COMPARATIVE STUDY OF LITHOTRIPSY AND MINIPERC IN 11 TO 18 MM IMPACTED PUJ CALCULI

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ABSTRACT

Background: Impacted PUJ calculi are well known entity. Nephrolithiasis is a common disorder that accounts for significant cost, morbidity, and loss of work. Over last 3 decades considerable advances have been made in the management of kidney stone disease, still there is no single universally accepted and uniformly effective modality of treatment in medium size of impacted PUJ calculi. **Aim:** To study the efficacy of lithotripsy and MINIPERC in 11mm to 18mm impacted PUJ calculi. **Methodology:** The patients with impacted PUJ calculi of size 11 to 18mm of both sexes of all age group varying form 18-60 years, on consecutive sampling method total 84 patients were included. All patients underwent basic lab investigations, USG, IVU and investigations for fitness purpose. **Group 1:** All procedures were tubeless. We used 15 Fr Richard Wolf nephroscope for the procedure. 16 to 20 Fr Amplatz sheath was used depending upon situation. Fragmentation was performed using pneumatic lithoclast or holmium Laser depending upon stone size and characteristics. Group 2: Underwent DJ stenting under subarachnoid block or short GA depending upon situation. On the next day they were subjected for lithotripsy on Dorniel alpha machine under USG guidance, 3000 shocks were given in each sitting. One to three such sittings were given. Post operatively ultrasonography and X-ray KUB was done in all the patients and stents were removed after assuring complete clearance. Patients with absence of stone or presence of stone less than 4 mm on USG or x-ray KUB were declared as completely cleared. **Results:** Average hospital stay was 48 hours in miniperc group and it was 30 hours in DJ with ESWL group. Clearance rate was 100 % in Miniperc group and it was 85.71 % in DJ with ESWL group. Five patients (11.9%) in DJ lithotripsy group required another procedure. (Two needed miniperc and three needed URS). Two(4.76 %) patients in miniperc group had fever in post op period but nobody suffered major sepsis. **Conclusion**: Miniperc fulfils many criteria if we see results and complications. Although bigger sized multicentric study and long term follow up is needed.

KEYWORDS: Lithotripsy; Miniperc; 11-18mm PUJ Calculi.

INTRODUCTION

Impacted PUJ calculi are well known entity. Nephrolithiasis is a common disorder that accounts for significant cost, morbidity, and loss of work [1]. Nephrolithiasis is more common in young populations who are actively working and want to rejoin the work earlier after surgical treatment. There are various methods to treat impacted PUJ calculi like PCNL, ESWL, RIRS and MINIPERC [2]. It is necessary to treat the impacted PUJ calculus earlier as it is usually symptomatic and hampers renal functions rapidly. Over last 3 decades considerable advances have been made in the management of kidney stone disease [3]. Still there is no single universally accepted and uniformly effective modality of treatment in medium size of impacted PUJ calculi.

PCNL is effective and well accepted in bigger size of calculi. With the introduction of ESWL about 30 years ago, a dramatic change took place in the clinical practice of kidney stone management [4]. ESWL is only useful for small size calculi and is less effective. RIRS is expensive, technically demanding and is not universally available. MINIPERC is comparatively newer technique. ESWL along with advances in ureteroscopic and percutaneous techniques has led to the virtual extinction of open surgical treatments for kidney stone disease [5]. We studied ESWL and MINIPERC in 11-18mm calculi as we considered it as a gray zone.

Aim of the study: 1. To study the efficacy of lithotripsy in 11mm to 18mm impacted PUJ calculi. 2. To study the efficacy of MINIPERC in 11mm to 18mm impacted PUJ calculi. 3. To compare efficacy and safety of both the methods.

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MATERIALS AND METHODS

Study design: It is a Randomized clinical trial.

Ethics approval: The study was approved by hospital review board and informed consent was obtained from the participants.

Study place: he study was conducted at Wankhade Kidney Hospital, Ahmerdnagar

Study period: during the period of April 2014 to March 2016.

Inclusion criteria: The patients with impacted PUJ calculi of size 11 to 18mm of both sexes of all age group varying form 18-60 years.

Exclusion criteria: Patients with bleeding tendency, serum creatinine more than 2mg%, and uncontrolled infection were excluded from the study

Sample size: Sample size: Total 84 patients were included as per the inclusion criteria (In each group n=42)

Sampling method: Consecutive sampling method was used. (i.e., patient attended during the study period)

Grouping:

Computer generated randomly technique was used for allocation to group. Participants divided in to two groups. All patients underwent basic lab investigations i.e, complete blood picture, Urine analysis, CT, BT, ECG, USG, IVU and investigations for fitness purpose.

Group1: Underwent miniperc under subarachnoid block.

