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Original Article

Comparative Study of Mental Stress Score between Various Surgical Modalities for Treatment of 10–20 mm Renal Calculi

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Abstract

Introduction: The treatment of renal calculi has undergone a paradigm change in the past two decades. The ultimate aim in treating these stones will be to achieve a complete clearance with minimal morbidity. The risk of recurrence or incomplete clearance or need for ancillary procedures would significantly affect patients' mental health.

Purpose: The purpose of this study is to compare mental stress experienced by the patient on the completion of the treatment using Kessler Psychological Distress Scale (K10) for each modality in the management of renal and upper ureteric calculi 10–20 mm size.

Materials and Methods: This was a prospective study on patients with renal calculi. Following the procedure, patients were asked to fill up and complete the questionnaire at 2 and 6 weeks. The K10 questionnaire contained 10 questions with each of them having 5 outcomes. Based on the total score, the degrees of mental distress due to the procedure were graded as mild, moderate, and severe.

Results: When assessing patients' psychological status using Kessler's scale at 2 weeks, a majority of patients had a score of <20. However, one-fifth of patients in the retrograde intrarenal surgery group and about one-sixth of patients in percutaneous nephrolithotomy (PCNL) group had a mild distress score. When assessing patients' psychological status using Kessler's scale at 6 weeks following primary procedure, most patients are <20 score, and hence, not statistically significant. But when the Shock wave lithotripsy (SWL) group was analyzed, 2.5% of patients had a significant psychological stress.

Conclusion: All three procedures have a good acceptance rate among the patients. PCNL, though more invasive than the other two procedures, has a better acceptance rate in view of achieving complete clearance in one sitting. On the other hand, extracorporeal SWL (ESWL), despite being so non-invasive, has a significant psychological impact in view of the need for multiple sittings and associated complications.

Key words: Lithotripsy, nephrolithotomy, questionnaire, renal calculi

INTRODUCTION

The primary goal while treating renal calculi and upper ureteric calculi is to achieve maximum clearance of stone with minimal morbidity. The various minimally invasive modalities described for treatment of such stones are shockwave lithotripsy (SWL), percutaneous nephrolithotomy (PCNL), and retrograde intrarenal surgery (RIRS).[1,2] The same authors had earlier published their study comparing success rate, retreatment rate, need for auxiliary procedure, complication rate, mean procedure time, and mean hospital stay between the above three modalities. As a part of that study, we also had assessed the mental stress score following the surgical treatment received using Kessler Psychological Distress Scale (K10). Kessler Psychological Distress Scale (K10) is used to assess

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the patients' mental stress, which was proposed by Kessler R, Professor of health care policy, Harvard Medical School, Boston, USA. This K 10 test is a patient's self-report measure to assess their current condition about anxiety and depression following a procedure.[3] The 10-item Kessler Psychological Distress Scale (K10) is a short measure of non-specific psychological distress, which has been shown to be a sensitive screen for the Diagnostic and Statistical Manual of Mental Disorders criteria for anxiety and mood disorders.[4]

The three surgical procedures taken for consideration in our study are all very well established and widely accepted modalities of treatment. For a stone smaller than 10 mm, initial treatment option has always been extracorporeal SWL. For a large stone above 20 mm, PCNL is the accepted modality of treatment. For stones in the interim range, the options are plenty. The level of acceptance of these procedures also varies from one procedure to the other. The purpose of this study is to identify if any of the above-mentioned procedures have any impact on the ultimate psychological status that might alter the final outcome in such patients.

Aim

The aim of this study is to compare mental stress experienced by the patient on the completion of the treatment using Kessler Psychological Distress Scale (K10) for each modality in the management of renal and upper ureteric calculi 10–20 mm size.

MATERIALS AND METHODS

This was a prospective observational comparative study conducted in a teaching institution over 1 year period from November 2013 to October 2014. A total of 287 cases renal and upper ureteric calculi of 10–20 mm size were included in our study. All patients underwent PCNL, RIRS, or SWL. The study model was presented to the Institutional Ethical Committee and approval was obtained. Following the procedure, patients were asked to fill up and complete the questionnaire at 2 and 6 weeks. The K10 questionnaire contained 10 questions with each of them having 5 outcomes. The outcomes were numbered and rated from 1 to 5.

Table 1 describes the details of the K 10 questionnaire circulated among the patients at 2 and 6 weeks after treatment. Based on the total score, the degrees of mental distress due to the procedure were graded as follows:

Score <20, where patients are likely to be well without any mental illness.

