal treatment of patients belonging to the economically poorer section of the society.

Many of the previous studies have used re-entry at the end of one year to assess the clinical outcome. However, since the patients had already undergone two surgical procedures during the duration of this study, a third surgery in the form of re-entry was not considered, instead a new innovative radiographic method of estimation to evaluate the changes in the bone was employed. However, variations in the degree of exposure, developing and fixing of the radiographs might have contributed to variations in the interpretation of the results.

Microbiological assessments also need to be looked into in future studies. Further follow up over a long period of time will throw more light on the efficacy and maintainability of these procedures.

One of the problems encountered with DRD is its lack of rigidity. If the same material can be reinforced to make it a little more rigid, possible collapse of the membrane into the defects could be prevented. Further, if the cervical portion is made tissue adherent this might result in better tissue adaptation and also might prevent recession. Further studies can look into these factors.

CONCLUSION

It can be concluded that dental Rubber dam is a barrier membrane with great potential in treatment of periodontal osseous defects provided the limitations brought to light in this study are addressed in the future. At present it can only be recommended for the treatment of osseous defects in the posterior teeth aesthetics is not a prime concern.

REFERENCES


**Source of Support:** Nil, **Conflict of Interest:** None declared.
Dental CT versus Radiography in the Detection of Vertical Root Fractures

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Abstract

Aims & Objectives: To compare the findings of Radiography and Computed Tomography (CT) in the diagnosis of vertical root fractures and to correlate our findings post operatively.

Material and Methods: We evaluated 22 cases of clinically suspected vertical root fractures those who were referred to us for Dental CT and compared findings of Radiography and CT. Radiography was carried out in the Oral Radiology department and Dental CT was carried out using Philips Brilliance multislice CT scanner. The findings of Radiography and CT were then compared by two experienced radiologists independently. All patients were confirmed intraoperatively.

Results: The sensitivity of Radiography for detection of vertical root fracture was 27% for reviewer I and 25% for Reviewer II. The specificity of Radiography for detection of vertical root fracture was 100% for both the reviewers. The sensitivity of CT for detection of vertical root fracture was 93% for reviewer I and 95% for Reviewer II. The specificity of CT for detection of vertical root fracture was 94% for Reviewer I and 100% for Reviewer II.

Conclusion: In conclusion, CT is an indispensable tool for the detection of vertical root fractures and scores far better over Radiography.

Keywords: Vertical root fractures, Dental CT, Dentascan

INTRODUCTION

Vertical root fractures are longitudinally oriented fractures of the root which usually involve endodontically treated teeth. They extend from the root canal to the periodontium. The fracture can involve the entire length of the root or only a part of it. It may affect only one or both sides of the root. Their diagnosis is very challenging since they have very diverse clinical features and they are often missed on Radiography.1 There are a number of radiological features like separation of root fragments, visualization of a lucent fracture line, clear space near a root filling or post, bone loss or dislodgement of filling material. Since a vertical root fracture necessitates extraction of the tooth, it would be better to find a more efficient and reliable means of establishing the diagnosis preoperatively so that prosthetic rehabilitation may be initiated and the cost and effort of an ineffective apical root resection may be avoided.2 Dental CT has proved time and again to be an indispensable tool in the diagnosis of vertical root fractures. The basic purpose of this study was to compare Radiography with Dental CT for diagnosis of vertical root fractures.

MATERIAL AND METHOD

We evaluated 22 cases of clinically suspected vertical root fractures those who were referred to us for Dental CT and compared findings of Radiography and CT. Informed consent was obtained from all the patients. Radiography was carried out in the Oral Radiology department and Dental CT was carried out using Philips Brilliance multislice CT scanner. Reconstructions were performed using the Dentascan software at the Extended workstation. We first drew a planning line along the arch of the jaw and then panoramic and cross sectional reconstructions were...
done. All the images were then evaluated including axial, coronal, sagittal, panoramic and cross sectional views. The findings of Radiography and CT were then compared by two experienced radiologists independently. All patients were confirmed intraoperatively. The signs of fracture on Radiography were separation of root fragments, visualization of a lucent fracture line, clear space near a root filling or post, bone loss or dislodgement of filling material. CT findings of a root fracture were characterized by a separation of the adjacent root segments or the demonstration of a hypodense fracture line.

**OBSERVATIONS AND RESULTS**

15 out of the 22 clinically suspected were found intraoperatively to have a fracture. Two experienced radiologists evaluated the images independently for vertical root fracture. On Radiography evidence of a fracture was indicated by direct visualization of a radiolucent line, separation of root fragments, clear space near a root filling or post, bone loss or dislodgement of filling material. CT findings of a root fracture were a linear hypodense line traversing the root of the tooth vertically or separation of adjacent root segments. The sensitivity and specificity of dental radiography and CT were then determined separately for each reviewer.

On Radiography, Reviewer I correctly diagnosed fracture in 4 of the 15 teeth. Diagnoses were false negative in 11 cases. All 7 cases without fracture were diagnosed correctly hence there were no false-positive results. The sensitivity was 27% and the specificity was 100%. The sensitivity and specificity for Reviewer II was 25% and 100%.

On Dental CT Reviewer I diagnosed 14 of the 15 fractures correctly. There was 1 false-negative case. There were 6 correct negative diagnoses and no false-positive results. The sensitivity and specificity of reviewer I was 93% and 100%, respectively. The sensitivity and specificity for Reviewer II was 95% and 100%. The average sensitivity and specificity of Dental CT were 94% and 100%, respectively (Figure 1a & 1b).

**DISCUSSION**

Patients present with pain, tenderness and local swelling after endodontic treatment. There are only a limited number of reports in the radiology literature that deal with the problem of dental vertical root fractures. These fractures are clinically very challenging. Horizontal root fractures are typically of traumatic origin and are relatively simple to diagnose. Vertical root fractures are usually iatrogenic and often follow endodontic treatment. They occur in vital teeth with an intact pulp as a result of conservative restorations (filling restoration such as amalgam filling) or in endodontically treated teeth (pulp-extracted teeth with root fillings that are consequently not vital) as a result of excessive pressure used during endodontic treatment. They can also be caused during dental filling or placement of a post. Detection of a vertical root fracture is of clinical importance since it necessitates extraction of the tooth. Clinical signs of the fracture develop slowly and are usually not apparent until 1 or 2 years after injury.

In our study, the sensitivity of Radiography for detection of vertical root fracture was 27% for reviewer I and 25% for Reviewer II. The specificity of Radiography for detection of vertical root fracture was 100% for both the reviewers.

The sensitivity of CT for detection of vertical root fracture was 93% for reviewer I and 95% for Reviewer II. The specificity of CT for detection of vertical root fracture was 94% for Reviewer I and 100% for Reviewer II.

In a study conducted by Soraya Youssefzadeh et al who studied 42 teeth showed CT was 100% sensitive and specific for diagnosing vertical root fracture.
Radiographic signs are usually absent as the orientation of X-ray beam may not be parallel to the plane of fracture. Superimposition also limits its sensitivity for detection of longitudinal fracture.

CONCLUSION

In conclusion, vertical root fractures are a very difficult diagnostic challenge because the clinical signs and symptoms are highly variable and Radiography is also very unreliable. There is no single pathognomonic clinical or radiographic feature. However, though CT is an indispensable tool for the detection of vertical root fractures and scores far better over Radiography, it would only be indicated in difficult where Radiography is negative despite clinical suspicion due to the high radiation dose as compared to Radiography.

REFERENCES


Source of Support: Nil, Conflict of Interest: None declared.
Knowledge and Attitude of School Teachers Towards Tooth Avulsion in Rural and Urban Areas

Abstract

Introduction: School teachers are most likely to be in the vicinity of the child at the time of the injury in the school. Thus they should be well prepared to intervene when such dental emergencies arise.

Purpose: The purpose of this study was to assess the knowledge and attitude regarding tooth avulsion and dental first aid among school teachers in Chandigarh (urban area) and Barwala (rural area).

Material & Methods: The study was performed by administering a self-designed questionnaire on a sample of 50 school teachers of Chandigarh and 50 school teachers of Barwala.

Results: Results showed poor knowledge in the management of avulsed teeth among the school teachers of both Chandigarh and Barwala.

Conclusion: School teachers, being one of the child managers, need to have the basic knowledge to recognize and manage oral emergencies avulsed teeth to prevent its consequences in the child’s development.

Keywords: Child managers, Dental emergencies, Knowledge, School teachers, Tooth avulsion

INTRODUCTION

Dental trauma involves injuries to the tooth, periodontium and supporting alveolar bone. Traumatic dental injuries can have a significant impact on the life of children, affecting them both emotionally and physically. Dental injuries may cause intrusion, extrusion, avulsion, luxation and subluxation of the tooth. Every year a large number of dental injuries are reported especially among children belonging to 7-15 year age group. Studies show that males are injured twice as often as females. The most commonly traumatised tooth is the maxillary central incisor.

In children, sports were found to be responsible for 13% of overall oral traumas. Tooth avulsion is a result of trauma in which a tooth comes out of the socket. It comprises 0.5 to 16% of all traumatic dental injuries. Tooth avulsion leads to disintegration of pulp and periodontal ligament. This is due to the effects of a lack of blood supply to the cells and environmental factors (example: drying or bacterial contamination).

Successful replantation of an avulsed tooth depends solely on extraoral drying time and the storage medium of the avulsed tooth. Clinical outcome studies have demonstrated that the immediate replantation of avulsed tooth is essential for regeneration of periodontal ligament after replantation.

People most likely to be in contact with the child at the time of the injury in school are school professionals, thus their knowledge of emergency procedure is important for the better prognosis of the injured tooth. This study was aimed to assess the knowledge and attitude regarding tooth avulsion and dental first aid among school teachers in rural and urban areas.
MATERIALS AND METHODS

The study was conducted among 50 school teachers of Chandigarh (urban area) and 50 school teachers of Barwala (rural area). Permission for the study was obtained from the concerned authorities. The objectives of the study were explained to all the school teachers who participated in the study and also a written informed consent was obtained from all teachers. A self-designed questionnaire containing demographic details and specially framed 9 questions in English language were administered to the teachers. The respondents were then asked to tick the most appropriate answer from the given list of answers. Filled questionnaire were collected on the same day. Information regarding the tooth avulsion and its emergency management, as a health talk was given in both English and local language in order to improve the awareness among school teachers. Data collected was statistically analyzed, subjected to chi-square test and represented in the form of tables.

RESULTS

The results showed that when teachers were asked about knocked-out tooth 25 (50%) teachers in urban area knew what it meant as compared to 33 (66%) teachers in rural area (Table 1).

<table>
<thead>
<tr>
<th>Options</th>
<th>Urban area (Chandigarh)</th>
<th>Rural area (Barwala)</th>
<th>P-value (≤ 0.05)</th>
</tr>
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<tbody>
<tr>
<td>Yes</td>
<td>25 (50%)</td>
<td>33 (66%)</td>
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</tr>
<tr>
<td>No</td>
<td>25 (50%)</td>
<td>17 (34%)</td>
<td></td>
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</tbody>
</table>

Regarding question of information on tooth replantation, 34 (68%) teachers knew what tooth replantation is in urban area, while 16 (32%) teachers in rural area were aware of the same (Table 2).

<table>
<thead>
<tr>
<th>Options</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>34 (68%)</td>
<td>16 (32%)</td>
<td>0.0003</td>
</tr>
<tr>
<td>No</td>
<td>16 (32%)</td>
<td>34 (68%)</td>
<td></td>
</tr>
</tbody>
</table>

When teachers were asked what should be done if knocked out tooth falls on the ground, in urban area 22 (44%) teachers knew what should be done as compared to 13 (26%) teachers in rural area (Table 3).

<table>
<thead>
<tr>
<th>Options</th>
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<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>22 (44%)</td>
<td>13 (26%)</td>
<td>0.059</td>
</tr>
<tr>
<td>No</td>
<td>28 (56%)</td>
<td>37 (74%)</td>
<td></td>
</tr>
</tbody>
</table>

Knowledge of teachers about placement of tooth back into its socket showed that 27 (54%) urban school teachers answered ‘yes’, while 32 (64%) teachers in rural area gave this answer (Table 4).

<table>
<thead>
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<th>Options</th>
<th>Urban area (Chandigarh)</th>
<th>Rural area (Barwala)</th>
<th>P-value</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>27 (54%)</td>
<td>32 (64%)</td>
<td>0.310</td>
</tr>
<tr>
<td>No</td>
<td>23 (46%)</td>
<td>18 (36%)</td>
<td></td>
</tr>
</tbody>
</table>

Information of teachers on ideal time within which avulsed tooth should be replanted showed that the number of teachers not aware about this was 18 (36%) in urban area and 30 (60%) in rural area, in urban area 15 (30%) teachers in and 17 (34%) in rural area answered that the optimum time is within 24 hours, 6 hours was the right answer for 5 (10%) teachers in urban area and 1 (2%) in rural area, 2 (4%) teacher in urban area said 5 and 30 min (Table 5).

<table>
<thead>
<tr>
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<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 min</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0.495</td>
</tr>
<tr>
<td>30 min</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>1 hour</td>
<td>3 (6%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>6 hour</td>
<td>5 (10%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>24 hour</td>
<td>15 (30%)</td>
<td>17 (34%)</td>
<td></td>
</tr>
<tr>
<td>72 hour</td>
<td>7 (14%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>18 (36%)</td>
<td>30 (60%)</td>
<td></td>
</tr>
</tbody>
</table>

When the teachers were asked about their knowledge on handling and cleaning of the avulsed tooth, the number of teachers who were unaware of this procedure was 14 (28%) in urban area and 19 (38%) in rural area, 9 (18%) teachers in urban area and 6 (12%) in rural area suggested that the tooth should not be kept or washed, milk was chosen by 1 (2%) teacher in rural area, 7 (14%) teachers in urban area and 16 (32%) in rural area answered washing it in the tap water, in urban area 9 (18%) teachers gave their opinion to brush the roots and crown (Table 6).

<table>
<thead>
<tr>
<th>Options</th>
<th>Urban area (Chandigarh)</th>
<th>Rural area (Barwala)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 min</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0.495</td>
</tr>
<tr>
<td>30 min</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>1 hour</td>
<td>3 (6%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>6 hour</td>
<td>5 (10%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>24 hour</td>
<td>15 (30%)</td>
<td>17 (34%)</td>
<td></td>
</tr>
<tr>
<td>72 hour</td>
<td>7 (14%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>18 (36%)</td>
<td>30 (60%)</td>
<td></td>
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</table>
Table 6: If the tooth falls on the ground and gets dirty, what should you do? (Question 6)

<table>
<thead>
<tr>
<th>Options</th>
<th>Urban area (Chandigarh)</th>
<th>Rural area (Barwala)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brush crown and root</td>
<td>9 (18%)</td>
<td>0 (0%)</td>
<td>0.032</td>
</tr>
<tr>
<td>Wash with tap water</td>
<td>7 (14%)</td>
<td>16 (32%)</td>
<td></td>
</tr>
<tr>
<td>Wash with milk</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Wash with saline</td>
<td>11 (22%)</td>
<td>8 (16%)</td>
<td></td>
</tr>
<tr>
<td>Do not wash</td>
<td>9 (18%)</td>
<td>6 (12%)</td>
<td></td>
</tr>
<tr>
<td>I do not know</td>
<td>14 (28%)</td>
<td>19 (38%)</td>
<td></td>
</tr>
</tbody>
</table>

The answer to the question on any prior information received by the teachers on this subject, 50 (100%) teachers in both rural and urban area had not received any information regarding the management of avulsed tooth (Table 9).

Table 9: Have you ever received any kind of information on management of knocked-out tooth? (Question 9)

<table>
<thead>
<tr>
<th>Options</th>
<th>Urban area (Chandigarh)</th>
<th>Rural area (Barwala)</th>
</tr>
</thead>
<tbody>
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<td>Yes</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>No</td>
<td>50 (100%)</td>
<td>50 (100%)</td>
</tr>
</tbody>
</table>

DISCUSSION

The results of the study showed insufficient knowledge regarding tooth avulsion and its first aid treatment among school teachers of Chandigarh (urban area) and Barwala (rural area), these results were comparable with previous similar studies. In present study, many teachers in both rural and urban area did not know what was knocked-out tooth or tooth replantation. This is very surprising, since tooth avulsion occurs commonly in school children between 7 and 11 years old. However, the teachers themselves cannot be blamed for, since hardly any campaigning or exposure regarding tooth avulsion had been done in Chandigarh or Barwala.

Successful prognosis for avulsed tooth depends on immediate replantation with minimal further damage to cells of the root surfaces. In this study, 32 (64%) teachers in rural areas were aware that the avulsed tooth can be placed back into its socket while 27 (54%) of them were aware of this in urban areas. However, in a study conducted by Hamilton et al only 10.7% of the respondents knew that the knocked-out tooth can be replaced back into its socket but they feared being sued for replanting the tooth incorrectly.

Time is one of the important factor for avulsed tooth to preserve their vitality after replantation. Two teacher in urban area answered that tooth should be replanted within 5 and 30 minutes while none in rural area answered correctly. This result could be attributed to lack of knowledge and information regarding management of tooth avulsion.