Group 2: Underwent DJ stenting under subarachnoid block or short GA with ESWL

Methodology:

Group 1: All procedures were tubeless. We used 15 Fr Richard Wolf nephroscope for the procedure. Alken dilators were used for dilatation of tract. 16 to 20 Fr Amplatz sheath was used depending upon situation. Fragmentation was performed using pneumatic lithoclast or holmium Laser depending upon stone size and characteristics. Fragments retrieval was done. All patients were discharged thirty-six to sixty hours after surgery depending upon situation. Stents were kept in all patients. Post operatively ultrasonography and X-ray KUB was done in all the patients and stents were removed after assuring complete clearance. Patients with absence of stone or presence of stone less than 4 mm on USG or x-ray KUB were declared as completely cleared [6].

Group 2: Underwent DJ stenting under subarachnoid block or short GA depending upon situation. On the next day they were subjected for lithotripsy on Dorniel alpha machine under USG guidance, 3000 shocks were given in each sitting. One to three such sittings were given. All the patients were discharged 3 hours after lithotripsy. All patients underwent ultrasonography or X -ray KUB after second and third sitting. Stents were removed after stone clearance. Patients with absence of stone or presence of stone less than 4 mm on USG or x ray KUB were declared as completely cleared. The patients with bigger size of residual stone were followed up for two weeks who were asymptomatic. Those who were symptomatic and asymptomatic but non progressive were subjected to another procedure after proper explaining. The following parameters were compared: Hospital stay, Clearance rate, Need for another producer, Major Intra or post op complication and data was expressed in percentage.

Statistical analysis: The data was presented in the form of percentage

RESULTS

Average hospital stay was 48 hours in miniperc group and it was 30 hours in DJ with ESWL group. Clearance rate was 100 % in Miniperc group and it was 85.71 % in DJ with ESWL group. Figure 1-5 showed Miniperc group and Figure 6-8 showed DJ lithotripsy group pre and post treatment. Five patients (11.9%) in DJ lithotripsy group required another procedure. (Two needed miniperc and three needed URS). Two (4.76 %) patients in miniperc group had fever in post op period but nobody suffered major sepsis. Nobody needed blood transfusion. The mean operative time was 52 minutes in miniperc group. Nobody suffered major chest complications or other major complications In ESWL group average no of settings were 2.4, average intensity used was 2.8 units.

Table 1. Comparison between Miniperc and DJ lithotripsy

Parameters	Miniperc Group	DJ lithotripsy Group
Hospital stay (average in hours)	48	30
Clearance Rate (%) {n}	100 {42}	85.71 {36}
Need for another Procedure (%)	00	11.9 (5)
Major intra or post op complication	None	none

Group 1. Miniperc group

Fig 1. Plain x-ray KUB.

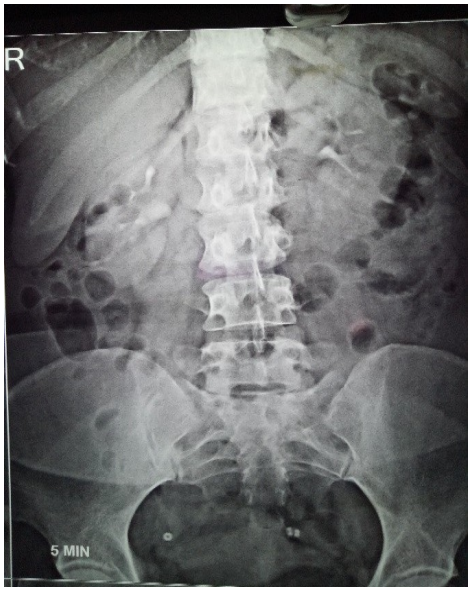

Fig 2. 5 Minutes IVP film.

