

Inguinal Hernia and Comparison between Mesh Repair and Conventional Repair of Hernia with Respect to Hernia Recurrence: A Clinical Study

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Abstract

Introduction: Inguinal hernia is one of the most common problems of mankind. Since the period of Hippocrates (4th century BC), the disease has been known and various palliative treatment methods were adopted. Historically the development of hernia surgery is one of the most interesting chapters in the field of surgery since hernias have always been the most common applications of man amenable to surgical treatment.

Materials and Methods: The study has been made of 60 cases of inguinal hernia who were admitted in various surgical units of Mahatma Gandhi Memorial Hospital, Warangal. This however does not include all the inguinal hernias admitted during the said period.

Results: General incidence of inguinal hernia Mahatma Gandhi Memorial Hospital, Warangal is 8.3%. The majority of the patients were in the age group of 40-69 years. Males are commonly affected by inguinal hernia (sex ratio: M: F - 19:1). Smoking is associated with increased incidence of inguinal hernia.

Conclusion: Lichtenstein mesh repair has significantly reduced complications, less hospital stay, low recurrence rate, less duration of surgery, and early return to work when compared to the conventional repair.

Key words: Bassini's repair, Direct hernia, Indirect inguinal hernia, Mesh repair, Scrotal haematoma, Scrotal edema, Urinary tract infection

INTRODUCTION

Inguinal hernia is one of the most common problems of mankind. Since the period of Hippocrates (4th century BC), the disease has been known and various palliative treatment methods were adopted.

Hernia is the word derived from Greek word "Herons" means "offshoot" or "bulge" or "budding." In Latin, it means "tear" or "rupture." It is defined by Sir Astley Cooper as "a protrusion of any viscus from its proper cavity."¹

Historically the development of hernia surgery is one of the most interesting chapters in the field of surgery since hernias have always been the most common applications of man amenable to surgical treatment. Although there are so many methods in repair of hernia, no one is exempted from complications hence surgery on hernia is still a challenging subject. Watson said "in the entire history of surgery, no subject has been so controversial as the repair of groin hernias".^{2,3}

This study is an attempt to evaluate certain well known anatomical, physiological and surgical concepts of inguinal hernia, with special reference to its surgical management with mesh repair.

Objectives

- To study the general incidence and different modes of presentation of inguinal hernia
- To compare between mesh repair and Bassini's repair in relation to hernia recurrence.

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www.ijss-sn.com

Month of Submission : 09-2016
Month of Peer Review : 10-2016
Month of Acceptance : 10-2016
Month of Publishing : 11-2016

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MATERIALS AND METHODS

In this series, the study has been made of 60 cases of inguinal hernia who were admitted in various surgical units of Mahatma Gandhi Memorial Hospital, Warangal, attached to the Kakatiya Medical College, Warangal, during the year January 2008 to July 2009. This however does not include all the inguinal hernias admitted during the said period. All complicated inguinal hernias were excluded from the study.

Mode of Selection

A total of 60 cases of inguinal hernia (30 mesh repair, 30 Bassini's repair) were randomly selected and studied in detail. After the admission to the hospital, all the patients were examined systematically as per the pro forma approved by the guide. The necessary and routine investigations were done preoperatively. Tone of the abdominal muscle was noted, respiratory and cardiovascular system was also evaluated.

Routine investigations were carried out in all the patients. Investigations were carried out like hemoglobin %, bleeding and clotting time, urine for albumin, sugar, microscopy, blood: Fasting sugar, urea, electrocardiogram screening, X-ray of chest to rule out lung pathology. Ultrasonography abdomen to rule out benign prostatic hyperplasia (BPH).

During the operation, the type of hernia and contents of the sac were noted down. 30 cases were operated by Lichtenstein tension-free mesh repair and other 30 cases by modified Bassini's repair.

The mesh repairs were done in:

- Recurrent cases
- Inpatients who belongs to older age
- In whom tone of the abdominal muscles were poor
- In whom high risk of recurrence is present like BPH, chronic lung diseases. During their stay in the hospital post-operative complications like urinary retention, Urinary tract infection (UTI), wound infection, scrotal hematoma were noted and treated properly.

All the cases were followed up for 6 months to 2 years for hernia recurrence and chronic groin pain. Long standing follow-up was not possible because patients did not come for checkup inspite of persuasion.

The data were analyzed using mean values, standard deviation, standard error, Chi-square test, and contingency table analysis.