In most of tooth avulsion cases, the avulsed tooth would fall on the ground and get dirty. The knowledge to clean a dirty avulsed tooth is also very important. In the present study, 25 teachers in rural areas responded that they would clean the tooth in saline water, milk or tap water as compared to 18 teachers in urban areas. However, nine teachers in urban area reported that they will brush the tooth root and crown unaware that they would severely decrease the chance of successful replantation. Similar
response was obtained in a study conducted by Hamilton et al, where 2.2% respondents wanted to scrub the tooth prior to replantation while only 8% washed it with milk.17

On review of literature, the appropriate storage media to permit periodontal and pulpal healing are milk, saline water and saliva.16 6 teachers in urban areas opted for these as compared to 5 teachers in rural areas. 15 teachers in urban area and 4 teachers in rural areas chose cotton rolls. In contrast, in another study teachers of Porto Rico statistically had more correct answer for transportation media for avulsed tooth.16

Regarding procedures to be followed in case of tooth avulsion, 48 (96%) teachers in rural areas would take the child to the dentist nearby as compared to 33 (66%) teachers in rural areas. No teachers in rural or urban area were given any information on management of knocked-out tooth.

**CONCLUSION**

This study concluded that, school teachers of both rural and urban area had insufficient information about the management of knocked out tooth. Due to lack of their knowledge on this subject, they are incapable to handle the avulsed tooth. Hence, school teachers should be given appropriate information to handle the child and the tooth during various dental emergencies and this can be accomplished by conducting school educational programmes for teachers and other child supervisors.

**ACKNOWLEDGEMENT**

I would like to thank Dr. Deepak Bansal and Dr. Shreen for providing me with this opportunity and monitoring me and guiding me through every phase of this research.

**REFERENCES**


**Source of Support:** Nil, **Conflict of Interest:** None declared.
Efficacy of Azithromycin Pulse Therapy in Acne Vulgaris Treatment: A Hospital Based Study

Sanjeev Sharma, Priyank Kumar1, Sanjay Banjare2, S K Jain3

Abstract

Background: Acne vulgaris or simply (acne) is a common dermatological problem. Acne most commonly seen in adolescence age, caused by increased androgens in both sexes. It is caused due to Propionibacterium acnes. In spite of many range of antibiotics available Azithromycin is one of the antibiotics that has been recently prescribe for treatment of acne which is as effective as doxycycline and minocycline. This study is undertaken to see the efficacy of Azithromycin in treatment of acne vulgaris.

Methods: This study is performed on 200 patients (100 male & 100 females) in Teerthankar Mahaveer Medical College and Hospital Moradabad, using special grading system GAGS. The exclusion criteria for the study were pregnancy, a history of macrolide sensitization and retinoid therapy.

Results: Grade I patient showed effect of 80%. Grade II 90% recovery. Grade III is also effective as a 90% recovery, but Grade 4 were not much effective only 40% recovered.

Conclusion: This study showed that azithromycin has greatest advantage over other systemic antibacterials in acne because it is long acting drug and can be used in single dose three times weekly.

Keywords: Acne vulgaris, GAGS & Propionibacterium acnes

INTRODUCTION

Acne vulgaris is a common inflammatory disorder of the Pilosebaceous follicles. It is a multi-factorial disease and its patho-physiology centers on the interplay of follicular hyper-keratinization, colonization with Propionibacterium acnes (PA), increased sebum production, and inflammation.

This disease has a high prevalence, occurring mainly in adolescence. Although the peak of prevalence is around the 17th year of life, acne lesions can appear earlier and are not uncommonly observed in the age group ranging from 12 to 14 years, in which the condition is under reported.

Antibiotic therapy has long been found useful in the management of moderate-to-severe acne vulgaris. Mechanisms of action include suppressing growth of PA, reducing the production of inflammatory mediators, and acting in immune modulation.

Commonly prescribed antibiotics include tetracyclines, doxycycline, minocycline, lymecycline and erythromycin. Azithromycin is one of the antibiotics that has been recently prescribe for treatment of acne which is at least as effective as doxycycline and minocycline.

Azithromycin is a nitrogen-containing macrolide antibacterial agent and a methyl derivative of erythromycin with actions and uses similar to those of erythromycin. Its extensive distribution in the tissues allows pulse-dose regimen recommendation for increased compliance.

MATERIAL & METHOD

The primary focus of this open-label non-comparative therapeutic study was to assess the efficacy of 500 mg of azithromycin thrice weekly (once on every other
day) for 8 weeks in the treatment of Acne vulgaris in TMU patients. This study enrolled 200 patients from the outpatient dermatology clinic at Teerthankar Mahaveer hospital during the period from December 2012 to December 2013. Patients were examined by dermatologists and an assessment was made, including a full count of acne lesions, we used special grading system of GAGS. The lesions were counted at the beginning of the treatment and at weeks. The difference between the number of lesions observed at baseline and the number seen in subsequent examinations was used to evaluate the efficacy of therapy. At every check-up we assessed the clinical response to azithromycin, any adverse events, and patient tolerance. The exclusion criteria were pregnancy, a history of macrolide sensitization and retinoid therapy. Patients with relapsing acne previously treated with antimicrobials such as doxycycline, minocycline, and erythromycin were eligible to be enrolled in the study after a six-month wash-out period. No topical therapy was associated. Patients were advised not to undergo any beauty procedures, such as chemical peels, bleaches during the study period. All patients were also evaluated at 2 months, post-treatment follow-up visit. 200 hundred patients 100 male and 100 female 17-25 yrs of age and with mild to severe acne (score of acne 19-38), in the Global Acne Grading System (GAGS), were included in the study. Every patient was being exact physical examination and graded by GAGS. In GAGS: Acne patients were assigned into 4 grades.

- Mild = 1-18 Score
- Moderate = 19-30 Score
- Severe = 31-38 Score
- Very Severe >39 Score

In this study patients were excluded if: Global acne score was greater than 39 or lower than 19. Concomitant use of anti-androgenic drugs Isotretinoin use in the last six months Participants were awarded and investigators got written informed consent from them. After that, they were allocated to four groups as a grading system. We prescribed Azithromycin in these groups as follow:

- Grade I: 500 mg Azithromycin as initial dose followed by 500 mg weekly pulse doses for 8 week.
- Grade II: 500 mg Azithromycin as initial dose followed by 500 mg weekly pulse doses for 8 week.
- Grade III: 500 mg Azithromycin as initial dose followed by 500 mg weekly pulse doses for 8 week.
- Grade IV: 500 mg Azithromycin as initial dose followed by 500 mg weekly pulse doses for 8 week.

We followed patients over a 08-week period and visited them monthly. At each visit, acne lesions were assessed by blinded dermatologist to treatment protocols and GAGS was used to evaluate the response of patients to treatment. The patient visits were done at the end of first, second and third month.

### RESULTS

At this open therapeutic trial 200 patients were enrolled (100 males, 100 females) all of them were teenagers and adolescents (ages 17-50 years) with moderate-sever papulo-pustular acne. Grade I patient were achieved good excellence effect 80%. Grade II is also effective as 90% recovery. Grade III is also effective as a 90% recovery. But Grade 4 were not much effective only 40% recovered. And around over all total efficacy of the Azithromycin was 75% for treatment of acne vulgaris.

### Table 1: Grading of acne vulgaris using visual analogue scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1 (Mild)</td>
<td>1-18</td>
<td>Microcomedone</td>
</tr>
<tr>
<td>Grade 2 (Moderate)</td>
<td>19-30</td>
<td>Comedone</td>
</tr>
<tr>
<td>Grade 3 (Severe)</td>
<td>31-38</td>
<td>Inflammatory Papule/Pustule</td>
</tr>
<tr>
<td>Grade 4 (Very-severe)</td>
<td>&gt;38</td>
<td>Nodule Nodulo-Cystic</td>
</tr>
</tbody>
</table>

### Table 2: Evaluation of efficacy of therapy

<table>
<thead>
<tr>
<th>Grade of Response</th>
<th>% of Reduction of Acne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I</td>
<td>Up to 80%</td>
</tr>
<tr>
<td>Grade II</td>
<td>Up to 90%</td>
</tr>
<tr>
<td>Grade III</td>
<td>Up to 90%</td>
</tr>
<tr>
<td>Grade IV</td>
<td>Up to 40%</td>
</tr>
</tbody>
</table>

### Table 3: Over all distribution of all acne patients (%)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Male</th>
<th>Female</th>
<th>Recovered Patient</th>
<th>Total % of Recovered Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>15</td>
<td>35</td>
<td>40</td>
<td>80%</td>
</tr>
<tr>
<td>Grade 2</td>
<td>35</td>
<td>15</td>
<td>45</td>
<td>90%</td>
</tr>
<tr>
<td>Grade 3</td>
<td>20</td>
<td>30</td>
<td>45</td>
<td>90%</td>
</tr>
<tr>
<td>Grade 4</td>
<td>30</td>
<td>20</td>
<td>20</td>
<td>40%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>150</td>
<td>75%</td>
</tr>
</tbody>
</table>

Figure 1: The efficacy of Azithromycin pulse therapy in acne vulgaris treatment
DISCUSSION

Acne is multifactorial disease primarily of teenagers with follicular plugging and inflammation. It is the most common skin disease; affecting almost every individual during puberty.\textsuperscript{3,10,11}

Despite the initially high default (expected in our community and circumstances, and this could be partially explained by the delayed response of acne lesions), the response rate and compliance of our patients was encouraging. But the compliance was much improved in those who continued treatment and noticed a desirable response. Also the easy dosing schedule and the higher tolerability of the drug contributed to this compliance. The use of mobile phone for communication had helped us greatly in follow up and to encourage patients continue treatment. The side effects reported were few (gastric upset, abdominal pain, diarrhea and headache) and fortunately, no serious reaction reported. Our patients achieved over all response (75%). Federico who reported a good-excellent response of 90.4% after 4 weeks of therapy\textsuperscript{8} and slightly higher than Singhi\textsuperscript{12} who reported a response of 70.25%. Gruber et al\textsuperscript{13} compared azithromycin with minocycline and observed a satisfactory clinical response (70-75%) with both the drugs. These findings suggest that azithromycin is a better alternative in patients with moderate to severe acne and has no serious side effects. This study showed that azithromycin has greatest advantage over other systemic antibacterials in acne because it is long acting drug and can be used in single dose three times weekly, no other acne drug has this property. Another advantage is the relatively long disease-free period after discontinuation of therapy which may be explained by the fact that azithromycin persists in tissues for long period.\textsuperscript{11,12} The drawback of this study is that it is open-labeled non comparative, but it threw alight to the tolerability, efficacy and safety of this drug in acne, since till now it is not so widely used in India and we expect the chance of Propionibacterium acnes resistance to be much lower than to other systemic antibacterials used for acne. The stability of azithromycin in gastric acid may be responsible for the low incidence of gastrointestinal disturbances which is very troublesome in the tetracyclines. Photosensitivity not reported in any patient, though we used the drug during summer season. This is another advantage of azithromycin over other antibacterials used in acne. Proper patient selection is mandatory as patients with inflammatory acne responded better than those with comedonal acne because the mode of action of azithromycin is mainly antibacterial and anti-inflammatory, but not keratolytic. Further studies are required to identify the optimum dose and duration of therapy and to compare the efficacy of the drug with other systemic antibacterials.

CONCLUSION

This study showed that azithromycin has greatest advantage over other systemic antibacterials in acne vulgaris because it is long acting drug and can be used in single dose three times weekly, no other acne drug has this property and its persistence in tissues is more as compared to other antibiotics.

REFERENCES

Relationships between Serum 25-Hydroxy Vitamin D Levels and Plasma Glucose and Lipid Levels in Pediatric Patients in a Rural Hospital

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INTRODUCTION

The discovery of the critical roles of Vitamin D for overall health is a fascinating story in the history of medicine. First are its osseous effects and the association to rickets. Then came the discovery of its anti-infective role, from the breakthrough by Niels Finson, earning him a Nobel prize in 1903 for the use of a form of ‘concentrated light radiation’ to treat tuberculosis skin lesions, through the sanatoriums built to treat the patients with sunbathing, until the discovery of cathelicidin- an antimicrobial peptide, regulated by vitamin D, that serves a critical role in mammalian innate immune defense against invasive bacterial infection.1

Over the last two decades, understanding of vitamin D synthesis and its function has changed remarkably. With its plethora of biological effects on diverse tissues, vitamin D sustains health throughout the body. It is now believed that vitamin D can protect against multiple sclerosis, type 1 diabetes mellitus and cancer. Among adults low levels of vitamin D have been shown to be associated with increased risks of obesity, hypertension, glucose intolerance, type 2 diabetes mellitus and cardiovascular disease.2

In the last 3 decades, there has been a dramatic increase in the prevalence of both childhood obesity and metabolic syndrome, which includes high plasma glucose and low high-density lipoprotein cholesterol (HDL) levels. Because...
this profile may predispose children to cardiovascular disease later in life, the identification of modifiable risk factors for metabolic syndrome is crucial in the pediatric age group.³

Hypovitaminosis D is now being identified as a prevalent health problem in both adults and children not only in countries with low UV exposure but also in countries close to the equator. Accordingly, vitamin D supplementation could potentially be beneficial to billions of people, but still, hard evidence is lacking especially in Indian children.

There is a relation between the serum 25(OH) D levels and diseases like cancer, cardiovascular diseases and skeletal growth. After supplementation of vitamin D recovery of above said diseases are good.

AIMS AND OBJECTIVES OF STUDY

To study the prevalence of vitamin D deficiency in children and to know whether it has any relation with the age, sex and body mass index (BMI) and to study relationships between serum vitamin D levels and plasma glucose and lipid levels.

Establishment of a significant relationship helps in the prediction of metabolic syndrome and other cardiovascular complications in future and gives an idea about various measures we can take to prevent or treat it.

MATERIALS AND METHODS

Source of Data
The study was a prospective study conducted in pediatric patients both out-patients as well as in-patients in Sri Adichunchanagiri Institute of Medical Sciences and Hospital, (AIMS) B.G.Nagara for the period of 1 year starting from December 2011 to November 2012.

Method of Collection of Data
The data was collected from patients and the following investigations were done:

• Serum vitamin D
• Fasting plasma glucose
• Serum lipid profile.

Inclusion Criteria
• Age between 2 years to 18 years.
• Both out-patients as well as in-patients of Sri Adichunchanagiri Institute of Medical Sciences, B.G.Nagara.
• Patients with symptoms like chronic pain, fatigue, poor growth, bone health concerns and obesity.

Exclusion Criteria
• Age <2 years and >18 years
• Those who are seriously ill
• Hepatic or renal disease
• Metabolic rickets
• Type 1 or 2 diabetes mellitus
• Malabsorptive disorders (inflammatory bowel disease, cystic fibrosis and celiac disease)
• Hyperparathyroidism and hypoparathyroidism
• Earlier kidney, liver or renal transplant
• Malignancy
• Ongoing use of anticonvulsant medications or systemic glucocorticoids
• Congenital heart disease
• Genetic disorders.

Data were collected for patients, including age, sex, height, weight, co-morbidities, and the primary indication for ordering 25 (OH) D levels. Age and sex-specific body mass index (BMI) percentiles were determined with the Agarwal growth charts for Indian children as recommended by the IAP.⁴ Vitamin D levels are graded as severe deficiency, deficiency, sufficiency and toxicity as per guidelines.⁵ Lipid profile values are analyzed by the suggested cut off values as per lipid profile norms in Indian children.⁶

Laboratory Methods
25(OH)D assays were done by the Elecsys 2010 and Cobas e411 immunoassay analyzers by the technique of Electrochemiluminescence Immuno assay. Measuring range was 3.00–70.0 ng/mL or 7.50–175 nmol/L (defined by the limit of detection and the maximum of the master curve). Values below the limit of detection are reported as <3.00 ng/mL (<7.50 nmol/L). Values above the measuring range are reported as >70.0 ng/mL (>175 nmol/L) Each parameter in lipid profile was estimated by the COBAS INTEGRA 2nd generation cassette which contains an in vitro diagnostic reagent system for the quantitative determination of total cholesterol, HDL, LDL, VLDL and triglycerides in serum and plasma by using the principle enzymatic colorimetric method. Quantitative determination of blood glucose was done on COBAS INTEGRA SYSTEMS by using the principle of enzymatic reference method with hexokinase.

Statistical Methods
Analysis of variance (ANOVA) has been used to find the significance of study parameters between three or more groups of patients, Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Chi-square/Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or
Shivaprakash and Joseph: Serum 25-Hydroxy Vitamin D Levels, Plasma Glucose & Lipid Levels

more groups. Pearson correlation has been used to find the correlation between Vitamin D with Lipids. The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate tables and graphs.

**Observations and Results**

A total of 53 children formed the study subjects who included 30 male children (56.6%) and 23 (43.4%) female children. Majority of the children were between 11-15 years (39.6%). Mean age of the children studied is 9.72±4.56 years.

43 (81.1%) children were included in the study due to evidence of poor growth and 5 (9.4%) due to overweight (BMI 85th to 95th percentile) and 5 (9.4%) due to obesity (BMI >95th percentile).

4 (7.5%) patients had weight <3rd percentile, 16 (30.2%) had weight between 3rd and 25th percentile, 16 (30.2%) had weight between 25th and 50th percentile, 8 (15.1%) had weight between 50th and 75th percentile, 8 (15.1%) had weight between 75th and 97th percentile and 1 (1.9%) had weight >97th percentile for age and sex.

