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Mini incision open nephrolithotomy for renal calculus: Colworths experience.

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Abstract

Background

Due to advances in endourology, there have been lesser indications to open surgery in the management of renal calculi thus reducing hospital stay. Nonetheless, mini access incisions of 4 to 6cm using open nephrolithotomy have reduced both operating times and hospital durations in our experience.

Aim

This study aimed to demonstrate the efficacy of minimal incision in open nephrolithotomy to reduce patient hospital stay, early ambulation and postoperative pain.

Patients and Methods

This is a prospective study of open nephrolithotomy procedures on renal calculus' with staghorns while minimally incising. Between 2019 and 2022, 14 patients underwent open nephrolithotomy and they were laterally positioned on the left or right depending on the site of surgery.

Minimal subcostal incisions of 6 to 8 cm combined with muscle cutting and a splitting technique were used to access the gerota fascia. Information obtained included age, gender, diagnosis, procedure, duration of surgery, length of hospital stays, and pain threshold. Subjective pain outcome was assessed using the visual pain analogue score (VAS).

Instruments included a combination of paediatric and adult operating instruments, c-arm fluoroscopy, diathermy, operating loops and anaesthetic machine with patient monitors. Some patients were administered epidural anaesthesia.

Results

During the period of study, 14 procedures were performed on patients with an average age of 44.07 years. The average incision length was 6.42 cm and the mean operation time was 135.5 mins. Additionally, the mean post operative stay was 3.2 days.

There were 9 males and 5 females. 1 patient had staghorn calculi, 3 had multiple renal stones and 10 had solitary stones in one of the calyces.

Conclusion

Mini incision open nephrolithotomy is a safe and effective technique however, there is a lack of manpower for percutaneous nephrolithotomy. Favourable outcomes and scar formations can be achieved without many technical difficulties.

Keywords: nephrolithotomy, incision, calculus.

Introduction

Due to advances in endourology, there have been lesser indications to open surgery in the management of renal calculi thus reducing hospital stay. Nonetheless, mini access incisions of 4 to 6cm using open nephrolithotomy have reduced both operating times and hospital durations in our experience.

In the past decades, advances in endoscopic management of nephrolithiasis, in the form of newer refined endoscopes and stone fragmentation energies, have resulted in a major shift towards minimally invasive therapy (1). Advances in the endoscopic management of stone disease, in the form of ureteroscopy, percutaneous nephrolithotomy (PCNL) and laparoscopy, initially promoted a rapid decrease in the use of this approach. Therefore, as a result, open stone surgery has become a second- or third-line treatment option. Centres worldwide with the proper equipments, expertise and experience in the surgical treatment of

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renal tract stones report that open surgery is needed in 1–5.4% of cases (2,3). The standard open nephrolithotomy procedure where a large muscle is incised from 15 to 18 cm is generally used. This is usually the major cause of postoperative morbidity and pain.

In our centre, we were able to demonstrate the use of minimal incision to gain access to the kidney and perform nephrolithotomy with minimal mobilization of the kidney. Consequently, this reduced patient hospital stays, early ambulation and less postoperative pain and morbidity.

Patients and Methods

This is a prospective study of open nephrolithotomy procedures on renal calculus' with staghorns while minimally incising. Between 2019 and 2022, 14 patients underwent open nephrolithotomy and they were laterally positioned on the left or right depending on the site of surgery.

Minimal subcostal incisions of around 6 to 8cm with a

combination of muscle cutting and a splitting technique were used to access the gerota fascia. Subsequently, the kidney was accessed and the stone was removed with the assistance of a C-arm fluoroscopic guidance [image 1,2,3]. Information obtained included age, gender, diagnosis, procedure, surgical duration, length of hospital stays and pain threshold. Subjective pain outcome was assessed using a numeric rating scale (NRS) from 0 to 10. The numbers indicated the following, 0 to 1= no pain, 1 to 3= mild pain, 3 to 5= moderate pain, 5 to 7= severe pain, 7 to 9= very severe pain ,9 to 10= worst pain possible.

Instruments used included a combination of paediatric and adult operating instruments, c-arm fluoroscopy, diathermy, operating loops and an anaesthetic machine with patient monitors. 2 patients were administered epidural anaesthesia.

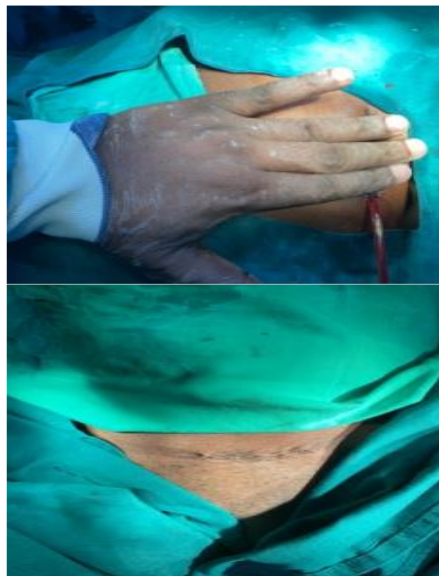


Image 1



Image 2

Results

During the period of study, 14 procedures were performed on patients with an average age of 44.07 years. The average incision length was 6.42 cm and the mean duration of operation time was 135.5mins. The mean post operative stay was 3.2 days.