Score 20–24, where patients are likely to have mild mental disorder.

Table 1: Indications for emergency thoracotomy

Indication	Number of patients
Lung laceration	2
Subclavian vessel injury	1
Penetrating chest injury	4
Diaphragmatic injury	3

Score 25–29, where patients are likely to have moderate mental disorder.

Score >29, where patients are likely to have serious mental disorder.

Inclusion and Exclusion Criteria

All patients presenting with calculi of 10–20 mm in otherwise normal renal pelvicalyceal system, pelviureteric junction, or proximal ureter up to L3 transverse process were included in our study. Those patients in whom the stone was below L3 transverse process, multiple renal calculi with second calculi size more than 4 mm, abnormal upper urinary tract anatomy such as duplex system, horseshoe kidney, ectopic kidney, and pelviureteric junction obstruction, and patients with axial skeletal abnormality such as scoliosis and kyphosis or bleeding diathesis were all excluded from the study.

The choice of treatment modality for the management of the upper urinary tract calculi of 10–20 mm calculi is largely determined by the individual surgeon taking into consideration the patient's anatomy, comorbid conditions, urinary tract anatomy, stone density, and location as well as patients' preference.

Statistical Analysis

Descriptive statistical analysis was carried out in the present study. To describe about the data frequency analysis, percentage analysis was used for categorical variables, and for continuous variables, the mean and standard deviation were used. For the multivariate analysis, the Kruskal–Wallis test and ANOVA were used, and for trivariate and bivariate analysis, Mann–Whitney test was used. To find the significance in categorical data, Chi-square test was used. In both the above statistical tools, the probability value of <0.05 is considered as significant level. The statistical software SPSS 16.0 version was used for the analysis of the data, and Microsoft Word and Excel have been used to generate graphs and tables.

Observations

Table 2 and Figure 1 illustrates the Kessler's distress scale at 2 weeks after intervention. When assessing patients' psychological status using Kessler's scale at 2 weeks, a majority of patients had a score of <20. However, one-fifth of patients in the RIRS group and about one-sixth

of patients in PCNL group had a mild distress score. None of the patients in RIRS group had moderate or severe distress scores.

Table 3 and Figure 2 illustrates the Kessler's distress scale at 6 weeks after intervention. When assessing patients psychological status using Kessler's scale at 6 weeks following primary procedure, most patients are <20 score and hence not statistical significant. But when the Shock wave lithotripsy (SWL) group was analyzed, 2.5% of patients had a significant psychological stress.. Following PCNL as the primary treatment at the end of the study at 6 weeks, all patients are stone free and without mental distress. In RIRS group, the mental distress at the end of 6 weeks is within the comfort zone. In SWL group, the mental distress at the end of 6 weeks is within the comfort zone in almost all patients with 2 patients having mild distress at 6 weeks in view of prolonged need of completion of stone management.

Table 2: Cause of death (*n*=16)

Cause of death	Percentage of patients
Hemorrhagic shock	2
Sepsis, MODS	3
Severe cardiac dysrhythmia	1
DIC	1
ARDS	5
Pulmonary thrmbo embolism	1
Missed retroperitoneal injury	1
Severe head injury	2

ARDS: Acute respiratory distress syndrome

Table 3: Morbidity (*n*=45)

Complication	Incidence
VAP/pulmonary sepsis	7
LRTI/atelectasis	5
Retained hemothorax	6
ICD reinsertion	12
Wound infection	4
Empyema	2
Delayed pleural effusion	2
Persistent pneumothorax	1
AKI	3
DVT	1
Pressure ulcer	2

Table 4: Outcome analysis (blunt and penetrating injury)

Parameter	Blunt injury	Penetrating injury	*P* valve
Mortality rate (%)	5.8	2.8	0.001
Injury severity score	17.2±7.4	14.5±3.1	NS
Hospital stay (days)	14.2	16.5	NS
Morbidity (%)	14.3	14.7	NS

DISCUSSION

Renal calculus and the bothersome symptoms increase the need for multiple visits to hospitals and also cause significant psychological impact on patients..[5] Moreover, continuous usage of medication, need for recurrent surgical procedures, limitation in physical activity, and loss of working hours and associated financial burden are found to be associated with many psychological disturbances. Among these, anxiety has been identified as the more prevalent entity and is associated with poor patient compliance toward management and even progress to depression in many patients.[6,7]

In the treatment of renal stones, the type of anesthesia, need for an inpatient admission, success and failure rate of the procedure, complications, need for the auxiliary procedure, and affordability to the procedures all play a role in influencing patients' anxiety status.