RESULTS

In this study, 60 cases of inguinal hernia who were admitted and treated at K.R. Hospital, Mysore during January 2008

to July 2009 were included and studied. The following data were obtained.

Age Distribution

In this study, the maximum incidence of inguinal hernia was observed among 40-69 years age group (55%). Comparatively less among <30 years age group and above 70 years. The youngest was 18 years and eldest age was 87 years.

The study made by Mills *et al.* clearly shows that mean age group having inguinal hernia was 61 years.

Sex Incidence

In this series, 3 female cases were studied. Sex ratio M: F - 19:1.

The total number of hernia cases admitted during the study period were 537, among which male were 495 and female were 42 cases, average was 91.26% male and 8.74% female.

In the study made by Lafferty *et al.*, the sex ratio was 92:8 (Male: Female) and mean age in female was 61.5 years.

Occupational Incidence

In this series among 60 cases, most of them were agriculturists (41.7%), laborers (33.3%), sedentary workers (16.7%), business persons (5%), and students (3.3%). This shows that inguinal hernia is commonly present in agriculturists and laborers who were commonly involved in hard labor work.

The study made by Laue *et al.* presence of hernia was associated with a higher work activity index and a higher total activity index.

Incidence among Religion

In this study, incidence of inguinal hernia among Hindus was 83.3%, Muslims 15% and Christians 1.7%.

Habit Incidence

In this study among 60 cases, 43 patients were smokers (71.7%) and remaining 17 cases were non-smokers (28.3%). This study clearly shows incidence of inguinal hernia is more among smokers when compared with nonsmokers group.

The study made by Laue *et al.*, smoking and chronic obstructive pulmonary disease were associated with higher incidence of hernia.

Type of Hernia

In this study, the majority of the patients had indirect type of inguinal hernia about 70%, direct inguinal hernia about 28.3%, and least was recurrent hernia about 1.7%.

Side of inguinal hernia

In this study of 60 cases, most of the cases (55%) presented with right sided inguinal hernia, about 35% presented with left sided inguinal hernia and 10% cases presented with bilateral inguinal hernia. This indicates that right sided inguinal hernia is common.

Mode of operation

The study conducted by Mills *et al.* study in British Journal of Surgery, 1998, shows that the mean age was 61 years. In this study, the mean age was 54 years in mesh repair and 43 years in Bassini's repair. Overall, the mean in the study group was 48.3 ± 16.8 years. In this study, although the number of indirect hernia was larger in number, the number of cases subjected to mesh repair were of the direct type. In the above quoted studies, the incidence of the number of indirect hernias is higher and hence the case who underwent surgery for this type is also higher.

Content of the sac

This study shows that most of the inguinal hernia patients had small intestine as a content of hernial sac (65%) and least was omentum (13.3%) and about 20% of the cases had both small intestine and omentum. 1.7% patients had omentum and fluid.

Management

In this study, 60 cases of inguinal hernia were taken up for the study, in which 30 cases were operated by Lichtenstein mesh repair and other 30 cases by Bassini's repair.

In Lichtenstein repair – prolene mesh was used to strengthen posterior wall, and fixed by onlay technique using prolene No. 2-0, interrupted stitches, mesh size was used depending on size of the defect.

In Bassini's repair, prolene No. 1 used to put interrupted stitches to strengthen posterior wall of inguinal canal.

Complications

This study of mesh repair, 2 patients had wound infection, 2 had scrotal hematoma, 5 urinary retention and 1 had UTI. Other complications such as pulmonary embolism, ileus, deep vein thrombosis, and recurrence were nil. Although the difference in complication rates between mesh and Bassini's repair is not statistically significant ($P < 0.007$), when compared with conventional repair mesh repair has got less complications.

In a study conducted by Miller *et al.* in Mayo's Clinic between 1974 and 1988 clinical data of 659 patients

clearly shows that urinary retention was the most common complication following surgery.

Duration of the hospital stay

In conventional repair, 90% of the patients hospital stay was 5-10 days and 10% of the patients had hospital stay from 11 to 15 days. Mean duration of hospital stay among patients who underwent Bassini's repair were 6.8 days.

In mesh repair group, 57% patients had <5 days of hospital stay and 43% patients had hospital stay of 5-10 days. Mean hospital stay was 5.6 days.

This study shows that mean hospital stay is less in mesh repair when compared to Bassini's repair ($P < 0.001$). In a study by Prior *et al.* concluded that Lichtenstein repair requires a marginally shorter hospital stay when compared to Bassini's repair.