2 (3.8%) patients had height <3rd percentile, 13 (24.5%) patients had height between 3rd and 25th percentile, 21 (39.6%) patients had height between 25th and 50th percentile, 11 (20.8%) had height between 50th and 75th percentile, 5 (9.4%) had height between 75th and 97th percentile and 1 (1.9%) had height >97th percentile for age and sex.

18 patients (34%) had BMI <5th percentile, 9 patients (17%) had between 5th and 25th percentile, 6 patients (11.3%) had between 25th and 50th percentile, 8 patients (15.1%) had between 50th and 75th percentile, 2 patients (3.8%) had between 75th and 85th percentile, 2 patients (3.8%) had between 85th and 90th percentile, 3 patients (5.7%) had between 90th and 95th percentile and 5 patients (9.4%) had >95th percentile for age and sex.

The mean level (SD) for 25(OH) D was 17.49 ng/mL (10.13), with a median of 14.7 and a range of <3 to 39.2 ng/mL. 25(OH) D levels were <20 ng/mL in 35 of the 53 subjects (66%).

The glucose values ranged from 63 to 124 mg/dL. A total of 19 subjects (35.8%) had a glucose level >100 mg/dL.

<table>
<thead>
<tr>
<th>Lipid parameter Cut-off</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cholesterol (mg/dL)</td>
<td>&lt;190</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>≥190</td>
<td>16</td>
</tr>
<tr>
<td>HDL (mg/dL)</td>
<td>&lt;20</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>≥20</td>
<td>50</td>
</tr>
<tr>
<td>LDL (mg/dL)</td>
<td>&lt;130</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>≥130</td>
<td>9</td>
</tr>
<tr>
<td>VLDL (mg/dL)</td>
<td>&lt;30</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>≥30</td>
<td>24</td>
</tr>
<tr>
<td>TGL (mg/dL)</td>
<td>&lt;150</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>≥150</td>
<td>24</td>
</tr>
<tr>
<td>Total cholesterol/HDL</td>
<td>&lt;5.5</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>≥5.5</td>
<td>16</td>
</tr>
<tr>
<td>LDL/HDL</td>
<td>≤4.9</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>≥4.9</td>
<td>2</td>
</tr>
</tbody>
</table>

**Vitamin D vs Age:** When the vitamin D levels were correlated with the age of the patients, it was found to be not significantly associated (P=0.476).

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Vitamin D Levels Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤5</td>
<td>1 (20%) 5 (22.7%) 4 (40%) 3 (16.7%) 13 (24.5%)</td>
</tr>
<tr>
<td>5-15</td>
<td>0 (0%) 9 (40.9%) 2 (25%) 4 (22.2%) 15 (28.3%)</td>
</tr>
<tr>
<td>15-20</td>
<td>3 (60%) 7 (31.8%) 2 (25%) 9 (50%) 21 (39.6%)</td>
</tr>
<tr>
<td>20-50</td>
<td>1 (20%) 1 (4.5%) 0 (0%) 2 (11.1%) 4 (7.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>5 (100%) 22 (100%) 8 (100%) 18 (100%) 53 (100%)</td>
</tr>
</tbody>
</table>

**Vitamin D vs Sex:** Vitamin D levels were not significantly associated with gender of the patients also (P=0.629).

<table>
<thead>
<tr>
<th>Gender</th>
<th>Vitamin D Levels Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>3 (60%) 14 (63.6%) 5 (62.5%) 8 (44.4%) 30 (56.6%)</td>
</tr>
<tr>
<td>Female</td>
<td>2 (40%) 8 (36.4%) 3 (37.5%) 10 (55.6%) 23 (43.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>5 (100%) 22 (100%) 8 (100%) 18 (100%) 53 (100%)</td>
</tr>
</tbody>
</table>

**Vitamin D vs BMI:** When the vitamin D levels were compared with BMI, it was found not to be significantly correlated (P=0.385).
Vitamin D vs Lipids: Lipid parameters studied along with the values of vitamin D include total cholesterol, HDL, LDL, VLDL, Triglycerides, total cholesterol/HDL ratio, LDL/HDL ratio. As per the guidelines, cut off values for each parameter were into taken into consideration for comparing with vitamin D. Increasing levels of 25(OH)D were significantly correlated with increasing levels of HDL and TGL. Vitamin D was also found to have some positive correlation with LDL and VLDL.

Vitamin D vs FBS: FBS values were classified as ≤99, 100-126 and >126 for comparing with vitamin D levels. FBS values were found to be significantly associated with vitamin D levels with a P value of 0.012

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Vitamin D Levels</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;5</td>
<td>5-15</td>
</tr>
<tr>
<td>&lt;5th</td>
<td>1 (20%)</td>
<td>8 (36.4%)</td>
</tr>
<tr>
<td>5th-25th</td>
<td>0 (0%)</td>
<td>6 (27.3%)</td>
</tr>
<tr>
<td>25th-50th</td>
<td>3 (13.6%)</td>
<td>3 (13.6%)</td>
</tr>
<tr>
<td>50th-75th</td>
<td>0 (0%)</td>
<td>1 (4.5%)</td>
</tr>
<tr>
<td>75th-85th</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>85th-90th</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>90th-95th</td>
<td>2 (40%)</td>
<td>1 (20%)</td>
</tr>
<tr>
<td>&gt;95th</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Total</td>
<td>5 (100%)</td>
<td>22 (100%)</td>
</tr>
</tbody>
</table>

With the above available values, Pearson correlation coefficient and its P value were calculated. 25(OH)D was found to have significant positive correlation with HDL levels (r=0.446, P value=0.001) and LDL/HDL ratio (r=0.459, P value=0.001). A significant negative correlation was found to be present between 25(OH)D and FBS (r = -0.611, P value=<0.001). 25(OH)D was also found to be positively correlated with LDL (r=0.295, P value=0.032) and TGL (r=0.330, P value=0.016) but with a lesser significance.

DISCUSSION

Studies done from different centers from parts of India have drawn attention towards wide prevalence of vitamin D deficiency (VDD). VDD has been reported in all age groups who are residing in rural and urban India.

Vitamin D Deficiency

Vitamin D deficiency can be easily diagnosed in presence of clinical features of rickets and laboratory support. But rickets is an extreme form of vitamin D deficiency and represents the tip of the iceberg of vitamin D deficiency. Improved understanding of the detrimental effects of insufficient vitamin D before the appearance of rickets led to a growing interest in these lesser degrees of vitamin D deficiency and diagnosing this prerachitic, subclinical vitamin D deficiency is important for nonskeletal health benefits.

Vitamin D deficiency in adults is defined by most experts as a 25(OH)D level <20 ng/mL, on the basis of functional outcomes of vitamin D such as intestinal absorption of calcium and serum parathyroid hormone levels. A level of 25(OH)D of 21 to 29 ng/mL is considered to be indicative of a relative insufficiency of vitamin D, and a level >30 ng/mL is considered to indicate sufficient vitamin D. Because similar studies of functional outcomes have not been evaluated in children, criteria for defining pediatric vitamin D sufficiency and deficiency have not been clearly defined. Therefore, we elected to use a cutoff point of 20 ng/mL for 25(OH)D to divide the study population into vitamin D sufficient and insufficient subgroups as per guidelines given by US Endocrine society.

Prevalence of Vitamin D Deficiency

The mean level for 25(OH)D in our study was 17.49 ng/mL, with a median of 14.7 and a range of <3 to 39.2 ng/mL. 25(OH)D levels were <20 ng/mL in 35 of the 53 subjects (66%). In study done by Johnson MD et al in American children, the mean level for 25(OH)D was 28.8 ng/mL, with a median of 27 and a range of 6.5 to 68.0 ng/mL. 25(OH)D levels were <30 ng/mL in 197 of the 302 subjects (65.2%).

In a study done by Raman MK et al among 290 school girls in Delhi, 93.7% girls were found to be vitamin D deficient.

Study done by Harinarayanan CV et al among 316 children of Andhra Pradesh, 69.3% were found to have vitamin D <20 ng/mL.

Role of Age, Sex and BMI

We could not find any significant relation in vitamin D levels with age, sex and BMI of the patients similar to
<table>
<thead>
<tr>
<th>Lipids</th>
<th>Cut-offs</th>
<th>25(OH) D level ng/mL</th>
<th>Total (n=53)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt;5 (n=5)</td>
<td>5-15 (n=22)</td>
<td>15-20 (n=8)</td>
</tr>
<tr>
<td>TC</td>
<td>&lt;190</td>
<td>2 (40%)</td>
<td>19 (86.4%)</td>
<td>4 (50%)</td>
</tr>
<tr>
<td></td>
<td>&gt;190</td>
<td>3 (60%)</td>
<td>3 (13.6%)</td>
<td>4 (50%)</td>
</tr>
<tr>
<td>HDL</td>
<td>&lt;20</td>
<td>2 (40%)</td>
<td>1 (4.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>≥20</td>
<td>3 (60%)</td>
<td>21 (95.5%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>LDL</td>
<td>&lt;130</td>
<td>5 (100%)</td>
<td>21 (95.5%)</td>
<td>5 (62.5%)</td>
</tr>
<tr>
<td></td>
<td>≥130</td>
<td>0 (0%)</td>
<td>1 (4.5%)</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td>TGL</td>
<td>&lt;150</td>
<td>3 (60%)</td>
<td>16 (72.7%)</td>
<td>5 (62.5%)</td>
</tr>
<tr>
<td></td>
<td>≥150</td>
<td>2 (40%)</td>
<td>6 (27.3%)</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td>TC/HDL</td>
<td>&lt;5.5</td>
<td>3 (60%)</td>
<td>18 (81.8%)</td>
<td>7 (87.5%)</td>
</tr>
<tr>
<td></td>
<td>≥5.5</td>
<td>2 (40%)</td>
<td>4 (18.2%)</td>
<td>1 (12.5%)</td>
</tr>
<tr>
<td>LDL/HDL</td>
<td>&lt;4.9</td>
<td>5 (100%)</td>
<td>21 (95.5%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td></td>
<td>≥4.9</td>
<td>0 (0%)</td>
<td>1 (4.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>VLDL</td>
<td>&lt;30</td>
<td>2 (40.0%)</td>
<td>15 (68.2%)</td>
<td>6 (75.0%)</td>
</tr>
<tr>
<td></td>
<td>&gt;30</td>
<td>3 (60.0%)</td>
<td>7 (31.8%)</td>
<td>2 (25.0%)</td>
</tr>
</tbody>
</table>

Vitamin D and FBS
Evidence for low vitamin D status as a risk factor for T2DM has accumulated steadily since calcium was first shown to be necessary for islet insulin secretion and release. Several

the study by Johnson MD et al.2 Abu Shady et al, showed statistically significant inverse association of serum vitamin D with BMI in 215 Egyptian school children but found no significant relation with age and sex.10
lines of evidence support a role for vitamin D in pancreatic beta cell function. Vitamin D receptors are known to be present in pancreatic B-cells. Vitamin D may also have a beneficial effect on insulin action, because vitamin D receptors are present in skeletal muscle. Vitamin D has been demonstrated to increase expression of the insulin receptor in vitro and therefore enhance insulin responsiveness for glucose transport. Vitamin D may also indirectly enhance insulin action by regulating extracellular calcium and thereby affecting calcium influx through cell membranes and maintaining adequate intracellular cytosolic calcium pool.  

We found an inverse correlation between 25(OH) D and fasting plasma glucose levels in our population. Although these associations are statistically significant, their clinical significance remains to be determined. Our results are in agreement with observations by several investigators that suggest a link between vitamin D deficiency and alterations in glucose metabolism.

Cross-sectional studies have shown inverse correlations between 25(OH) D levels and fasting plasma glucose values, hemoglobin A1C level and insulin resistance. The association between 25(OH) D levels and plasma glucose levels is likely caused by the effect of vitamin D on both pancreatic beta cell function and insulin sensitivity. Therefore, hypovitaminosis D is a higher risk factor for type 2 diabetes and the metabolic syndrome.  

Effects of vitamin D supplementation on glucose homeostasis have been shown in numerous studies. Study done by Talei et al suggested that the insulin resistance appears to be decreased in T2DM patients who had received vitamin D. Inzucchi et al showed a 60% improvement in insulin sensitivity by increased serum 25(OH)D concentration from 10 to 30 ng/ml, by which metformin or troglitazone were 54% and 13% respectively. Von Hurst (2009) showed that vitamin D supplementation significantly improved insulin sensitivity and insulin resistance. Ken (2004) found an inverse relation between 25(OH)D concentrations and FBS, but a direct relation with insulin sensitivity.11

Vitamin D and Lipids

In our study, a positive correlation was identified between 25(OH) D levels and HDL level. The relationship between 25(OH) D and the lipid profile has been examined in adults with morbid obesity and in healthy adults. Chiu et al noted a negative correlation between 25(OH) D level and total and low-density lipoprotein cholesterol levels, but did not find relationship between 25(OH) D level and HDL level. The positive association between low 25(OH) D levels and low HDL levels is likely caused by the role of vitamin D in maintaining adequate concentrations of apolipoprotein A-1, the main component in HDL. Decreased concentrations of apolipoprotein A-1 have been reported in adults with hypovitaminosis D. We found that the fasting glucose level was significantly higher and HDL level was significantly lower in the group with vitamin D insufficiency. We have also got a positive association of vitamin D with LDL and TGL which is of lesser significance when compared to that of HDL and FBS and may be due to small sample size.

Study done by Abu Shady et al in 215 Egyptian school children, showed statistically significant inverse association of serum OH vitamin D with BMI, triglyceride, serum cholesterol and LDL-cholesterol and direct association with HDL-cholesterol. Xiao Yin et al found among 601 adults of China that 25(OH)D was inversely associated with waist circumference, fasting insulin, triglycerides, fasting glucose, and LDL-cholesterol, positively associated with HDL-cholesterol in a multivariable-adjusted regression model.14

Fatih Kardas et al from Turkey conducted a study on 114 obese and healthy children. 25-Hydroxy vitamin D levels were positively correlated with adiponectin and HDL-cholesterol (HDL-C) and inversely correlated with body mass index (BMI), LDL-cholesterol (LDL-C), total cholesterol (T-C), triglyceride (TG), fasting glucose, homeostasis model assessment of insulin resistance (HOMA index), systolic blood pressure (SBP), and diastolic blood pressure (DBP).15
John WG et al in their study of British South Asians, showed a positive relation of fasting apo A-I concentrations to serum 25(OH)D concentrations, which is independent of glycermia and other dietary, anthropometric and lifestyle risk factors for type 2 diabetes and ischemic heart disease after multiple regression analyses. Subjects with hypovitaminosis D are likely to have an increased risk of ischemic heart disease independent of their increased risk of type 2 diabetes.15

Review of the evidence on hypovitaminosis D as a risk factor for metabolic syndrome and its sequelae, T2DM and CVD, suggests long-term vitamin D repletion could reduce these risks. Much of the studies so far available from randomized controlled trials is weakened by low vitamin D dosages, inadequate power, starting supplementation too late in life or after metabolic syndrome disorders have developed or most importantly by not including of many recognizable confounders. On balance, therefore, maintenance of recommended intakes for bone protection has the potential to prove protective for metabolic syndrome. Supplementation has been shown to increase survival in patients with cardiac disorders, whether higher doses would provide useful protection for apparently healthy people in the general population awaits the outcomes of ongoing randomized-controlled trials that, it is hoped, will prove or disprove causality for hypovitaminosis D in metabolic syndrome and its ill-effects.

RECOMMENDATIONS

There is a need to target high risk groups such as pregnant women and the rapidly growing child. Vitamin D supplementation can be given relatively easily in the form of a ‘children’s multi-vitamin’ supplement. Vitamin D2 (ergocalciferol) or D3 (cholecalciferol) should be provided to pregnant women. We should all be made aware of the need for calcium containing foods and the importance of sunlight. Exposing to sun rays is an effective way of enhancing vitamin D status. Children who are not exposed to sunlight should be supplemented with oral vitamin D and vitamin D rich foods such as oily fish and cod liver oil.

This study has some limitations like lack of information on calcium and vitamin D intake and sunshine exposure of the subjects and the seasonal changes in vitamin D levels. We did not account for parathyroid hormone (PTH) levels. PTH levels may play a role for the effect of VDD. However, effects of PTH levels on metabolic syndrome still remains a controversy as the previous results have been inconsistent. Another limitation is the lack of information on factors influencing glucose and lipid levels such as socioeconomic status, physical activity and family history of diabetes mellitus. The data in this study were derived from a heterogeneous group of children and adolescents coming to pediatric outpatient clinics for various reasons, and therefore the results may not mirror results that might be found in healthy children and adolescents without symptoms.

However, the strengths of the associations found in our study population suggest that prospective interventional trials are needed to determine whether vitamin D replacement impacts glycermic status or lipid levels in healthy children and adolescents or children and adolescents with risk factors for diabetes mellitus and cardiovascular disease.