There were 9 males and 5 females. 3 had multiple renal

stones [21%], 1 patient had staghorn calculi [7%] and 10 had solitary stones in one of the calyces [72%] [Fig 1].

There was more mild than moderate pain and the patient indicated no severe pain according to the numeric rating scale (NRS) for pain [Fig 2]. Images 4 and 5 show the extracted kidney stones

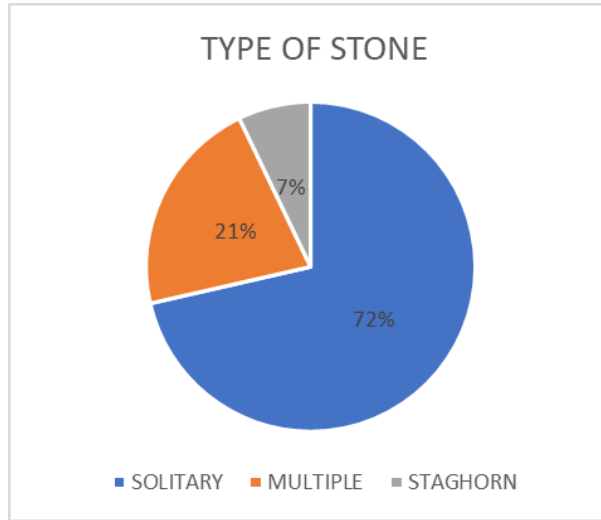


Figure 1.

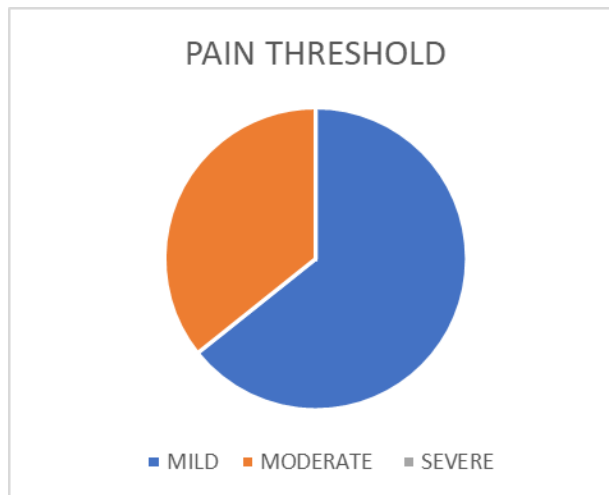


Figure 2.



Image 3



Image 4

Discussion

Over the decades, surgical approach to stone treatment has dramatically changed with extracorporeal shockwave lithotripsy and endoscopic treatments thus eliminating the need for open surgery in both kidney and ureteric stones [4]. The advent of laparoscopic stone removal has further reduced the need to perform open surgery. The great limitation of laparoscopic surgery resides in patient's comorbidity such as severe heart failure and previous laparotomy just to mention a few [5].

In contrast to adults, among the paediatric population, nephrolithotomy is still considered a treatment of choice because it allows, through a small access, the best chance of stone free rate for staghorn and complex kidney stones [6]. In our region which is considered to be developing, there is paucity of trained personnel in endoscopic treatment. As a result, fluoroscopy is essential in guiding surgeons to stones during open nephrolithotomy in order to achieve shorter hospital stays and render stone free outcomes. The diverse manifestations of urolithiasis provide a very interesting epidemiological study from the standpoint of geography, socioeconomic status, nutrition and culture. There has been a continuous search for the cost effectiveness of different treatment modalities not only to treat the patient but also to prevent recurrence [7]. Nowadays, developed countries have reduced the incidence of staghorn stones to 4% of all urinary stones, owing to effective and early management of renal stones. However, it remains a difficult challenge for urologist [8]

In this study, we performed open nephrolithotomy via a small incision of 6-8cm with majority of our patients having solitary stones. There were 9 males and 5 females with mean age of 44.07 years. Trinchieri et al found male preponderance and a mean age of 45.5 years. Benchekroun et al found female preponderance with mean age of 46 years [9,10]. The use of the C-arm was very useful in guiding us to the exact location of the stone with very minimal mobilization of the kidney.

With the help of the C-arm, operation time was very short and the hospital stay for the patient was an average of 3 days. There was mild postoperative pain as measured with

the numeric rating scale for pain. All our patients did well and on follow up had very satisfactory care.

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