Duration of follow-up and recurrence

In this study, 80-85% of patients were followed up for 6 months to 2 years and 10-15% did not turn up for follow-up. One recurrence was recorded during this period of 2 years in Bassini's repair group and no recurrence was noted in mesh repair group.

In a study by Vrijland *et al.* recurrence rate for non-mesh repair was 7%.

According to study made by Martin, the recurrence rate after inguinal hernia repair using mesh.

Chronic Groin Pain

In this study, 13% of patients developed chronic groin pain following mesh repair whereas 23% of patients developed chronic pain following Bassini's repair ($P = 0.317$).

In a review article by Aasnang and Kehlet concluded that chronic groin pain is less after mesh repair when compared with non-mesh repair of hernia.

DISCUSSION

In this study, 60 cases of inguinal hernia were selected randomly and studied them in detail.

Out of 60 cases, 30 patients underwent conventional (Bassini's) repair and 30 patients were treated with mesh repair using prolene mesh.

A total number of surgical admissions during January 2008 to July 2009 were 6244. Out of which, total number of inguinal hernias were 537 comprising 8.6% of total surgical admissions.

Age Incidence (Table 1)

In this study of 60 cases, the maximum incidence of inguinal hernia was seen in the age group of 40-69 years. The youngest patient was 18 years and the eldest patient was 87 years. The total percentage of patients between the age group of 40-69 years was 55%.

Sex Ratio (Table 2)

In this series, 3 female cases were present. Ratio being M: F - 19:1.

Occupational Incidence (Table 3)

In the present series of 60 cases, 25 patients were agriculturists, 20 patients were laborers, 10 patients were sedentary workers, 3 were business pupil, and 2 were students. From this observation, we can see that the inguinal hernia is occurring more commonly in agriculturists and laborers who does hard work.

Incidence among Religion (Table 4)

In the present series, 50 patients (83.3%) were Hindus, 15% were Muslims and 1.7% were Christians. No definite conclusion can be drawn from this observation.

Habit Incidence (Table 5)

Smoking is known to be an indirect risk factor for the development of inguinal hernia leading to lung diseases. In the present series of 60 cases, 43 patients (71.7%) were smokers and 17 patients (28.3%) were non-smokers. In this regard, we can observe that hernia is occurring more in smokers compared to non-smokers.

Longer the duration of hernia more the damage to the inguinal musculature which results in high incidence of recurrence and also causes difficulty in selecting the operative technique (Table 6).

Table 1: Age distribution

| Age group (years) | Number of cases (%) |
|-------------------|---------------------|
| <20 | 4 (6.7) |
| 21-29 | 5 (8.3) |
| 30-39 | 11 (18.3) |
| 40-49 | 9 (15.0) |
| 50-59 | 12 (20.0) |
| 60-69 | 12 (20.0) |
| >70 | 7 (11.7) |
| Total | 60 (100.0) |

Table 2: Sex distribution

| Sex | Number of cases (%) |
|--------|---------------------|
| Male | 57 (95) |
| Female | 3 (5) |
| Total | 60 (100) |

Table 3: Occupational incidence

| Occupation | Number of cases (%) |
|------------------|---------------------|
| Agriculturists | 25 (41.7) |
| Business | 3 (5.0) |
| Laborer | 20 (33.3) |
| Sedentary worker | 10 (16.7) |
| Student | 2 (3.3) |
| Total | 60 (100.0) |

Table 4: Incidence among religion

| Religion | Number of cases (%) |
|-----------|---------------------|
| Hindu | 50 (83.3) |
| Muslim | 9 (15.0) |
| Christian | 1 (1.7) |
| Total | 60 (100.0) |

Table 5: Habit incidence

| Habits | Number of cases (%) |
|------------|---------------------|
| Nonsmokers | 17 (28.3) |
| Smokers | 43 (71.7) |
| Total | 60 (100.0) |

Comparative study of duration of hernia

| Duration of hernia (months) | Mersedes series | | Present series (60 cases) | |
|-----------------------------|-----------------|----------------------|---------------------------|----------------------|
| | Number of cases | Number of recurrence | Number of cases | Number of recurrence |
| 0-3 | 665 | 34 | 13 | 1 |
| 4-12 | 398 | 20 | 21 | 0 |
| Above 12 months | 525 | 51 | 26 | 0 |

Table 6: Type of hernia

| Type of hernia | Number of cases (%) |
|----------------|---------------------|
| Direct | 16 (28.3) |
| Indirect | 43 (70) |
| Recurrent | 1 (1.7) |
| Total | 60 (100) |

Side of inguinal hernia

In this study, 33 patients (55%) had hernia on right side, 21 (35%) had on left side and bilateral inguinal hernia was seen in 10% from this observation we can notice that the incidence of hernia is higher on right side.