SUMMARY

It has been suggested that low serum levels of vitamin D may increase insulin resistance and in turn the risk of type 2 diabetes mellitus over time. Our findings relate vitamin D deficiency to dyslipidemia in children and add to the sparse body of literature in this area. We found that children and adolescents with varying levels of vitamin D deficiency had significantly increased risk of dyslipidemia. These findings suggest more aggressive lifestyle and dietary interventions with vitamin D supplementation to reduce the risk of dyslipidemia in high risk children. In this study, high vitamin D levels were positively associated with high HDL levels implicating the role of vitamin D in evolution of metabolic syndrome and cardiovascular diseases as vitamin D deficiency predisposes to low level of protective HDL levels.

CONCLUSION

There is a high prevalence of vitamin D deficiency even in countries receiving abundant sunshine like India. Growing evidence supports a physiologic role for vitamin D in many chronic diseases, in addition to known effects on bone. In children, further studies are needed to determine the optimal circulating concentration of 25(OH)D, and the effects of a given 25(OH)D on various organs. Knowledge gaps also exist regarding the potential physiologic impact of vitamin D deficiency in childhood on health outcomes throughout the lifespan. Vitamin D supplementation is inversely associated with insulin resistance and some cardiometabolic risk factors. Use of Vitamin D supplementation may have beneficial effects in controlling some complications of childhood obesity. Low vitamin D level in children and adolescents are associated with higher plasma glucose and lower HDL concentrations.

The results of this study may not mirror the results that might be found in healthy children and adolescents as the data in this study were derived from a heterogeneous of children and adolescents coming to out-patient clinics for various reasons. However, the strength of the associations
found in our study population suggest that prospective interventional trials are needed to determine whether vitamin D replacement impacts glycemic status or lipid levels in healthy children and adolescents or children with risk factors for diabetes mellitus and cardiovascular diseases. Sensitizing pediatricians to recognize and treat this pandemic would have great impact on child health in the 21st century. Given the high worldwide prevalence of vitamin D deficiency, well-designed outcomes studies in children are urgently needed to address these research priorities.

REFERENCES


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Sonographic Evaluation of Salivary Gland Tumors – A Hospital Based Study

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Abstract

Background: As stated anatomically there are three paired major Salivary glands, the Parotid, Submandibular and Sublingual. Including other diseases salivary glands are also prone for neoplastic involvement though rarely. As a rule smaller the gland the chances of malignancy are more there. Salivary gland tumors mostly emerge in Parotid gland. After clinical evaluation, ultrasound is the most preferred imaging modality to differentiate benign from malignant conditions. The aim of this study is to find out the incidence of salivary gland tumors among various neck pathologies and the most preferred radio-imaging modality to differentiate between benign and neoplastic salivary gland tumors.

Methods: This study was carried out in hospital of Teerthankar Mahaveer Medical College & Research Centre, Moradabad, in which all group of patients were included, following total research protocol as admissible in the research and ethical division of the institute. Ultrasound with frequency of 7–12 MHz, was employed for the study.

Result: Out of 40 patients with lumps in the neck 4 patients (10%) were found to have salivary gland tumors in the neck, out of which 5% were malignant and 5% were benign in nature as demonstrated by ultrasonography.

Conclusion: Ultrasonography is the most preferred choice of investigation for salivary gland tumors identification, though MRI is the most preferred modality for staging of malignancies of salivary gland tumors.

Keywords: Salivary glands, Ultrasonography & Malignancy

INTRODUCTION

There are three pairs of salivary glands, namely Parotid, Submandibular and Sublingual. Parotid gland is located in the retro-mandibular fossa, Submandibular under the body of the mandible, & the Sublingual in the sublingual space lying lateral to the genioglossus muscle.

Salivary gland tumors are predominantly benign (80%). About 70% of the tumors are located in the parotid gland, 10% in the submandibular gland, and the remainder in the sublingual salivary glands. The size of the salivary gland is inversely proportional to the tumor detected being malignant.1

On histological basis, some benign and malignant salivary gland tumors share overlapping cytological features.2-4

Identifying the nature of swelling benign or malignant is next to impossible clinically and to rule out any confusion various imaging modalities are available like Sialography, Computerized Tomography, MRI and Ultrasound. Ultrasound is the first imaging modality of choice for the salivary gland swellings. The advantage of Ultrasound in salivary gland enlargements is that it is comparatively easy to use, non ionizing, & less expensive. In the present study, sonography based differentiation of benign and malignant salivary gland lesions is done.

Although benign and malignant salivary gland tumors often have a similar sonographic appearance, several sonographic features, including a heterogeneous echotexture, indistinct margins, regional lymph node enlargement, and absence of distal acoustic enhancement, have been reported to be more frequently associated with malignancy.5

MATERIAL & METHODS

This study is being carried out in the department of Radio-diagnosis Teerthankar Mahaveer Medical College & its associated
hospital. Forty patients were evaluated for neck swelling in the neck out of which four patients were identified as having salivary gland swelling. A routine protocol was maintained while evaluating the salivary gland lesions, which included informed consent (in patients under 18 yrs of age consent was taken from guardians), presence of female attendant in case of examination of female subject, Institutional research and ethical committee approval was taken before hand.

Patients were subjected to routine laboratory investigations and then taken for Ultrasound examination with the help of Ultrasound system present in the department.

The ultrasound scanner was placed on the skin immediately below the mandible, allowing the visualization of the salivary glands.

Out of forty patients in all 22 patients were male and 18 females. Age group between 21-30 yrs was found to be most susceptible for neck swellings. Ultrasound was performed using linear-array broadband transducer with a frequency of 7–12 MHz.

Bilateral examination of salivary glands was done as it is must do protocol.

**Sampling Method**
Convenience sampling technique was used in this study.

Age and Sex distribution of patients with Neck Masses (Table I and Figure I)

<table>
<thead>
<tr>
<th>Age group (In years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>11-20</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21-30</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>31-40</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>41-50</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>51-60</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>61-70</td>
<td>3</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>71-80</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>18</td>
<td>40</td>
</tr>
</tbody>
</table>

**RESULTS**

**Table 2: Distribution of neck Massses according to the nature of the lesion**

<table>
<thead>
<tr>
<th>Nature of the lesion</th>
<th>No. of cases</th>
<th>Percentage of total cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflammatory</td>
<td>1</td>
<td>17.5%</td>
</tr>
<tr>
<td>Abscess</td>
<td>6</td>
<td>15%</td>
</tr>
<tr>
<td>Adenopathy</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Developmental</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Branchial Cyst</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Ranula</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Lymphangioma</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Thyroid Masses</td>
<td>8</td>
<td>20%</td>
</tr>
<tr>
<td>Benign</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>Malignant</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>Mesenchymal</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Lipoma</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Sarcoma</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Neural</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>Schwannoma</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Neurofibroma</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Vascular</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Hemangioma</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Carotid body tumor</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Bone</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Osteoma</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Metastasis</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Lymphnode Masses</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>(non inflammatory)</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>3</td>
<td>7.5%</td>
</tr>
<tr>
<td>Metastasis</td>
<td>3</td>
<td>7.5%</td>
</tr>
<tr>
<td>Salivary Gland Masses</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>Benign</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Malignant</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Figure 1: Age and sex distribution of patients with neck masses**

**Figure 2: Distribution of various neck pathologies**

**Figure 3: Showing occurrence of salivary gland tumors in range of 10%**
SALIVARY GLAND LESIONS

Four cases (10%) of neck, masses in the present study were of salivary gland origin. Two of these were benign (50%) and two (50%) malignant.

Benign Lesions of Salivary Glands

Benign lesions consisted of a pleomorphic adenoma and a Warthin’s tumor.

The Pleomorphic adenoma appeared as a well defined hypoechoic lesion in the right parotid gland.

Ultrasonographic Findings Obtained are as under (Figure 4)

a. Size Approximately 28.1 Mm.
b. Limits Were Well Defined
c. Contour Was Lobulated
d. Internal Structure Was Homogenous
e. Calcification Was Almost Absent
f. Acoustic Enhancement Seen.

Figure 5: H/P Warthin tumor

Ultrasonographic Findings of Warthin’s Tumor (Figure 5)

a. Size Approximately 28.9 Mm. And Located In Parotid Gland
b. Limits Were Well Defined
c. Contour Was Non-Lobulated
d. Internal Structure Was Mostly Heterogenous
e. Calcification Was Almost Absent
f. Acoustic Enhancement Seen

Figure 6: Heterogeneous hypoechoic ovoid mass

Adenoid Cystic Carcinoma of Salivary Gland – Sublingual Gland

Salivary gland tumors are not very common and more so over neoplastic (malignant) lesions are seen in 5–10% of cases.

It will be good for patients if these tumors are diagnosed pre-operatively without going into surgical intervention.

DISCUSSION
Therefore, many clinical researchers have tried to evaluate the ability of sonography to differentiate benign and malignant tumors.

Sonography is a powerful tool for characterizing salivary gland tumors. Different imaging techniques are valuable in assessing salivary gland disease, out of which the choice of modality depends on local protocol, clinical features and, importantly, the site of suspected pathology. Technical advances, in many imaging centers have made ultrasound nowadays the investigation of choice for major salivary gland disease. It allows a quick, cheap and thorough assessment without the use of ionizing radiation. Ultrasound is able to simultaneously evaluate gland parenchyma and large ducts as well as demonstrate duct dilatation.

Tumors of the salivary glands are not common, representing about 3% of all head and neck tumors. Histopathology of salivary gland tumors is very varied, with a large number of both benign and malignant tumors. Out of this Pleomorphic adenomas are the most common, representing 70-80% of all salivary gland tumors most frequently located in the parotid gland. Cytological examination often faces difficulty in differentiating adenoid cystic carcinoma from Pleomorphic adenoma. It is seen histopathologically both lesions contain myxoid material. A number of ultrasonographic features are considered typical for pleomorphic adenomas: sharp borders, lobulations of the contour, homogeneous structure, poor vascularization, acoustic enhancement, which well correlates with the ultrasonographic pictures of our present study.

Warthin’s tumour is the second common salivary neoplasm, typically occurring in older male patients, with a propensity for smokers. It arises from parotid intraglandular lymphoid tissue, typically in the tail, and is multiple or bilateral in approximately 15% cases.

Ultrasound shows an ovoid hypoechoic mass. In our study it was present unilaterally and patient didn’t give history of smoking. Sublingual gland tumors are rare and account for only 0.4–2.6 of all salivary gland tumors.

However, most of the recorded literature assert that Pleomorphic adenoma is more common than Adenolymphoma. Only Schick et al recorded an equal number of cases of Pleomorphic adenoma and Warthin’s tumour (7:7), which is also seen in our study.

The majority of sublingual gland tumors are malignant and ACC is the most common. As can be seen in our study out of two malignant lesions one is of Adenoid Cystic Carcinoma, which very well correlates with the study of Anderson LJ et al.

**CONCLUSION**

Before going into any type of radiological investigation histological grading of salivary gland tumor is a preliminary step in clinical setting, though not alone.

A variety of radio-imaging modalities may be employed in salivary gland imaging in which Ultrasound has emerged as the technique of choice for major salivary gland disease and forms a useful aid for FNA/biopsy. MRI is of particular value for staging salivary gland malignancy.

As a simple guide If ultrasound is able to differentiate as a benign pathology there is no need to go further imaging.

Through our experience we now know that sonographic features are most accurate but we should keep other modalities in our mind for improving the diagnostic accuracy.

**REFERENCES**


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Relationship Between Depression and Vitamin C Status: A Study on Rural Patients From Western Uttar Pradesh in India

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According to an August 2003 article in vitamin C acts as the co-factor for the enzyme dopamine-beta-hydroxylase to convert dopamine into nor-epinephrine (Figure 1), which plays an important role in the regulation of mood.

Evidence for the involvement of Norepinephrine in depression is abundant, and latest studies on neural

INTRODUCTION

Depression is a state of extreme sadness that reaches a point where it affects a person’s day to day activities and also disturbs socio-occupational functioning. Depression may have a relationship with vitamin C deficiency. When a group of patients were deprived of Vitamin C they experienced symptoms like sad mood, reduced concentration, reduced energy, fatigue and hypochondriasis. They were significantly more anxious and people deficient in vitamin C were also significantly more depressed based on ratings from the Symptom adjective checklist, but the Freiburg personality inventory scale showed no significant depressive scores.

Among diverse functions of vitamin C, one is its role in the synthesis of some neurotransmitters. Vitamin C is a cofactor for dopamine beta-hydroxylase which is involved in the conversion of dopamine to nor-epinephrine.

Abstract

Aim & Objective: To study vitamin C status of rural depressed population of Western U.P vis-a-vis age- and sex-matched healthy controls.

Materials & Methods: From patients visiting the Psychiatric outpatient department of TMMC & RC, thirty depressed patients, diagnosed according to Structured Clinical Interview DSM-IV-TR schedule, were selected randomly and their serum vitamin C levels were measured by dinitrophenyl hydrazine method. These levels were compared with 30 age- and sex-matched healthy controls.

Results: Mean (± SD) serum vitamin C levels of depressed patients and controls were 0.18 ± 0.09 mg/dl and 0.41 ± 0.07 mg/dl respectively. The difference between these two groups of subjects was statistically significant (p value < 0.001).

Conclusion: This study shows low vitamin C status in depressed patients as compared to normal individuals, and suggests that vitamin C supplementation can have a positive effect in the treatment of these patients.

Keywords: Depression, Vitamin C

Figure 1: Role of vitamin C in norepinephrine synthesis

Original Article
pathways and mechanisms highlight the specific role of Norepinephrine in this disorder. Norepinephrine plays a significant & determinant role in executive functioning regulating cognition, mood, interest, and intelligence, which are fundamental in social relationships.

Vitamin C is also a cofactor for tryptophan-5-hydroxylase required for the conversion of tryptophan to 5-hydroxytryptophan in serotonin production. Vitamin C may therefore be valuable for patients with depression associated with low levels of serotonin. Deficiency of serotonin produces depressant effect and excess of serotonin in brain tissue produces stimulation of cerebral activity. Vitamin C has broad-spectrum antioxidant properties and is essential for the mitochondrial metabolism of fats. Vitamin C is also required for the activity of peptidylglycine alpha-amidating mono-oxygenase. This enzyme catalyses the rate-limiting step in the biosynthesis of neuropeptides.

In a 2011 study, investigators used an objective assessment of physical function and a range of socio-demographic, dietary, and health behaviours to explore the possible factors that could explain the association between depression and mortality in community-dwelling elderly participants aged 65 years and older. Depression was assessed from the 15-item Geriatric Depression Scale (GDS) and physical functioning. Subjects were followed up till death over an average of 9.2 years. At baseline, 20.9% of participants demonstrated depression (GDS-15 score ≥ 5). Depressed participants were at a higher relative risk of all-cause mortality during follow-up (age- and sex-adjusted hazard ratio = 1.24, 95% confidence interval: 1.04-1.49). These factors collectively explained an estimated 54% of the association between depression and death. Low-grade inflammatory changes and low plasma vitamin C were also independently associated with depression and mortality but did not explain any of the association between depression and mortality. Physical dysfunction might partly explain the co-relation although studies are required to fully elucidate the mechanisms.

Trials were carried out to find out whether patients with generalized anxiety disorder (GAD) and depression have any difference in blood serum levels of vitamins A (β-carotene), C, and E in comparison to normal healthy controls and whether supplementation of adequate doses of vitamins A, E, and C leads to significant reduction in anxiety and depressive scores of the subjects. It was observed that patients with GAD and depression had significantly lower levels of vitamins A, C, and E in comparison to healthy controls. After supplementing these deficient vitamins in the diets of the subjects, a significant reduction in anxiety and depressive scores was observed.

AIM OF THE STUDY

Keeping the above reports in mind, the present study was carried out on a random sample of 30 patients from rural background in Western U.P. diagnosed as depressed as per the Structured Clinical Interview DSM-IV to find out the levels of vitamin C in their serum and to compare these with 30 healthy age- and sex-matched controls.

MATERIAL AND METHODS

The study was conducted over a period of six months in Teerthankar Mahaveer Medical College and Research Centre, Moradabad situated in rural surroundings in the western part of U.P. From amongst the patients attending the Psychiatric outpatient department, thirty depressed patients, diagnosed according to SCID schedule, were selected randomly. A thorough physical examination and relevant investigations were done to rule out any physical disease. Thirty age- and sex-matched controls from healthy population belonging to the same area were also included in the study. Serum vitamin C levels were measured in all the subjects by dinitrophenyl hydrazine method. The mean (±SD) serum vitamin C levels of patients with depression were compared with those of controls by Student’s t-test.

RESULTS

Serum vitamin C levels ranged from 0.3 to 0.6 mg/dl in controls with a mean ± SD of 0.41±0.07 mg/dl. In patients with depression, the levels ranged from 0.1 to 0.4 mg/dl with a mean ± SD of 0.18 ± 0.09 mg/dl. The difference between the two groups was highly significant with a p value of <0.001 (Table 1) (Figure 2).

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Control Group (n=30)</th>
<th>Depressed Patients (n=30)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin C (mg/dl)</td>
<td>0.41±0.07</td>
<td>0.18±0.09</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

DISCUSSION

Vitamin C is an anti-oxidant, commonly used to boost immunity in the cases of cold and flu. In the treatment of Vitamin C is also very important, because it is needed for the conversion of tyrosine into dopamine, norepinephrine and epinephrine. These are the neurotransmitters providing with both physical and motivational energy and feelings of reward and satisfaction.
Vitamin C is needed to convert tryptophan, amino acid present in the animal proteins in the diet, into serotonin, major neurotransmitter of the brain.

