

Case Report

A Huge Staghorn Calculus Managed by Open Surgery - A Case Report

Sardar Rezaul Islam^{1*}, Debabroto Paul², Shah Alam Sarkar², Haldar Kumar Golap³ and Mushfiqur Rahman⁴

¹Department of Surgery, Ad-Din Medical College Hospital, Bangladesh

²Department of Surgery, Jahurul Islam Medical college Hospital, Bangladesh

³Anwer Khan Modern Medical College Hospital, Bangladesh

⁴Sir Salimullah Medical College Hospital, Bangladesh

Abstract

A 45 years old man presented with left loin pain and recurrent urinary tract infection. X-ray KUB and CT IVU showed a huge stag horn calculus occupying entire left kidney. Still a rim of kidney tissue is preserved. Isotope renography showed 34% kidney function is yet present in the left kidney. Open nephrolithotomy via anterior approach was done. Patient recovered fully without any complication.

Introduction

Upper urinary tract stones that involve the renal pelvis and extend into at least 2 calyces are classified as staghorn calculi [1].

Staghorn calculi, also known as coral calculi, struvite calculi, or triple phosphate, are renal calculi that obtain the shape of stag horns by occupying multiple portions of the renal pelvis and calyces [2-5]. Struvite stones are crystalline compounds made up of three cations (calcium, magnesium, and ammonium) and one anion (phosphate) [6].

Patients with staghorn calculus can be asymptomatic even when the stones have grown large and occupy the entire kidney. This lack of symptoms is because large staghorn calculi may not lead to acute urinary tract obstruction and hydronephrosis. However, chronic flank pain and recurrent urinary tract infections with the same organism are key clinical indicators of staghorn calculus [5,6].

A non-contrast Computed Tomography (CT) scan is best method to diagnose staghorn calculus. If a CT scan is unavailable, ultrasonography combined with a plain radiograph can be employed. Struvite stones are usually radio-opaque due to their calcium content, and a typical struvite stone will demonstrate high density on CT scan [7,8]. But IVU or Isotope renography is required to assess renal function.

Staghorn stones have a high probability of progressing to infection. Modern techniques like Percutaneous Nephrolithotomy (PCNL), retrograde intrarenal surgery, and extracorporeal shock

wave lithotripsy are frequently used for removal of stag horn calculus. Laparoscopic nephroolithotomy is also being used. We report a rare case of a very large staghorn calculus removed intact using open nephrolithotomy, which is a relatively traditional technique. Its significance lies in the fact that a renal stone of this size is rarely reported.

Case Presentation

A 45 years old man presented with left loin pain and recurrent urinary tract infection. X-ray KUB and CT IVU showed a huge stag horn calculus occupying entire left kidney (Figure 1 and 2). Still a rim of kidney tissue is preserved. Isotope renography was performed to see split function of kidneys. It showed 34% kidney function is yet present in the left kidney (Figure 3 and 4). We decided to go for straight-forward open nephrolithotomy *via* anterior approach. Extended left subcostal incision was given. The huge stone was easily removed intact as renal cortex became very thin (Figure 5 and 6). Patient recovered fully. He was discharged on 7th post-operative day. He was seen on follow up visit and was found doing excellent.

Discussion

Our patient presented with loin pain and recurrent urinary infection. CT IVU showed that stone is occupying entire kidney. Simple IVU showed no excretion of dye on the left side. Then isotope renography was done to determine the split function of the kidney, which was more than 34% on the left side. Then nephrectomy was not indicated. To preserve the remaining kidney function, the patient underwent left open nephrolithotomy via extended left subcostal incision. Open nephrolithotomy is a traditional yet safe, efficient, and frugal procedure for very large staghorn stones in resource-limited settings. There is less risk of residual fragments and hence need for multiple interventions [9,10].