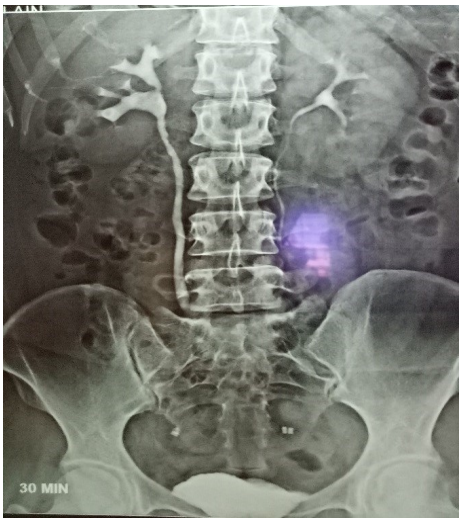

Fig 3. 30 min IVP film

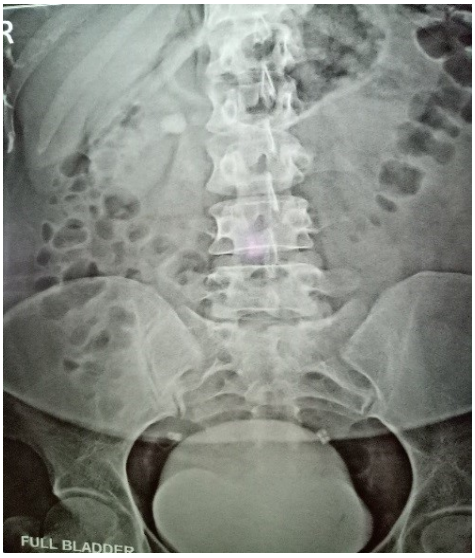

Fig 4. Full bladder IVP film

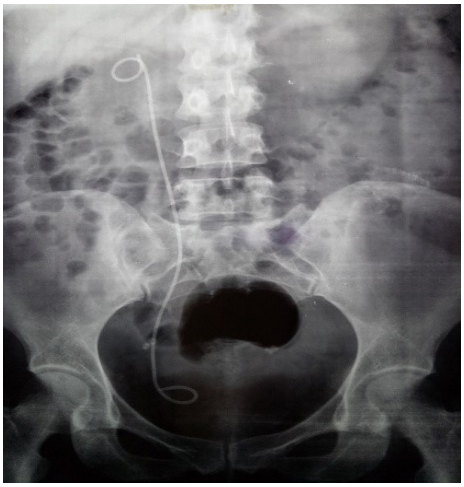

Fig 5. Post operative X ray KUB showing complete clearance

Group 2: DJ lithotripsy group

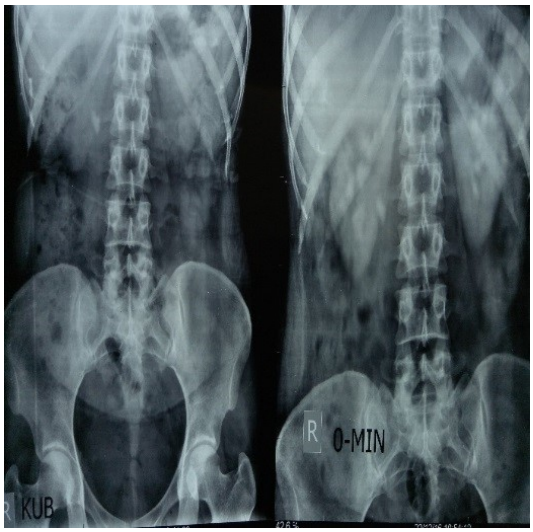

Fig 6. Group 2: DJ lithotripsy group, X ray KUB and 0 min film of IVP

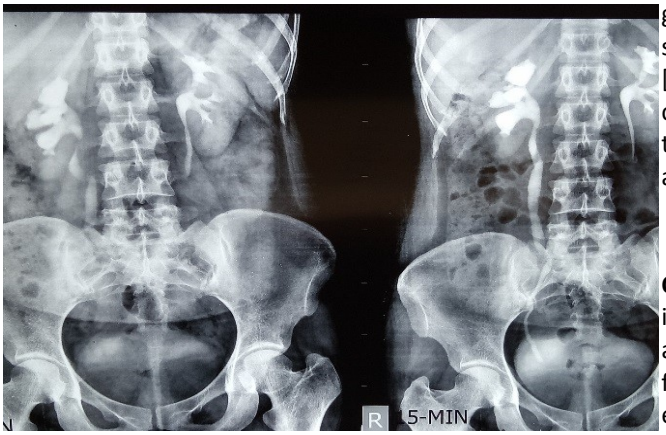

Fig 7. Group 2: DJ lithotripsy group, IVP films

Fig 8. Group 2: DJ lithotripsy group, Post-operative film showing DJ stent in situ and complete clearance

DISCUSSION

PCNL is established treatment for impacted PUJ calculi [2,7]. ESWL can also be used but clearance rate is low [8]. We compared here the results of Miniperc and ESWL in impacted PUJ calculi of size 11 to 18 mm. The invasiveness of PCNL is not justifiable for these sizes of stones [9,10]. Minipercis effective, minimally invasive and complications free [9]. ESWL is less invasive but less effective [9]. Clearance rate ESWL is significantly low and 11.5% patients needed another procedure [8]. Also it needs anesthesia and hospital stay for DJ stenting. Patients also need to do repeat hospital visits and long term follow up.

PCNL is established procedure for management of renal calculi >20 mm is size [11]. We can justify doing in > 18 mm calculi. ESWL has excellent results and is first line of treatment in < 11 mm calculi [8]. 11 mm to 18 mm we thought as a grey zone. Miniperc is excellent tool in these type of stones especially when stones are impacted [12, 13]. Complete removal of the stone is the primary management goal in miniperc to relieve obstruction, eliminate infection, prevent further stone growth, and preserve renal function [14]. Impacted stones make it necessary to do stenting prior to ESWL [8].That makes it less acceptable in addition to low clearance rate [8]. There is significant advantages of the Miniperc procedure for reduced bleeding leading to a tubeless procedure and reduced hospital stay [10].

Conclusion: Today we need to have a procedure which is noninvasive, complication free, which does not need anesthesia, is safe and more than that which has uniformly high clearance rate for management of impacted PUJ calculi. Miniperc fulfils many criteria if we see results and complications.

Limitations of study: Although bigger sized multicentric study and long term follow up is needed.

Abbreviations: 1) ESWL- extra corporeal shock wave lithotripsy 2) PCNL- Percutaneous neprolithotomy. 3) RIRS- Retrograde intrarenal surgery. 4) DJ- double J. 5) PUJ-Pelviureteric junction.

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