In our earlier study when assessing the failure rates of these procedures, SWL recorded the maximum failure (17.3%), with 19.8% of patients needing auxiliary procedure.[8] On the other hand, PCNL and RIRS (5.6% and 11.1%, respectively) had the least number of cases needing an auxiliary procedure.[8]

The degrees of mental distress due to the procedure were graded based on Andrew's study.[9] The work done by Brown *et al.* assessed patients' anxiety before and after different surgical procedures for renal calculus and to identify various factors that can attribute to pre- and post-

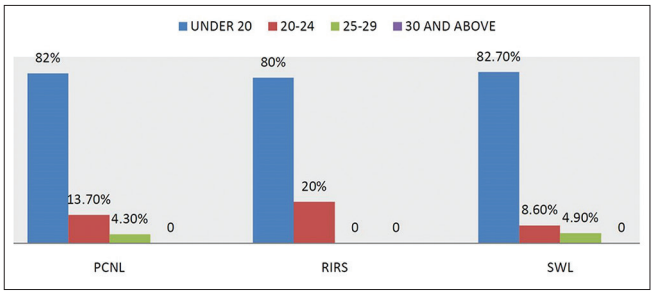

Figure 1: Kessler psychological distress scale at 2 weeks

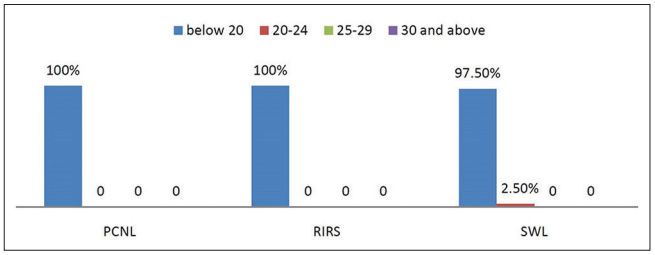

Figure 2: Kessler psychological distress scale at 6 weeks

operative anxiousness.[10] The measurement of palmar sweat (evaporimeter) for quantifying stress and bipolar visual analog scale and the Spielberger State Anxiety Questionnaire were used before and after the procedures. The study concluded highly significant reduction in the palmar sweat production and score obtained following open surgery, but no changes in patients undergoing PCNL or lithotripsy before and after treatment. Pre-operatively, fear of a general anesthetic, and post-operatively, pain were identified as cause for patients' anxiety.

State and Trait Anxiety Inventory scale was used to assess the anxiety status of 128 patients following SWL. It showed that the residual fragments after SWL procedure made patients more anxious as additional procedures were needed for clearing the left out stones.. The study also concluded that detailed information should be provided to patients with respect to procedure and possible complications, and potential need for additional treatment may reduce the anxiety.[11]

A study done by Brown *et al.* with 24 patients undergoing extracorporeal piezolithotripsy with continuous assessment of anxiety by measurement of palmar sweat during the procedure itself found with 50% of patients showed increased levels of palmar sweat throughout treatment, with a return to pre-treatment levels after the procedure. 8 patients attributed pain as their cause for anxiety. Patient education before the procedure may help in reducing anxiety.[12]

Extracorporeal SWL (ESWL) seems to be safe and simple and being done as an outpatient procedure. It does not require any anesthesia and patient can go back home the same day. All of these factors support the fact that it will not have any impact on the psychological status of the patients, but it was not so in our study. This study underlines the fact that the patient anxiety depends not only on the severity of the procedure but also on the sequelae of the procedure, such as incomplete clearance, complications of the procedure, need for multiple admissions, and ancillary procedures.

Limitations of this Study

The sample size is small and associated with difficulty in performing stratified analysis. The study was unable to exclude many of the other confounding factors which may have influenced some of the outcomes analyzed which is beyond the scope and purview of this study.

CONCLUSION

All three procedures have a good acceptance rate among the patients. PCNL, though more invasive than the other two procedures, has a better acceptance rate in view of achieving complete clearance in one sitting. On the other hand, ESWL, despite being so non-invasive, has a significant psychological impact in view of the need for multiple sittings and associated complications.

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