Content of the sac

In this series of 60 cases inguinal hernia, 39 patients (65%) had intestine in the hernial sac (enterocele), 8 patients (13%) had greater omentum and both intestine and omentum were the contents in 20% of cases. Hence, in this study, enterocele was the most common.

Management

Regarding anesthesia

Among 60 cases, 3 cases were done under general anesthesia, 2 cases under local anesthesia and all other cases were done under spinal anesthesia. The cases operated under spinal anesthesia, 5 cases developed spinal headache and treated symptomatically.

In the present series of 60 cases, 30 patients underwent Bassini's repair and another 30 patients were repaired with prolene mesh. The size of the prolene mesh selected according to the size of the defect. The technique was Lichtenstein on lay repair. The mesh was fixed with superiorly and inferiorly with interrupted stitches. For Bassini's repair, prolene No. 1 suture material was used.

As per present study, 30 cases taken for Bassini's repair, 30 cases taken for Lichtenstein mesh repair.

Duration of the hospital stay

In 30 cases, who underwent Bassini's repair 90% of the patients had hospital stay of around 5-10 days. Another 10% patients had hospital stay between 10 and 15 days. The mean duration of hospital stay among the patients who underwent Bassini's repair was 6.8 days.

In another 30 patients who underwent prolene mesh repair, 57% patients had a maximum hospital stay <5 days and 43% patients had hospital stay of 5-10 days. Hence, the mean hospital stay was 5.6 days ($P < 0.001$).

Complications

Among 30 patients, who underwent mesh repair, 2 patients had operative wound infection, 2 had scrotal hematoma, 5 patients had urinary retention and 1 patient had UTI.

In conventional repair, 13 patients had urinary retention, 6 patients had scrotal hematoma, 7 patients had wound

infection, UTI was seen in 2 patients and combined complications were seen in majority of patients.

Compared to conventional (Bassini's) repair, the mesh repair had relatively less complications in the present study ($P < 0.007$).

Follow-up and recurrence

About 85% of patients were followed-up from 6 months to 2 years. 15% of patients did not turn up for follow-up. One recurrence was seen in the Bassini's repair group but no recurrence noted in mesh repair group.

The Lichtenstein tension free inguinal hernia is becoming increasingly popular nowadays. It offers the effective repair that overcomes many of the problems. It is relatively easier and less technically depending than other anatomical repairs like Bassini's/Shouldice's repairs and easy to learn. Median length of operation is almost 10 min shorter than the other techniques reduced operating time. Infection rate in mesh repair is comparatively less compared to the Bassini's repair. Length of the hospital stay is lesser than anatomical repair. All (mesh repair) patient return to work normally very early. Nowadays, staples are used to fix the mesh instead of interrupted prolene stitch which is time consuming, mortality in both study is nil.

According to the study done by Laffery *et al.* (1998), the Lichtenstein Institute in Los Angeles, the Shouldice in Toronto and London Hernia Clinic, have made study in 100 cases of inguinal hernia and reported Lichtenstein repair was (1) recurrence rate <1%, (2) number of days in hospital shortened, and (3) less of infection. The study has indicated that the present day "Gold standards can be reproduced safely and effectively highly motivated and dedicated hospital/health centers." Lichtenstein tension-free mesh repair has become the standard method of hernia repair and is easier to learn that take less time and results in fewer recurrences.

CONCLUSION

Lichtenstein mesh repair has significantly reduced complications, less hospital stay, low recurrence rate, less duration of surgery and early return to work when compared to the conventional repair. For surgeons in training the Lichtenstein open mesh technique is a better method of inguinal hernia repair than other conventional hernia repairs and is cost-effective for the patients also.

Although Bassini's principle of posterior wall reinforcement remains valid in surgical practice, his operation lost its popularity. Open suture repair of hernia has higher recurrence rate and postoperative pain and disability is high. It is only recommendable in the repairs of pediatric hernias and in selected cases in which use of prosthetic materials is contraindicated.

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How to cite this article: Goud VS, Babu NV, Kumar PB. Inguinal Hernia and Comparison between Mesh Repair and Conventional Repair of Hernia with Respect to Hernia Recurrence: A Clinical Study. *Int J Sci Stud* 2016;4(8):150-155.

Source of Support: Nil, **Conflict of Interest:** None declared.