Conclusion

PCNL is the treatment of choice for Stag horn calculus. However, A huge size stag horn calculus is best treated by open nephrolithotomy. This has the highest chance of achieving a calculi-free outcome through a single procedure. This can also avoid repeated procedure and complication related to incomplete removal of stone. More-over expertise and facility should be available to remove huge

Citation: Islam SR, Paul D, Sarkar SA, Golap HK, Rahman M. A Huge Staghorn Calculus Managed by Open Surgery - A Case Report. *Am J Surg Case Rep.* 2024;5(3):1124.

Copyright: © 2024 Sardar Rezaul Islam

Publisher Name: Medtext Publications LLC

Manuscript compiled: Mar 30th, 2024

***Corresponding author:** Sardar Rezaul Islam, Department of Surgery, Professor and Head, Ad-Din Medical College Hospital (AWMCH), Dhaka, Bangladesh



Figure 1: Plain X-ray KUB.

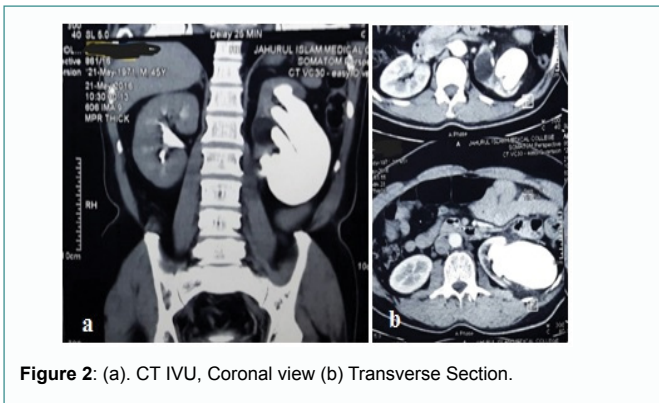


Figure 2: (a). CT IVU, Coronal view (b) Transverse Section.

Table of Result Summary			
Parameters	Left	Right	Total
Split Function (%)	34.7	65.3	
Kidney Counts (cpm)	45514	85704	131218
Kidney Depth (cm)	5.815	5.854	
Uptake (%)	3.250	6.120	9.370
GFR (ml/min)	29.5	55.6	85.1
Normalized GFR (ml/min)			87.8
GFR Low Normal (ml/min)			80.0
Mean GFR (ml/min)			104.0
Time of Max (min)	0.434	15.7	
Time of 1/2 Max (min)	0.937	19.3	

Figure 3: Isotope Renography showing split function of both kidneys.

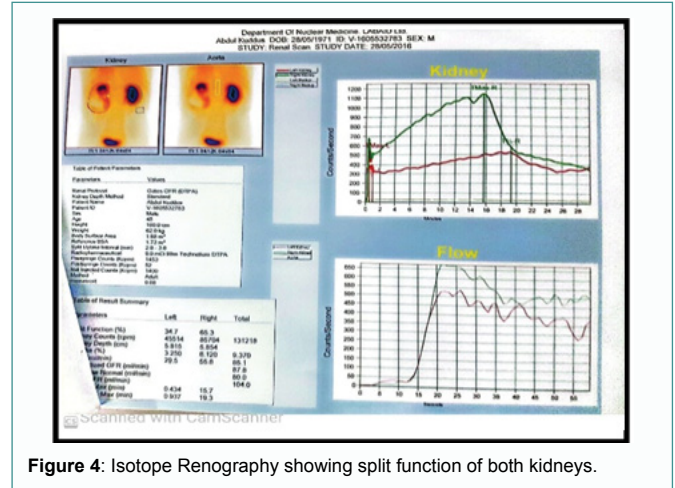


Figure 4: Isotope Renography showing split function of both kidneys.