Without Vitamin C these biochemical reactions can’t be properly carried out and that will result in lesser amounts of neurotransmitter in the brain and body, and consequently, in lower mood and motivational energy.

Serum vitamin C in patients with depression was found to be significantly lower as compared to healthy controls indicating poor vitamin C status in depressed patients. As described above, vitamin C is a cofactor for dopamine beta-hydroxylase, which converts dopamine to nor-epinephrine, and a cofactor for tryptophan-5-hydroxylase required for the conversion of tryptophan to 5-hydroxytryptophan in serotonin production.

Since synthesis of serotonin, dopamine and nor-epinephrine requires vitamin C, it is to be expected that their synthesis would be impaired if vitamin C is deficient. It is an established fact that serotonin, dopamine and nor-epinephrine play important roles in maintaining mood. Deficiency of nor-epinephrine can cause clinical depression and poor memory, and deficiency of serotonin can produce a depressant effect.

Results presented here demonstrate poor vitamin C nutrition in depression in the sample of population studied. Whether this under-nutrition is prevalent in other sections of population needs to be investigated.

Vitamin C under-nutrition may be a causative or contributory factor in the genesis of depression. Hence correction of this deficiency alongside the conventional treatment of depression is expected to yield better results in patient management.

**CONCLUSION**

This study shows low vitamin C status in depressed patients as compared to normal individuals, and suggests that vitamin C supplementation can have a positive effect in the treatment of these patients. Vitamin C has an important role in the formation of neurotransmitters required for normal neuronal functioning and the lack of this important factor can be a cause of treatment failure and resistance in the depressed population.

**REFERENCES**

The Burden of Anaemia amongst Antenatal Women in the Rural Population of Northern India

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Abstract

Background: Nutritional anaemia in pregnant women is one of the India’s major public health problems and is major factor responsible for low birth weight. Out of total maternal deaths in world most of them occur due to anaemia.

Objectives: To check prevalence of anaemia in pregnant women and its association with literacy status, dietary factors and BMI.

Material & Methods: The study was conducted in village Khera at RHTC, Rama Medical College Hospital and Research Centre, Hapur, Uttar Pradesh. It is cross sectional study.

The study was carried from Oct 2012 to June 2013. A total of 321 pregnant women with gestational period between 12 to 20 weeks were registered. The detail clinical examination including measurement of weight and height was carried out. Hemoglobin was estimated and peripheral smear examination was done. Data was analyzed by using Chi-Square Test. P-value less than 0.05 were considered significant.

Results: A high prevalence of anaemia (79.75%) was observed in antenatal women. Majority of the antenatal women were moderately anaemic (58.38%) and were under 20 years of age. Occurrence of anaemia in antenatal women was found to be inversely proportional to the literacy status. Statistically significant association (P <0.05) were found amongst anaemic antenatal women with their literacy status and BMI however statistically significant association was not found in various dietary factors.

Keywords: Antenatal Women, Anaemia, Basal Metabolic Index, Literacy Status

INTRODUCTION

Anemia is the most common nutritional deficiency worldwide. It leads to reduced work capacity in adults and leads impact on mental development in children and adolescents. There is some evidence that anemia affects cognition in adolescent girls and causes fatigue in adult women. Anemia may affect visual and auditory functioning and is weakly associated with poor cognitive development in children.1

In India, anaemia contributes directly to 20% maternal death and indirectly to further 20%.2,3 The main causes of Anaemia in the developing countries in Antenatal women includes low dietary intake of iron and folic acid, poor bioavailability of iron and fiber rich Indian diet, poor absorption of iron due to hook worms infestation and blood loss during delivery and heavy menstrual blood loss.4,6 Iron deficiency & Anaemia during antenatal period are associated with low birth weight babies, premature birth, increase perinatal and neonatal mortality. Anaemia increases the risk of maternal morbidity & mortality and adverse maternal outcome such as ante partum haemorrhage, post-partum haemorrhage & puerperal sepsis.7,9 National Nutritional Anaemia prophylaxis programme (NNAPP) was initiated in 1970 during the fourth five year plan with the aim to reduce the prevalence of Anaemia to 25%.10 After subsequent evaluation it was seen that there was no change in situtaion. Since 1992 the daily dosage of elemental iron for prophylaxis and therapy has been increased to 100 mg & 200 mg, respectively under Child Survival and Safe Motherhood Programme (CSSM Programme).

This current study was carried out to find out the prevalence of the Anaemia in antenatal women and to determine the association with their literacy status, dietary factors and BMI.
MATERIAL AND METHODS

Present community based, cross sectional study was carried out at Rural Health Training Centre, Khera, Rama Medical College Hospital. Research centre Hapur, Uttar Pradesh from October 2012 to June 2013. Total 321 antenatal women with gestational period 12-20 weeks, visiting at antenatal clinic were registered for the study. Antenatal women giving history of worm’s infestation, bleeding disorder and bleeding in last pregnancy were excluded from the study.

The antenatal women were interviewed by using pre-structured, pre-tested performa. Prior consent was obtained from the subjects. Detail clinical examination was done at Khera, RHTC. Weight and Height measurement of the subject were taken with pre-standardized weighing machine and Height scale. BMI was calculated by the formula weight in Kgs/Height in meter square. Haemoglobin estimation was done by Sahli’s method. Anaemia was classified as per WHO criteria.\textsuperscript{11} Haemoglobin below 11 gm/dl in labeled as anaemia during antenatal period. Typing of anaemic was done as per standard peripheral smear examination.\textsuperscript{12} Literacy status was assessed according to modified B.G. Prasad Classification.\textsuperscript{13-14} Severely anaemic pregnant women were referred to Rama Medical College Hospital, Hapur for further management. Data was analyzed by using Chi-Square Test. P-value < 0.05 were considered significant.

RESULTS

In this observational study, 47.97% of subjects were from joint family, 39.25% from muscle family and 12.77% from the extended family. Majority of the antenatal women belonged to Hindus religion (75.70%) followed by Muslims (12.14%), Christians (3.73%) and other caste (8.41%) respectively.

As shown in Figure 1, Pie diagram, 79.75% subjects were found anaemic. The prevalence of mild, moderate and severe anaemia was 20.56%, 44.23% and 14.97% respectively. Majority of them were moderately anaemic.

Table no. 1 shows 94.81% and 91.66% of Antenatal women were belonged to illiterate and primary school category. Moderate anaemic was seen amongst middle school (52.12%) and high school category (65.62%). Severe anaemia was detected in illiterate (29.31%) and primary school (23.33%) category. Lower percentage of anaemia was found in higher education category viz: intermediate (40%), Graduate (27.77%) and post graduate (28.5%) subjects. Statistically significant difference were observed ($\chi^2 = 47.05$, P <0.05).

Table no. 2 shows 34.89% antenatal women were vegetarian and 65.11% were on mixed diet. The percentage of mild anaemia (22.32%) moderate anaemia (44.42%) and severe anaemia (16.07%) were higher amongst vegetarian as compared to those on mixed diet subjects where mild, moderate & severe anaemia was detected as 19.61%, 43.06% & 14.35% respectively.

Table no. 3, shows that majority of the anaemia subject belonged to category of BMI <18.5 kg/m² viz: mild anaemia (21.37%), moderate anaemia (48.38%) and severe anaemia (16.93%) respectively. 31.14% of moderate anaemia was seen in the subjects of BMI category 18.5 – 24.9 kg/m² and 33.33% mild anaemia was seen in

![Figure 1: Pie diagram showing – Distribution of anaemia in the antenatal women](image)
was observed (x² = 18.04 P<0.05) in different categories. Bentley/Griffth subjects and higher in lower BMI subjects. These results in vegetarian diet subjects as compare to the subjects on Present study showed the high prevalence of anaemia. CONCLUSION

women which in consistent with the other studies except for type of blood was predominantly present in antenatal Normal T otal

Dietary habits of Antenatal Women (n=321)

Table 2: Distribution of Anaemia according to dietary habits of Antenatal Women (n=321)

<table>
<thead>
<tr>
<th>Type of Diet</th>
<th>Mild Anaemia</th>
<th>Moderate Anaemia</th>
<th>Severe Anaemia</th>
<th>Normal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetarian</td>
<td>25</td>
<td>52</td>
<td>18</td>
<td>17</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>22.32%</td>
<td>44.42%</td>
<td>16.07%</td>
<td>15.17%</td>
<td>34.89%</td>
</tr>
<tr>
<td>Mixed diet</td>
<td>41</td>
<td>90</td>
<td>30</td>
<td>48</td>
<td>209</td>
</tr>
<tr>
<td></td>
<td>19.61%</td>
<td>43.06%</td>
<td>14.35%</td>
<td>22.96%</td>
<td>65.11%</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>142</td>
<td>48</td>
<td>65</td>
<td>321</td>
</tr>
</tbody>
</table>

BMI category >25 kg/m². Statistically significant difference was observed (x² = 18.04 P<0.05) in different categories.

DISCUSSION

The high prevalence of Anaemia (79.75%) was observed amongst antenatal women in this study which is similar to earlier studies. Higher prevalence of Anaemia was observed in the subjects of lower literacy category and lower prevalence of anaemia was seen in high literacy category. Anaemia in antenatal women is thus inversely related to the literacy status as seen in earlier studies. Present study showed the high prevalence of anaemia in vegetarian diet subjects as compare to the subjects on mixed diet & similar results were seen in earlier studies. Prevalence of anaemia was minimal amongst overweight subjects and higher in lower BMI subjects. These results coincide with the earlier studies of Bentley/Griffith.

Normocytic hypochromic and Microcytic hypochromic type of blood was predominantly present in antenatal women which in consistent with the other studies except for dimorphic blood picture. It indicates iron deficient intake and absorption amongst antenatal women irrespective of their literacy status, dietary habits & type of the family.

CONCLUSION

As high prevalence of nutritional Anaemia was detected in antenatal women, Nutritional education & dietary counseling is recommended by nutritionist.

• Supplementation of iron & folic acid should be implemented to all the antenatal women in rural area.

ACKNOWLEDGEMENT

This study was conducted at RHTC Rama Medical College Hospital and Research Center, Hapur. He wants to thank Principal & Head of Department of Community Medicine for allowing him to carry out this study. He is thankful to his colleagues, laboratory staff, nursing staff members, social workers and statistician for their coordination & co-operation during the study.

REFERENCES


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Hepatitis B Seropositivity and Vaccination Coverage among Health Care Workers in a Tertiary Care Hospital in Moradabad, UP, India

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Abstract

Introduction: Hepatitis B is one of the major public health problem globally and is the tenth leading cause of death. In India, HBsAg prevalence among the general population is 4-8%, which place India in an intermediate endemic zone and second largest global pool of chronic hepatitis B infection. Among health care workers sero prevalence is two to four times higher than that of the general population. Healthcare workers are known to be prone to infection with the hepatitis B virus. Hepatitis B virus is transmitted through percutaneous or permucosal as with exposures to blood, which occur in the healthcare setting most often as needle sticks or other sharp device injuries. To effectively curb HBV infection prevention programs must be implemented and the applicability of a complete vaccination schedule must be underline.

Aim & Objective: The following study was undertaken with the following aim and objective. To study the seropositivity of serum hepatitis in health care workers of TMMC & RC and prophylactic measures in health care workers.

Material & Method: Serum sample of 125 health care workers of Teerthanker Mahaveer Medical College and Research Center was taken during two years duration and tested for HBsAg by rapid card test and ELISA test. Vaccination history was taken from health care workers.

Result: The present study was done on 125 health care workers of Teerthanker Mahaveer Medical College and Research Center. Among 125 health care workers 4 were found HBsAg positive by rapid card test and ELISA test. Out of 125 health care workers 58(46.4%) were fully vaccinated.

Conclusion: The risk of hepatitis B infection is well documented among health care workers, although with use of hepatitis B vaccine the incidence of HBV infection in health care workers has decreased. Therefore there is need for well planned and clear policies for HBV screening and vaccination in health care workers.

Keywords: Serum Hepatitis, Health Care Workers, Seropositivity, Prophylaxis

INTRODUCTION

Hepatitis B is one of the major public health problem globally and is the tenth leading cause of death. Worldwide, more than two billion of the population have evidence of past or recent HBV infection and there are more than 350 million chronic carriers of this infection.¹ In India, HBsAg prevalence among the general population is 4-8%, which place India in an intermediate HBV endemicty zone and India with 50 million cases is also the second largest global pool of chronic HBV infections. Among healthcare workers sero prevalence is two to four times higher than that of the general population.²

Healthcare personnel are persons whose activities involve contact with patients or with blood or other body fluids from patients in a healthcare facilities, labs, or public-safety setting. An exposure that might place Health care workers at risk of infection as a percutaneous injury (e.g., a needle-stick or cut with a sharp object) or contact with mucous
membrane (of eyes, mouth, nose, etc.) or non-intact skin (e.g., exposed skin that is chapped, abraded, or afflicted with dermatitis) with tissue blood or any other body fluids that are potentially infectious.³

The causative agent of hepatitis is hepatitis B virus, which remains asymptomatic in most individuals, but it can show features of fulminant, acute, or chronic hepatitis, considering that the last one might lead to serious complications, such as hepatocellular carcinoma & Cirrhosis. Each year, from 500,000 to 1.2 million individuals die as a consequence of hepatitis B virus infection.⁴ Hepatitis B virus (HBV) infection is highly prevalent in continents like Africa, Asia, and in the different countries, the infection rate in them ranges from 5% to 20%.⁵

Healthcare workers are known to be prone to infection with the hepatitis B virus.⁶ Hepatitis B virus is transmitted through permcosal or percutaneous exposures to blood, which occur in the most of healthcare setting through needle sticks or other sharp device injuries.⁷ To effectively curb Hepatitis B virus infection prevention programs must be implemented, and the relevance of a complete vaccination schedule must be underlined.⁴ The risk of acquiring hepatitis B virus infection through exposure to blood or its products is highest amongst health care workers. Despite potential risks, a proportion of health care workers never get their vaccinations done. India ranks second to China in the numbers of people with chronic HBV.⁹

It is very important to promote vaccination campaigns and increase knowledge and awareness about hepatitis B among health care workers.⁹

Aim of this study was to study the seropositivity of serum hepatitis in health care workers of TMMC&RC, and prophylactic measures in health care workers.

**MATERIALS & METHODS**

The study was done in the Department of Microbiology, Teerthaker Mahaveer Medical College and Research Center over a period of two years.

Serum sample of 125 health care workers of Teerthaker Mahaveer Medical College and Research Center was collected during two years duration. General history of age, sex, socio economic status, marital status was taken. Proper history of the health care workers was taken about needle stick injury and sharp device injury and exposure to blood and blood products during handling the patients. History of vaccination was also taken.

Samples were collected from doctors, nurses, technicians and general service workers.

Aseptically 5 ml venous blood was collected in sterilized plain vial and transported to microbiology laboratory. It was centrifuged and serum was separated. Samples were Tested for HBsAg by rapid card test and ELISA test. To detect HBsAg in samples test were done by using commercially available HEPACARD (J. Mitra. Co. Pvt. Ltd).

ELISA test was also done to detect HBsAg in 125 blood samples, commercially available HEPALISA kit (J. Mitra. Co. Pvt. Ltd) was used.

**Rapid Card Test**

HEPACARD is one step rapid visual test for the qualitative detection of HBsAg in human serum or plasma. Use of this assay is intended as an aid in the recognition and diagnosis of acute infections and chronic infectious carriers of hepatitis B virus. It is a one step immunoassay based on the antigen capture or sandwich principle. The particular method uses monoclonal antibodies conjugated to colloidal gold and polyclonal antibodies immobilized on a nitrocellulose strip in a thin line. This test sample is introduced to and flows laterally through an absorbent pad where it mixes with the signal reagent. If the sample contains HBsAg, the colloidal gold-antibody conjugate binds to the antigen, forming an antigen –antibody-colloidal gold complex. Then complex migrates through the nitrocellulose strip by capillary action. Then further complex meets the line of immobilized antibody (test line) T, the complex is trapped forming an antibody –antigen-antibody colloidal gold complex. The pink band formed indicates the sample is reactive for HBsAg. To serve as a procedural control, an additional line of anti-mouse antibody (control line) C, has been immobilized at a distance from the test line on the strip. When the test is performed correctly, this will result in the formation of a pink band upon contact with the conjugate.

**ELISA Test**

HEPALISA is a solid phase enzyme linked immunosorbent assay (ELISA) based on the Direct Sandwich principle. The microwells are coated with Monoclonal antibodies with high reactivity for HBsAg. The samples are added in the wells followed by addition of enzyme conjugate (polyclonal antibodies linked to Horseradish Peroxidase (HRPO). A sandwich complex is formed in the well wherein HBsAg (from serum sample) is trapped or sandwiched between the antibody and antibody HRPO conjugate. Unbound conjugate is then washed off with wash buffer. The amount of bound peroxidase is proportional to the concentration of HBsAg present in the sample. Upon addition of the substrate buffer and chromogen, a blue colour develops.
The intensity of developed blue colour is proportional to the concentration of HBsAg in sample. To limit the enzyme-substrate reaction, stop solution is added and a yellow colour develops which is finally read at 450 nm spectrophotometrically.