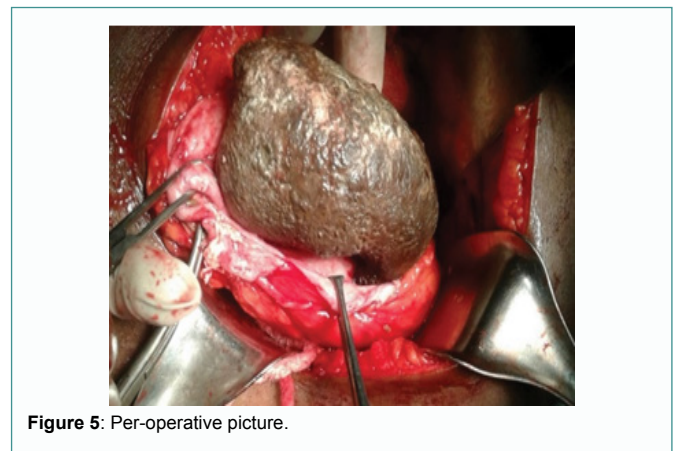


Figure 5: Per-operative picture.

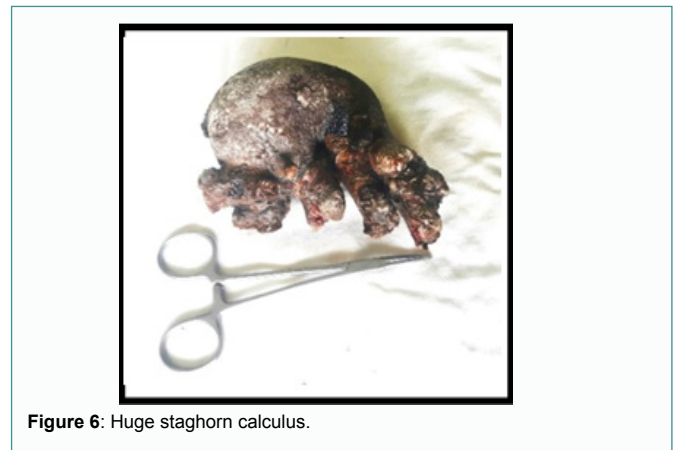


Figure 6: Huge staghorn calculus.

size of stone by minimal invasive procedure. Open surgery is still relevant in urological practice and should be continued to be taught and practiced when required.

References

- Diri A, Diri B. Management of staghorn renal stones. *Ren Fail.* 2018;40(1):357-62.
- Cheng PM, Moin P, Dunn MD, Boswell WD, Duddalwar VA. What the radiologist needs to know about urolithiasis: part 1--pathogenesis, types, assessment, and variant anatomy. *AJR Am J Roentgenol.* 2012;198(6):W540-7.
- Niknejad MT. Staghorn calculus (kidney). *Radiopaedia.* 2022.
- Sharbaugh A, Morgan Nikonow T, Kunkel G, Semins MJ. Contemporary best practice in the management of staghorn calculi. *Ther Adv Urol.* 2019;11:1756287219847099.
- Zhao P. Staghorn calculi in a woman with recurrent urinary tract infections: NYU

Case of the Month, December 2016. *Rev Urol.* 2016;18(4):237-8.

- Karki N, Leslie SW. Struvite and triple phosphate renal calculi. *Treasure Island (FL): StatPearls.* 2023.
- Zilberman DE, Ferrandino MN, Preminger GM, Paulson EK, Lipkin ME, Boll DT. In vivo determination of urinary stone composition using dual energy computerized tomography with advanced post-acquisition processing. *J Urol.* 2010;184(6):2354-9.
- Keshavamurthy R, Karthikeyan VS, Mallya A, Sreenivas J, Nelivigi GG, Kamath AJ. Anatomic nephrolithotomy in the management of large staghorn calculi - a single centre experience. *J Clin Diagn Res.* 2017;11(5):PC01-04.
- Melissourgous ND, Davilas EN, Fragoulis A, Kiminas E, Farmakis A. Modified anatomic nephrolithotomy for complete staghorn calculus disease -- does it still have a place? *Scand J Urol Nephrol.* 2002;36(6):426-30.