RESULTS

The present study was done on 125 health care workers of Teerthanker Mahaveer Medical College and Research Center, Moradabad.

Out of 125 health care workers 80 were men and 45 were female. Among 125 health care workers 4 were found HBsAg positive by both rapid card test method and ELISA test. Out of four positive cases three were men and one was female.

Two positive cases were detected among 41 health care workers of age group 28-37 years. Out of 125 healthcare workers 4 cases were found positive. Among 36 health care workers between 18-36 years only one case was detected positive. Among 32 health care workers between 38-47 years age group one case was detected positive (Table 1).

<table>
<thead>
<tr>
<th>Age</th>
<th>No. of health care workers</th>
<th>HBsAg positive</th>
<th>HBsAg positive %</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-27</td>
<td>36</td>
<td>1</td>
<td>2.77%</td>
</tr>
<tr>
<td>28-37</td>
<td>41</td>
<td>2</td>
<td>4.87%</td>
</tr>
<tr>
<td>38-47</td>
<td>32</td>
<td>1</td>
<td>3.12%</td>
</tr>
<tr>
<td>48-57</td>
<td>12</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>58-onward</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>4</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

Two positive two cases were detected among 32 general service workers. Among 31 nurses one case was detected HBsAg positive. Among 32 Laboratory technicians one case was detected HBsAg positive. Among 30 doctors positive case was not detected (Table 2).

<table>
<thead>
<tr>
<th>Occupation</th>
<th>No. of health care workers</th>
<th>HBsAg positive</th>
<th>HBsAg positive %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors</td>
<td>30</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nurses</td>
<td>31</td>
<td>1</td>
<td>3.22%</td>
</tr>
<tr>
<td>Lab technicians</td>
<td>32</td>
<td>1</td>
<td>3.12%</td>
</tr>
<tr>
<td>General service</td>
<td>32</td>
<td>2</td>
<td>6.25%</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>4</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

Out of 125 health care workers only 58 were fully vaccinated. Not vaccinated health care workers were 52. Incomplete course of vaccination in 15 health care workers. Among incomplete course of vaccination one case was HBsAg positive (Table 3).

<table>
<thead>
<tr>
<th>Vaccination status</th>
<th>No. of health care workers</th>
<th>% of health care workers vaccinated</th>
<th>HBsAg positive</th>
<th>HBsAg positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully vaccinated</td>
<td>58</td>
<td>46.4%</td>
<td>1</td>
<td>6.6%</td>
</tr>
<tr>
<td>Incomplete course of vaccination</td>
<td>15</td>
<td>12%</td>
<td>3</td>
<td>5.77%</td>
</tr>
<tr>
<td>Not vaccinated</td>
<td>52</td>
<td>41.6%</td>
<td>4</td>
<td>3.2%</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>41.6%</td>
<td>4</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

DISCUSSION

In the present study out of 125 healthcare workers 4 (3.2%) were HBsAg positive and 46.4% health care workers were vaccinated. In a study done by Batista SM et al reported that seropositivity for hepatitis B among dentist is 10.8% from Campo Grande and majority of the dentists (96.6%) are done with HBV vaccination, although only 73.1% completed the three-dose schedule. In dentists from the other regions of Brazil, the infection rates ranged from 10.00% to 17.9%. On the other hand, it was observed that 9% of seropositivity for HBV infection among was there among dentists from United States of America and 7% from Berlin. In a study done on healthcare workers by Shin BM et al positive rate for HBsAg was 2.4%. In 1992, Elavia et al conducted study on healthcare workers and reported that prevalence of HBsAg was 10%. In 2003 E.P. Simard et al conducted a study and reported that in the United States, a 70% decrease in the incidence of acute hepatitis B and estimated 75% of HCWs have been vaccinated against hepatitis B. In a tertiary care hospital in Delhi reported that only 1% of healthcare workers were HBsAg positive by Sukriti et al in 2008 and vaccination in health care workers was 55.4%. In a study done in 2012 by Patricia Carvalho et al seropositivity of hepatitis virus is 8.8% in health care workers. In 2008 in Japan vaccination coverage was found to be 48.2% in dental workers by Nago Y. et al. In a study done by Hutin Y et al. vaccination coverage varies from 18% in Africa to 77% in Australia and New Zealand. In a study done in 2006 by Dannetun E et al in Sweden, the number of HCWs who have received at least one dose is 79%, but only 40% were reported to be fully vaccinated.

The risk of acquiring hepatitis B virus infection through exposure to blood or its products is highest amongst health care workers. To effectively curb Hepatitis B virus infection prevention programs must be reinforced and the relevance of a complete vaccination schedule must be underlined.
CONCLUSION

Exposure to blood borne pathogens poses a serious risk to healthcare workers, and risk of hepatitis B infection is well documented among healthcare workers & professionals. Although with the use of hepatitis B vaccine the incidence of hepatitis B virus infection in healthcare workers & professional has sufficiently decreased, but there is still lots of scope for improvement, as many healthcare workers have not undergone any vaccination. Therefore, there is a utmost need for clear and well-planned policies for HBV screening and vaccination in healthcare workers, especially the one who are at a greater risk of exposure to blood or other potentially infectious material. To minimize the risk, all healthcare should adhere to standard precautions, including the use of appropriate use of hand washing, protective barrier and disposal of needles and sharp instruments. Energetic steps should be taken in all hospitals for the prevention of hepatitis B virus infection among healthcare workers. Hospitals need to identify methods to improve hepatitis B vaccination coverage levels and should consider developing targeted vaccination programs directed at unvaccinated, at-risk healthcare workers who have frequent or potential exposure to blood or other potentially infectious materials. To effectively curb hepatitis B virus infection prevention programs must be implemented and the relevance of a complete vaccination schedule must be underlined. It is important to promote vaccination campaigns and improve knowledge and awareness about hepatitis B among health care workers.

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Electric Burns Injuries of Head and Neck Region: A Retrospective Study

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MATERIAL & METHODS

This retrospective study was conducted in Department of General Surgery in Teerthankar Mahaveer Medical College & Hospital, Moradabad from March 2010 to march 2013 with 113 patients affected with burns. Out of them 51 patients had electric burns of head and neck region with rest of them being chemical, thermal and other burns. Only electric burn patients were included in this study.

As soon as the patient arrived in department of emergency, patients were hemo-dynamically stabilised for their vitals.

INTRODUCTION

Electricity forms the main modality of support to every one's life. In the modern times the use of electricity has increased many times and so has the incidence of high/low voltage electrical burn injuries. The incidence of high/low voltage electrical injuries are much higher in rural, semi-urban areas of developing countries. Literature says that about 0.8-1.0% of accidental deaths happen due to electricity burns and constitute around 6-9% of all burns patients. Electrical injuries cause around 1000 deaths in States each year with a mortality rate of 3-15%.1,2

Abstract

Introduction: Electric burn patients are increasing every day with increasing use of importance of electricity. This is more common in semi-urban and rural areas where the people are less aware regarding the safety of electrical burns in contrast to develop countries.

Aim & Objectives: To assess the incidence of electric burn injuries in head and neck area and enforce strict laws and create public awareness to prevent the same.

Materials and Methods: A retrospective analysis was done in our Department of General Surgery from March 2010 to March 2013 with 113 patients affected with burns. Out of them, 89 patients had electric burns with rest of them being chemical, thermal and other burns. Out of 89 patients, 51 patients had electric burns of head and neck region that were included in the study.

Results: Electric burns injuries involving head and neck region was seen in 61.4% of total victims. The most common age group was 20-40 yrs. Incidence was higher in rural population with 81.9% compared to urban 28.1%. Electricians, workers in electricity board comprised 59.26% of victims. In all patients, debridement was done and collagen membrane was grafted and some patients required reconstructive procedures 35.2% of patients.

Conclusion: Electric burns are not uncommon in rural areas of India. The incidence electric burn injuries can be decreased if there is a public awareness especially among the electric workers regarding hazards of high voltage tension lines explained and use of safety equipments made mandatory.

Keywords: Electric burns, Head and neck, Safety measures
using strict ATLS protocols. Medical history and clinical examination of the patients were carried out. Fluid replacement was titrated to maintain urine output of 0.5-1.0 ml/kg/hr and complete surgical profile was taken to rule out myoglobinuria. Patients with only electric burn injuries of head and neck were included in this study. A complete personal history regarding occupation, cause of electrical burn injury, site and duration of contact, voltage of the electric current (voltage) was taken. Routine investigations like electrocardiogram, arterial blood gas, chest x-ray and renal function test were performed in every patient.

RESULTS

Out of total 113 patients (Table 1) of burn injuries, 51 patients had involvement of head and neck region (Table 2). Males were more commonly affected 42 males against 9 females. Incidence of injuries were higher in rural areas with 81.9% as compared to urban with 28.1% (Table 3). The patients in this study had the age range from 20 years to 40 years.

Most of the patients were associated with electric department workers with 65.3%, house hold workers 23.5%, and others indirectly associated with electricity jobs were 11.2% (Table 4). Electric burn injuries of head and neck were comprising of 61.4% when compared to other parts. 64.8% of patients underwent debridement of the wound injuries, collagen grafting procedures. 35.2% of patients required skin grafting. We did not find any major complications in our study.

DISCUSSION

Electric burn injuries of head and neck were more common in males occurring in age group of 20 to 40 years. This might be due to the occupational hazards are most common associated with them as they are the earning group of the family. The young adults were associated with electric burns of head and neck due to their aggressiveness of performing activities and their carelessness and risk taking behavior. Most of the electric
workers were young adults and improper instructions for the precautions.

Electric burns of head and neck region comprised of 61.4% of high/low voltage injuries and is quite high than other parts of the world.8-10 The main reason may be less or no public awareness about the precautions in rural and semi urban population for using helmets, electric gloves and risk of touching live wires. It was also due to lack of proper insulated transmission lines and lack of enforcement of strict rules among the population.11-14 The electric burn injuries are more in winter months when these non insulated wires are exposed outside.

Among occupation, electrical department workers were the most commonly affected and the reason was lack of proper training and non enforcement of strict laws for prevention of electric burns. Hence use of electric gloves, helmets, rubber boots were used to prevent the injuries. Head and neck injuries might be more common due to the first exposed area of the body for the injuries. 64.8% of patients underwent debridement of the wound injuries, collagen grafting procedures. 35.2% of patients required skin grafting. There were no major complications found in this study.

We conclude that electric burn injuries of head and neck are most common in rural and semi-urban areas of population. This can be prevented by enforcement of strict laws and training for all the electric department workers and also creating mass media public awareness among the general public. All the tension lines must be insulated in rural and semi-urban areas to prevent the chances of electric burn injuries.

REFERENCES


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Sonomammographic Evaluation & Characterization of Breast Lumps

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Abstract

Introduction: Modern breast USG is an established, ideal and accurate tool for the investigation and characterization of breast lumps. It also compliments X-ray mammography in further evaluation and diagnosis of breast masses and thus avoids unnecessary breast surgeries in benign conditions. We present a case series of 64 patients with ultrasound findings in various breast lumps and pathologies.

Aims & Objective: In this study we planned to evaluate and characterize breast lumps with USG examination.

Material & Method: The present study was conducted in the Department of Radio-diagnosis, TMMC & RC, TMU, Moradabad. Patients under study were referred from the department of Surgery, medicine and gynaecology & obstetrics. Patients included for study were evaluated by Clinical and Ultrasound examination. Histopathological confirmation was done in all the cases by FNAC/ excision biopsy.

Result: On examination distribution of lesions was found to be Fibroadenoma (31.1%), Breast cyst (20.7%), Intraductal papilloma (5.2%), Lipoma (3.4%), Breast abscess (3.4%), Galactocele (3.4%), Cystosarcoma phyllodes (3.4%), Hamartoma/ Fibroadenlipoma (3.4%) & Fat necrosis (3.4%), Invasive ductal carcinoma (17.4%), Invasive lobular carcinoma(5.2%).

Conclusion: Sonomammography is a very dynamic and powerful tool for the evaluation of lumps. It considerably improves the visualization and evaluation of tumors in radiodense breasts as well it improves the specificity of mammography when used to complement X-ray mammography.

Keywords: Breast, Ultrasound, Sonomammography, X-Ray mammography

INTRODUCTION

As there is increased awareness and incidence of breast cancer in women, a breast lump may alarm both the patient and clinicians. Breast sonography is appropriate modality in the initial evaluation of a woman younger than 30 years with a palpable lump and also helpful in the evaluation of mammographic masses, focal asymmetric densities, and palpable abnormalities not seen mammographically.1 Although the cause may be benign, additional evaluation and histopathological confirmation might be needed.

Sonographic feature analysis of breast masses continues to improve2, though inter observer variability continues to be a problem, in avoiding biopsy.3,4 An illustrated Breast Imaging Reporting and Data System (BI-RADS) ultrasonographic lexicon5 may be helpful in improving observer performance.

MATERIAL & METHOD

The present study was conducted in the Department of Radio-diagnosis, TMMC & RC, TMU, Moradabad. Patients
under study were referred from the evaluated by Clinical and Ultrasound examination.

**Patient Evaluation**

Patients were evaluated along the following lines.

**A. Clinical examination**

A detailed clinical history was taken from all cases, general physical and local examination were carried out.

**B. Radiological evaluation**

Ultrasoundography

High-resolution real time sonography of the breast lumps was done in all patients. Scanning done with 7-10 MHz transducers on Medison Diagnostic ultrasound system installed in Department of Radio-diagnosis, TMMC & RC, Teerthanker Mahaveer University, Moradabad. The sonographic examination for inner part of breast was performed in supine position and for the outer part of breast; patient was placed in contralateral posterior oblique position with the ipsilateral arm raised. Scanning was performed in transverse and sagittal planes. Color Doppler (CD) & Power Doppler (PD) also used for assessment of vascularity of the lesion. Histopathological confirmation done in all the cases by FNAC/ excision biopsy.

**RESULTS**

**Table 1: Lesion detection in 64 patients on breast USG examination**

<table>
<thead>
<tr>
<th>Nature of lesion</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesions</td>
<td>58</td>
</tr>
<tr>
<td>Indeterminate</td>
<td>02</td>
</tr>
<tr>
<td>Normal</td>
<td>04</td>
</tr>
</tbody>
</table>

Number of Patients, N=64

**Table 2: Ultrasonic characterization of 58 lesions in breast**

<table>
<thead>
<tr>
<th>Nature of lesion</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibroadenoma</td>
<td>18</td>
<td>31.1</td>
</tr>
<tr>
<td>Breast cyst</td>
<td>12</td>
<td>20.7</td>
</tr>
<tr>
<td>Intraductal papilloma</td>
<td>03</td>
<td>5.2</td>
</tr>
<tr>
<td>Lipoma</td>
<td>02</td>
<td>3.4</td>
</tr>
<tr>
<td>Breast abscess</td>
<td>02</td>
<td>3.4</td>
</tr>
<tr>
<td>Galactocele</td>
<td>02</td>
<td>3.4</td>
</tr>
<tr>
<td>Cystosarcoma phyllodes</td>
<td>02</td>
<td>3.4</td>
</tr>
<tr>
<td>Hamartoma/Fibroadenlipoma</td>
<td>02</td>
<td>3.4</td>
</tr>
<tr>
<td>Fat necrosis</td>
<td>02</td>
<td>3.4</td>
</tr>
<tr>
<td>Invasive ductal carcinoma</td>
<td>10</td>
<td>17.4</td>
</tr>
<tr>
<td>Invasive lobular carcinomas</td>
<td>03</td>
<td>5.2</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td></td>
</tr>
</tbody>
</table>

Number of Lesions, N=58

**DISCUSSION**

In our series, 64 patients with complaints of breast lumps were assessed. Mostly patients presented with clinical features of lumps/swelling, pain, nipple discharge and combination of these complaints.

Out of 64 patients, lesions were detected in 58 patients on ultrasound examination, while 4 patients were normal on clinical & ultrasound examination and two patients were with indetermined lesions on USG.

Fibroadenoma were the largest group, representing 31.1% (18 out of 58) of lesions. It is usually seen in young women. On ultrasound it is usually homogenous, well defined, hypoechoic, ellipsoid, wider than tall, and may even show posterior enhancement. It may also present with foci of calcifications within. Histopathologically benign fibroadenomas have a higher incidence of transformation into breast cancer. On CD & PD, mostly lesions present with mild/ absent vascularity.

Breast cysts comprised 20.7% (12 out of 58) of lesions. It shows either simple or complex cystic features on USG. A significant number of complex cysts, especially those with a solid intracystic components, may turn out to be malignant on histopathology. On USG simple cysts presented as completely anechoic lesion, with a thin echogenic capsule, posterior acoustic enhancement, and thin clear edge shadow. Complex cysts showed internal echoes, septations or thick irregular walls. Sometimes it may appear as hypoechoic or solid echogenic lesion, depends on its contents. On CD & PD mostly lesions present with increased peripheral vascularity. Air shadowing was also noted along with inflammatory changes in adjacent breast parenchyma.

Intraductal papillomas comprised of 5.2% (3 out of 58) of all lesions. Papillomas in the breast may be intracystic (Figure) or intraductal. They are difficult to differentiate from papillary carcinomas only on sonography and a FNAC/biopsy is required for confirmation. In our study, most of the patients with clinical complaint of bloody
nipple discharge were turned out to be Intraductal and Intracystic Papillomas/papillary carcinoma. On USG it presented as a complex cystic lesion with an intracystic, solid, polypoidal echogenic mass of varying sizes. On CD & PD, lesions presented with increased vascularity within solid echogenic component.

2 out of 58 lesions (3.4%) were turned out to be lipoma. These are fatty tumors in the breast parenchyma and may vary in appearance on USG, ranging from uniformly echogenic to heterogeneous or completely anechoic lesions. In our study, breast USG showed well-defined, oval, echogenic mass lesion partially compressible on probe pressure, without any significant vascularity on Doppler.

2 out of 58 (3.4%) lesions turned out to be breast abscess. Acute breast abscesses may occur during lactation and are clinically present with high-grade fever, painful lump, skin erythema and oedema. On USG, it showed a large complex heterogeneous cystic lesion with mobile internal echoes and adjacent inflammatory breast tissue with increased peripheral vascularity on CD & PD.

2 out of 58 (3.4%) lesions turned out to be galactocele, which usually occur during lactation or shortly after breastfeeding is stopped, are mostly caused by an obstructed milk duct. In our study, both patients presented with complaint of breast lump during lactation. On USG, it showed a complex mass lesion filled with uniform dense echoes. On aspiration, this yielded a milky substance.

2 out of 58 lesions (3.4%) were turned out to be cystosarcoma phyllodes. These are rapidly growing, benign-looking lesions with internal cleft and cystic spaces and moderately vascular on Doppler. They are fibroepithelial stromal tumors that may be benign or malignant. Recurrence rate is high and may rarely metastasize. In our study, both patients presented with complaint of breast lump during lactation. On USG, it showed a well-defined, lobulated, hyperechoic, encapsulated, with multiple, linear, anechoic internal “clefts” and cystic spaces. On CD & PD, lesions presented with increased vascularity.

2 out of 58 (3.4%) lesions turned out to be hamartomas. These are fat-containing, benign tumors in the breast, with varying amount of fibrous and fatty components. On USG, it showed heterogeneous nature with mixed hyperechoic, echogenic areas and focal calcifications within.

2 out of 58 (3.4%) lesions turned out to be of fat necrosis. Fat necrosis is a common entity. However, may pose difficulty to clinicians and sonologist. Fat necrosis may result from accidental trauma, after surgery or radiation therapy. The sonographic features of fat necrosis are varied and depend on the degree of fibrosis. In our study, on USG, it showed complex mass with echogenic bands that shift in orientation with changes in patient position, and an echogenic mass with posterior acoustic enhancement in other patient.

10 out of 58 (17.2%) lesions showed malignant features on USG and turned out to be invasive ductal carcinoma on histopathology. On USG, it presented with irregular, ill-defined, microlobulated, heterogeneously hypoechogenic lesions with infiltrative indistinct margins. These lesions were taller than wide in dimension.

3 out of 58 (5.2%) lesions showed malignant features on USG and turned out to be invasive lobular carcinoma on histopathology. This is the second most common breast malignancy and may be seen in elderly women. It is often missed on X-ray mammography. On sonography, its appearances are variable, ranging from lesions similar to ductal carcinomas to barely visualized areas of architectural distortion with picket-fence shadowing. Some of these tumors may even not visualized on USG. In our study, it showed large, ill-defined, heterogeneous, hypoechogenic lesions with area of architectural distortion on USG.

On histopathological confirmation out of 58 lesions, 41 lesions turned out to be benign, malignancy were detected in 13 lesions and 2 lesion were remain of indeterminate category.

CONCLUSION

Sonomammography is a very dynamic and powerful tool for the evaluation of breast lumps. The advantages of USG include good availability, cheaper, fast, with no ionizing radiation. As well as it helps in the assessment of vascularity of the lesion. USG should be used as the primary investigation or in conjunction with X-ray mammography for the evaluation and characterization of the breast lumps.

REFERENCES


Source of Support: Nil, Conflict of Interest: None declared.
Psychiatric Morbidity Associated with Hip Fractures – A Hospital Based Study

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Abstract

Background: Most prevalent type of fractures encountered in elderly population are fall related hip fractures, which are even more common in female elderly population. Studies have shown such type of fractures are associated with psychiatric morbidity. This study is being taken into account for evaluation of different type of psychiatric morbidities associated with hip fractures in elderly population.

Methods: This retrospective study is conducted Teerthankar Mahaveer medical college hospital, Moradabad, on 45 patients, who underwent hip surgery in last six months.

Results: Maximum number of patients with hip fracture were in the age range of (81-90 yrs), more so over in that category females with hip fractures were 80.95%, and least number of patients with hip fractures were in the age range of (61-70 yrs.).

Conclusion: Delirium, dementia and depression are most severe type of neuro-psychiatric co-morbidities are associated with elderly hip fractures. These co-morbidities may be minimized by pre-operative and post-operative care.

Keywords: Hip fractures, Delirium, Dementia and Depression

INTRODUCTION

Hip fractures are the most severe type of fall-related injuries among elderly patients and are associated with high morbidity, mortality and impairment in quality of life.1,2 There are two major anatomic types: intra-capsular and extra-capsular type of hip fractures. Research has shown that advancing age is more strongly associated with risk of inter-trochanteric fractures than sub-capital fractures.3 In women the proportion of the hip fractures rises significantly with age whereas the proportion of inter- trochanteric fractures among men decreases with age. The rise in hip fractures incidence in elderly4 will lead to exponential rise in patients with co-morbid conditions like dementia, depression and delirium. Hip fractures were defined according to the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada (ICD-10-CA) as either sub-capital fractures (S72.0-S72.091) or intertrochanteric fractures (S72.1-S72.191). High rates of psychiatric morbidity have been reported amongst subjects with hip fracture as compared to community rates.5,8 Among the co-morbidities, neuropsychiatric disorders represent a major challenge in terms of mortality and functional outcome of hip fracture patients.

Delirium is the most studied organic psychiatric disorder in patients who sustained a hip fracture, and it has been associated with increased morbidity and mortality rates, a longer length of hospital stay, and an increased risk of nursing home placement.9

Its incidence ranges from 16% to 62% after surgery for hip fracture.10 It usually peaks between 2 and 5 days after surgery.11

Prevalence of depression in older people after hip fracture ranged from 9% to 47% and largely exceed the 2% and 10% respectively reported for major and minor depressive disorder in the aged-matched not affected people.12
The amount of research on hip fracture outcomes is quite extensive. Significant predictors of the degree of recovery from hip fracture include pre fracture variables such as age, functional ability, mental status, and psychiatric conditions such as dementia and depression.\(^{13}\)

Although females have a higher incidence of hip fracture than males, men who fracture a hip often show higher mortality rates than women.\(^{14,15}\)

The research findings relating cognitive status to hip fracture survival and return of functional status clearly indicate that the presence of cognitive deficits, either dementia or delirium, was associated with death and delayed return of mobility.

**AIM & OBJECTIVE**

The high rates of mortality and morbidity after hip fracture in elderly demands further research so that we can combat those predisposing factors and decline in the incidence in associated co-morbid conditions can be made.

**MATERIAL & METHODS**

This retrospective study was conducted in department of Psychiatry and Orthopaedics, Teerthankar Mahaveer medical college hospital, Moradabad, on 45 patients (Male=8, Female=37) above 60 years, who had undergone surgery for hip fracture, for last six months were included in the study. Snowball sampling technique was used. We recorded age, sex, socio-economic status, rural/urban background, type of fracture, pre-operative physical and mental status.

Diagnostic and Statistical Manual of Mental Disorders (DSM-IV criteria) (1994)\(^{16}\) type of anesthesia used, operation performed, drugs and advice prescribed at the time of discharge. Before starting the study necessary research protocol including ethical and research committee approval was taken. Data recording was done from medical record section with prior permission of Medical Superintendent.

**RESULTS**

As can be using Table 1, that maximum number of patients with hip fracture was in the age range of (81-90 yrs), more so in that category females with hip fractures were 80.95%, and least number of patients with hip fractures were in the age range of (61-70 yrs).

Maximum percentage of female patients was in age range of more than 91 yrs of age (88.88%).

Out of 45 patients in whom the study was conducted 82% were females.

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Total=45</th>
<th>Female=37</th>
<th>Male=8</th>
</tr>
</thead>
<tbody>
<tr>
<td>61-70</td>
<td>3 8</td>
<td>2 66.66</td>
<td>1 33.34</td>
</tr>
<tr>
<td>71-80</td>
<td>12 27</td>
<td>10 83.33</td>
<td>2 16.67</td>
</tr>
<tr>
<td>81-90</td>
<td>21 46</td>
<td>17 89.5</td>
<td>4 10.5</td>
</tr>
<tr>
<td>&gt;91</td>
<td>9 19</td>
<td>8 88.88</td>
<td>1 11.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Trochanteric fracture N=14</th>
<th>Cervical fracture N=31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (yrs)</td>
<td>81.9</td>
<td>78.8</td>
</tr>
<tr>
<td>Standard deviation (SD)</td>
<td>±6.8</td>
<td>±5.2</td>
</tr>
<tr>
<td>Range (yrs)</td>
<td>75-91</td>
<td>69-89</td>
</tr>
</tbody>
</table>

As can be observed using Table -2 that out of 45 patients having hip fractures 14 (31.11%) patients were having Trochanteric, and 31 (68.89%) patients suffered Cervical fractures. Trochanteric fractures were mostly seen in age range of (75-91 ± 6.8 yrs), while Cervical fractures were mostly present in age range of (69-89 ± 5.2 yrs). Mean age for Trochanteric fractures was (81.9 yrs) and for Cervical fractures, it was (78.8 yrs).

<table>
<thead>
<tr>
<th>Type of psychiatric disorder</th>
<th>Number</th>
<th>Percent</th>
<th>Number</th>
<th>Percent</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>12</td>
<td>26.66</td>
<td>19</td>
<td>42.22</td>
<td>10</td>
<td>22.22</td>
</tr>
</tbody>
</table>
Differences in anatomical structure and bone composition. Obscure etiological and occurrence patterns that result from considering these together as a single unit. However, this may not be the case with elderly males. This result is similar to as observed by Karagas et al. in showing a rise in the proportion of intertrochanteric fractures in women with increasing age, but not in men.

Our study showed rise in incidence of trochanteric fractures in elderly females with increasing age, but this is not so with elderly males. This result is similar to as observed by Hempsall, V. J., Robertson et al showed 12±20% mortality in the first year after hip fracture and Laxton, C., Freeman, C. et al showed that remaining suffered impaired quality of life.

Prevalence of psychiatric illness in elderly hip fracture population is 9±47% for depression and 31±88% for cognitive impairment are described by Williams et al in 1985a and Williams et al 1985b. Billington et al 1986, Berggren et al 1987, & Gustafson, 1989). So much of variation in prevalence is probably due to differing sampling methodology, screening tools used. Such type of wide variation in psychiatric illness was not reported in our study. This is because of the fact that we employed uniform criteria (snowball sampling method) to access the condition.

The presence of depression in older persons who fracture a hip also is a determining factor in recovery.

A year later analysis of the same study, showed that elderly patients with persistent depression were at a much higher risk for not returning to pre-fracture levels.

Our study on 45 patients who developed 12 (26.66%) depression, 19 (42.22%) dementia and 10 (22.22%) delirium well in accordance with similar studies conducted by Van Marwijk HW, Wallace P et al & Lenze EJ, Munin MC et al.

CONCLUSION

Functional outcome in elderly patients having hip fractures are significantly related to the presence of neuropsychiatric co-morbidities. The most frequent ones in elderly are delirium, dementia and depression. Early detection of these co-morbidities may improve survival, and level of functional recovery. We the authors of this study strongly support the pre-treatment assessment of neuropsychiatric disorders using appropriate screening tools and further assessment of patient condition at 1, 3 and 6 months post-operatively.

REFERENCES


Source of Support: Nil, Conflict of Interest: None declared.
Cariogram – A Multi-factorial Risk Assessment Software for Risk Prediction of Dental Caries

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Abstract
For years, Swedish researchers have recognized caries risk assessment as an important part of routine dental practice for caries management. This paper reviews a new way of illustrating the caries risk profile of an individual through a computer program, the Cariogram, which was described by Professor Bratthall in 1976. Cariogram is a risk as well as a prediction model. It presents a ‘weighted’ of the input data related to caries such as caries experience, related disease, diet, fluoride content, saliva and plaque amount. It’s a didactic tool which illustrates the multifactorial etiologic factors of dental caries in a graphical manner as well as it provides targeted preventive strategies. Many studies have been done to validate the software as a caries risk assessment tool since 2000. This paper attempts to embrace the studies related to Cariogram.

Keywords: Cariogram, Caries-risk assessment, Dental caries

INTRODUCTION
Caries risk assessment is a vital element in the comprehensive management of the disease. It has gained a great deal of attention in the recent literature. Caries risk assessment approaches must ruminate the risk implications from various factors that influence carious activity. Accurate prediction of caries risk help in directing targeted preventive actions to those who are at high caries risk, before cavities could develop. Unsurprisingly, if the chief etiological factors could be identified, appropriate individualized treatment can be carried out with good results.

The multifactorial etiology of dental caries points to the inevitability of developing new caries risk assessment models that would embrace the different factors or parameters which influence new carious lesions. Currently, caries-risk assessment models comprehend a combination of factors such as diet, fluoride exposure, a susceptible host, and microflora that interact with a variety of social, cultural, and behavioural factors. No single test takes into account all the caries etiological factors and can accurately predict an individual’s susceptibility to caries risk.

There are two different approaches described for caries risk assessment models: the risk model and the prediction model. The risk model is used to determine the causative caries factors called risk factors but it cannot predict the caries outcome. The prediction model estimates the risk of caries progression in the future. Risk models counting multiple variables result in better predictions as the disease process is multifactorial. The most commonly used statistical methods for caries risk assessment are multiple regression analyses.

Caries preventive measures must be integrated based on knowledge and understanding of the predicted risk. Caries risk assessments during treatment aids as a monitor for the success of the treatment. They may also be very valuable for screening populations in community preventive programs. In ignite of today’s prominence on health care reform, dental insurers may eventually use risk assessment to determine a patient’s benefit package.

For each patient, risk assessment allows for customization of a prevention program. A patient at low caries risk may not need office fluoride treatments or a six-month recall appointment. On the contrary, a patient at high risk of developing caries may need home fluoride treatments and a three month recall appointment. Risk assessment consents dental care to be rendered more resourcefully.
As an aid for professionals and a didactic tool for patients, a computer program (Cariogram) for caries risk assessment has been developed. The Cariogram is a modest and expedient tool for caries risk assessment that uses an algorithm to assess caries risk. It analyses the input data, chiefly biological factors such as past caries experience, related diseases, diet contents & frequency, plaque amount, Mutans streptococci count, fluoride programme, saliva secretion & buffer capacity. All these etiological factors are assessed and the risk is calculated. Preventive measures to evade the development of new caries are also proposed by the software.

What is Cariogram?
It is a graphical picture illustrating in an interactive way the individual's/patient's risk for developing new caries at some point in the future, concurrently, it expresses the magnitude at which the multiple etiological factors of caries affect the caries risk for that particular patient. The Cariogram under no circumstances, states a particular number of cavities that will or will not occur in the future. It rather elucidates a possible over-all risk picture, based on the interpretation of gathered information.

Purpose of the Cariogram
1. To determine the caries risk graphically, expressed as the “Chance to avoid new caries” (i.e. to avoid getting new cavities or 'holes') in the near future.
2. To exemplify to what extent different factors affect this ‘Chance’.
3. To encourage preventive measures to be introduced before new cavities could develop.

Cariogram – Aims
• Illustrates the interaction of caries related factors.
• Illustrates the chance to avoid caries.
• Expresses caries risk graphically.
• Recommends targeted preventive actions.
• Can be used in the clinic.
• Can be used as an educational programme.

This program cannot supersede the personal and professional judgement of caries risk made by the examiner. However, it may provide beneficial hints and may even serve as a base for discussions with the patient about various risk factors and preventive approaches. In other words, it does not conquer the verdict or the obligations of the examiner, but may assist in the clinical decision-making.

HISTORY
Over the past few spans, Swedish researchers had been working on the development of new concepts for caries risk assessment. The ground-breaking work of Bo Krasse and his team at the Dental School in Goteborg laid the underpinning for the development of a comprehensive model of the caries risk profile for use in the management of dental caries. Building on this work, Douglas Bratthal and associates at the Dental School in Malmo had endeavoured to make the practical application of risk assessment more accessible by developing a computer-based caries risk assessment model.

Bratthal in 1976 developed a new model, the Cariogram which can be used for illustration of caries-related factors. Professor Bratthal is program manager for the World Health Organisation oral database. His work on Cariogram instigated after he penned to oral health experts around the world asking them to fill in a questionnaire on the factors which most influence caries reduction. Several thought it was better brushing, others believed it was better diet or fluoride. He categorically wanted to find a way of explaining all the different factors affecting caries and how they relate to each other.

In November 1997, after extensive trials, the Swedish version of the Cariogram was launched officially. Since then, Cariogram have been created in several languages to be used in different countries. The concept and formula for the Cariogram was developed by Professor D. Bratthal and the PC version was designed in collaboration with Dr L. Allander and K-O. Lybegård B.Sc. It can be downloaded by everyone from the Internet page: http://www.db.od.mah.se/car/cariograminfo.html. The English version is available from that page, at no cost.

The ‘Cariogram’ is a new concept, professed initially as an edifying model, targeting at illustrating the multifactorial upbringing of dental caries in a simple way. It has steadily evolved over a long epoch of time until it became a reality. Originally, the Cariogram was a circle alienated into three segments. Each segment represented factors that strongly influence carious activity, diet, bacteria and susceptibility. The necessity to clarify why, in some individuals, carious activity could be low inspite of, for example, more amount of sucrose consumption, deprived oral hygiene practices or non-use of fluorides, led to the development of the model. As it presents the interaction of relevant factors in caries in a graphical manner, it is called as Cariogram, and the process of preparing such graphs, is known as Cariography.

Contributing factors in creating a Cariogram
1. Immediate factors involved in caries process directly at the site of lesion
   a) Attack mechanisms- dental plaque, microorganisms, and diet.
   b) Defence mechanisms- Salivary protective systems and fluoride exposure
2. Indicators of caries risk- factors that do not participate in the ‘making’ of a cavity  
   a) Socioeconomic status  
   b) Past caries experience

The five sectors of Cariogram (Figure 1)  
- **Green sector** - denotes the “Actual chance to avoid caries”. It is what is left, after the other factors take their segment.  
- **Dark blue sector** - “Diet” (diet contents and diet frequency).  
- **Red sector** - “Bacteria” (amount of plaque and mutans streptococci).  
- **Light blue sector** - “Susceptibility” (fluoride programme, saliva secretion and saliva buffer capacity).  
- **Yellow sector** - “Circumstances” (Past caries experience and related diseases).

“The larger the green sector, the better the dental health of the patient.”

The Cariogram shows the overall risk of the patient i.e. high, intermediate or low caries risk. The problems such as fractured teeth or fillings, discolorations etc are not taken in to consideration by the program.  

Studies to validate the computer program - ‘Cariogram’ as caries risk assessment tool and Caries risk profiles according to Cariogram  
Though the concept of Cariogram came in 1996, the studies to validate the program were started in 2000 and eventually the program has proved to be expedient. (Table 1). There have been many studies done to record the caries risk profiles of varying population using the Cariogram (Table 2).

**CONCLUSION**

Risk assessment has enthused from the sheer addition of individual risk factors to a tactic in which risk factors are prejudiced on the basis of alleged role they play in the etiology of the disease. A caries risk software, Cariogram, has been developed along the same line of thought. The credence of the component factors included in the program is derived from proficient unanimity. Cariogram acts as a prediction model that predicts who is at high risk, as well as it is a risk model categorising the risk factors to facilitate planning of interventions. Cariogram program is effective and has shown promising results in prophesying caries. It assesses and graphically exemplifies a caries risk profile for an individual. The pie chart presentation helps in increment of patient motivation. It also provides endorsements for targeted preventive measures to overcome new caries

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Table 1: Studies to validate the Cariogram

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Study setting</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Gunnel Hansel Petersson, Douglas Bratthall | 2000 | Sweden | The ‘opinion’ of the Cariogram on caries risk was in agreement with that of the majority of dentists and dental hygienists.  
   The Cariogram predicted caries increment more accurately than any included single-factor model. |
| Gunnel Hansel Petersson, Svante Twetman, Douglas Bratthall | 2002 | Malmo, Sweden | The Cariogram was able to sort the elderly individuals into risk groups that reflected the actual caries outcome. |
| Gunnel Hansel Petersson, Solveig Fure, Douglas Bratthall | 2003 | Malmo, Sweden | When the Cariogram was used as a predictor for the metabolic state of the disease, the sensitivity and specificity was 75% and 71%, respectively.  
   Cariogram software program highlights both relevant caries-related factors and practical therapeutic interventions for selected patients. |
| Svante Twetman, Douglas Bratthall, Gunnel Hansel Peterson | 2005 | Sweden | The past caries experience, Streptococcus mutans count, fluoridation programme and buffer capacity of the saliva are the factors included in the Cariogram that showed significant correlation with the caries risk determined by the program. Other factors that the Cariogram does not include directly, such as, DMFT, DMFS and the plaque index, also showed high correlation with risk. |
| Anna Y. Alian, Mary E. McNally, Solveig Fure, Dowen Birkhed | 2006 | Goteburg, Sweden |  |
| Ana Ruiz Miravet, Jose Maria Montiel Company, Jose Manuel Almerich Silla | 2007 | University of Valencia |  |

Contd.
Table 1: Contd.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Study population</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Zukanovic, S Kobasiuja, M Ganibegovic, Sonbul Helal, Al-Otaibi, Birkhed Dowen, Pernilla Lf Holgerson, Svante Twetman, Christina Stecksen-Blicks, Gugliemo Campus, Maria Grazia Cagetti, Gianluca Sacco, Guido Benedetti, Laura Strohmenger, Peter Lingstrom, Gunnel Hansel Petersson, Per-Erik Isberg and Svante Twetman</td>
<td>2004</td>
<td>Bosnia</td>
<td>Caries risk prediction software A caries risk prediction software is a software that can be used to predict the risk of developing dental caries.</td>
</tr>
<tr>
<td>Rodrigo Andrés Giacaman, Paulina M Tellez, J Gomez, I Pretty, R Ellwood, Esra Uzer Celik, Necmi Gokay, Mustafa Mamata Hebbal, Anil Ankola, Sharada P Lingstrom, G Campus, MG Cagetti, S Sale, G Carta, Paramdeep Singh, Varun Dua, Avninder Kaur, Kawaldeep Singh Kwatra, Devinder Utreja, Mauli Simratvir,</td>
<td>2012</td>
<td>Saudi Arabia</td>
<td>The accuracy of caries prediction in schoolchildren was significantly impaired when the Caries risk prediction software was applied without enumeration of salivary tests.</td>
</tr>
<tr>
<td>G Campus, MG Cagetti, S Sale, G Carta, P Lingstrom, Mamata Hebbal, Anil Ankola, Sharada Metgud</td>
<td>2012</td>
<td>Saudi Arabia</td>
<td>The Caries risk prediction software was confirmed, the software fulfilling the criteria for a good risk assessment model: precision, accuracy and ease of use.</td>
</tr>
<tr>
<td>Esra Uzer Celik, Necmi Gokay, Mustafa Ates, M Tellez, J Gomez, I Pretty, R Ellwood, A Ismail</td>
<td>2012</td>
<td>Saudi Arabia</td>
<td>The Caries risk prediction software model can identify the caries-related factors that could be the reasons for the estimated future caries risk, and therefore help the dentist to plan appropriate preventive measures.</td>
</tr>
<tr>
<td>Rodrigo Andrés Giacaman, Paulina Miranda Reyes, Valeria Bravo León, J H Lee, H H Son, H Y Kim, J Chang</td>
<td>2012</td>
<td>Saudi Arabia</td>
<td>Cariogram had a diagnostic accuracy of 63.33%.</td>
</tr>
<tr>
<td>Gunnel Hansel Petersson, E Ericson, Per-Erik Isberg and Svante Twetman</td>
<td>2012</td>
<td>Saudi Arabia</td>
<td>The proportion of subjects assessed with high or very high risk was similar using the Public Dental Service guidelines and the Caries risk prediction software.</td>
</tr>
</tbody>
</table>

Table 2: Caries Risk Profiles Using Cariogram

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Study population</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gunnel Hansel Peterson, S Fure, Svante Twetman, Douglas Bratthal</td>
<td>2004</td>
<td>400 children and 150 elderly in Sweden</td>
<td>26% and 3% elderly and children respectively, belonged to high risk group.</td>
</tr>
<tr>
<td>GL Tayanin, Gunnel Hansel Peterson, Douglas Bratthal</td>
<td>2005</td>
<td>Hundred 12-13 years old children in Laos compared with 392 Swedish Children</td>
<td>According to the ‘opinion’ of the Cariogram, the Laotian children demonstrated significantly higher caries risk than Swedish children.</td>
</tr>
<tr>
<td>Anas H. Al Mulla, Saad Al Kharsa, Heidrun Kjellberg, Dowen Birkhed, Khalid Medrad, Helal Sonbul, Moataz Gholman, Clas Reit, Dowen Birkhed, Jeddah</td>
<td>2009</td>
<td>Hundred Orthodontic patients aged between 12-29 years</td>
<td>Patients with high (S&gt;= DFS) numbers before orthodontic treatment ran a higher risk of developing caries.</td>
</tr>
<tr>
<td></td>
<td>2010</td>
<td>Two hundred Saudi adults (Two groups- Endodontic Group with a minimum of 2-root filled teeth and Non-Endodontic Group)</td>
<td>No association between caries risk profile and presence of root-filled teeth, but reinforced the opinion that root-filling procedures might make the tooth more susceptible to caries.</td>
</tr>
<tr>
<td>Gunnel Hansel Petersson, Per-Erik Isberg and Svante Twetman</td>
<td>2010</td>
<td>Four hundred thirty eight schoolchildren aged 10-11 years at baseline</td>
<td>Increment in “chance to avoid cavities” from 47% to 87%.</td>
</tr>
<tr>
<td>Y B Patil, S. Hegle- Shethiya, P V Kakodkar, R Shirahatti</td>
<td>2011</td>
<td>Fifty four mentally challenged children (7-17 years old) in Pimpri, Pune, Maharashtra, India</td>
<td>22% displayed high caries risk (Chance to avoid new cavities=40%).</td>
</tr>
<tr>
<td>Hani Fadel, Khalid Al Hamdan, Yaseer Rhbeini, Lars Heijl &amp; Dowen Birkhed</td>
<td>2011</td>
<td>112 periodontal disease patients in Riyadh and Jeddah, Saudi Arabia</td>
<td>The Caries risk prediction software revealed that 26% of the children had high caries risk, while only 9% exhibited low caries risk.</td>
</tr>
<tr>
<td>Katerina Kavvadia, Andreas Agouropoulos, Sotiria Gizani, Lisa Papagiannoulis, Svante Twetman</td>
<td>2012</td>
<td>814 two-six-year-old Greek preschool children in Athens</td>
<td>The Cariogram revealed that 26% of the children had high caries risk, while only 9% exhibited low caries risk.</td>
</tr>
<tr>
<td>Naiif Abdullah Almosa, Anas H. Al-Mulla, Dowen Birkhed</td>
<td>2012</td>
<td>89 orthodontic patients aged between 13-29 years in Gothenburg, Sweden</td>
<td>The “chance to avoid new cavities” in orthodontic patients at de-bonding was 28% in governmental group and 61% in the private group.</td>
</tr>
</tbody>
</table>
formation. Cariogram has been found satisfactory when used in the clinic, as it allows more objective handling during data interpretation and, as part of an educational program, in elucidating the caries situation to patients and encouraging preventive measure. However, it might be possible to develop simpler models with regression analyses to define the risk for caries. Assessing caries risk using fewer variables by regression analyses the use of Cariogram, being less time consuming and more economic, may be confined by as this method is less time consuming and more economic.

Country like India, needs the emphasis on assessing the caries risk and identifying high risk individuals who will develop caries. Preventive measures can then be beleaguered at this group thereby not only plummeting the encumbrance of the restorative care but also eliminating pain and refining the quality of life.

REFERENCES

Adenomatoid Odontogenic Tumour: Report of a Case and Review of Literature

Vikas Singh, D J Bhaskar, R Chandan Agali, Mallika Kishore, Safalya S Kadtane, Harender Singh

Introduction

Adenomatoid odontogenic tumour was first described in 1907 by Dreiblatt, as a pseudo adenoameloblastoma. Over the years a variety of terminologies have been used to designate this extremely fascinating entity like adenoameloblastoma, adenoameloblastic odontoma, epithelial tumour associated with ameloblastic adenomatoid tumour, developmental cysts, and adenomatoid or pseudo adenomatous ameloblastoma. Philipson and Birn proposed the name adenomatoidodontogenic tumour in 1969 and suggested that it not be regarded as a variant of ameloblastoma because of its different behaviour. Adenomatoid odontogenic tumour is also called ‘two-thirds tumor,’ because 2/3rd occur in young females, 2/3rd of adenomatoid tumors occur in the maxilla, 2/3rd of the cases are associated with un-erupted teeth, and two-thirds of the affected teeth are canines. There are 3 variants of adenomatoid odontogenic tumour, the follicular type (accounting for 73% of cases), which has a central lesion associated with an embedded tooth; the extrafollicular type (24% of case), which has a central lesion and no connection with the tooth; and the peripheral variety (3% of cases). The WHO histological typing of odontogenic tumors, jaw cyst and allied lesions (2005) has defined AOT as a tumor of odontogenic epithelium with duct-like structures and with varying degree of inductive changes in the connective tissue. Conservative surgical enucleation is the most suggested choice of treatment. Recurrence rate for AOT is exceptionally rare. Except only three cases which are reported in Japanese patients showed recurrence of this tumor, therefore, the prognosis is excellent when completely removed in toto.

Case Report

A 14-year-old female child reported to the Department of Public health dentistry with a complaint of swelling in the right upper front tooth region since 5 months. History of the present illness revealed that initially the swelling was small in size and gradually it increased to reach up to the present size. It was not associated with any pain or
discharge with no history of trauma associated with it. Extra oral examination revealed mild facial asymmetry with the obliteration of the nasolabial fold (Figure 1). Intraoral examination revealed a solitary diffuse swelling was present on the right anterior maxillary teeth region extending from mesial aspect of 51 to mesial aspect of 13 roughly oval in shape measuring about 1×2 cm in greatest dimension. The colour of overlying mucosa was normal. On palpation, all inspectory findings are confirmed the swelling was soft in consistency, non tender. In hard tissue examination, there was retained 51 with clinically missing 11. There was vestibular obliteration with respect to 51,12,13 (Figure 2). So, based on the history and clinical examination a provisional diagnosis of dentigerous cyst i.r.t 11 was given with a differential diagnosis of adenomatoid odontogenic tumor. In investigations fine needle aspiration cytology was done which revealed a straw coloured fluid and protein estimation level was 4.9 gm/dL. (Figure 3). Intraoral periapical radiograph showed a well defined unilocular radiolucency was seen with respect to 51 with impacted 11. Root resorption in relation to 51 was noted (Figure 4).

Occlusal radiograph also shows well defined radiolucency with impacted 11 (Figure 5). Orthopantomograph of the patient was also taken with showed similar findings (Figure 6). In the treatment surgical excision was done and the specimen was sent for the histopathological examination which revealed cuboidal to columnar cells arranged in the form of nests and rosettes. Tubular appearance, solid areas, duct-like pattern, and whorled arrangement of cells is evident. Few cells were also arranged in a plexiform pattern.
and cribriform areas are also seen. At high magnification, sheets, nests of polyhedral cells along with ductal pattern lined by cuboidal to columnar cells (Figure 7). At low magnification, sheets of epithelial cells along with ductal pattern (Figure 8), which confirmed the final diagnosis of Adenomatoid odontogenic tumour i.r.t.11.

**DISCUSSION**

AOT is a benign, non-invasive odontogenic lesion showing slow growth. It is generally intraosseous, but can also occur rarely in peripheral locations.6 Sixty-nine percent of adenomatoid odontogenic tumours are diagnosed in the second decade of life, and more than half occur during the teenage years. There is 2:1 female to male ratio for all age groups and all variants. Generally the tumours do not exceed 1–3 cm in greatest diameter, but they can be larger, usually occurs within the tooth bearing areas of jaws and often found in association with impacted teeth.9,10 The origin of AOT is believed to be from an odontogenic source, The cytological features are similar to those of the enamel organ, reduced enamel epithelium, dental lamina and their remanants.8 The lesions are typically asymptomatic, but growth of the types with central lesion results in cortical expansion. The involved teeth are commonly impacted, and adjacent teeth may be slightly displaced.11 The radiographic findings of AOT frequently resemble other odontogenic lesions such as dentigerous cysts, calcifying globule-maxillary cysts, calcifying odontogenic cysts, odontogenic tumors, ameloblastomas, odontogenic keratocysts and periapical disease.12 Displacement of neighbouring teeth due to tumor expansion is much more common than root resorptions. The peripheral lesions may show some erosions of the adjacent cortical bone.9 Intraoral periapical radiographs allows perception of the radiopacities in AOT as discrete foci having a flocculent pattern within radiolucency even with minimal calcifies deposits while panoramic often do not. Approximately 78% of AOT shows those calcified deposits.13 Conservative surgical enucleation is the treatment modality of choice. Guided tissue regeneration with membrane technique is suggested for periodontal intrabony defects caused by AOT after complete removal of the tumor.14

**CONCLUSION**

AOT is an uncommon odontogenic lesion, seen but it can be usually identified from its clinical and radiographic appearance. Persistence of deciduous teeth for a longer duration and unerupted succeeding permanent teeth, when associated with a swelling, always need to be investigated for odontogenic lesions.

**REFERENCES**


