ORIGINAL ARTICLE

ANATROPHIC NEPHROLITHOTOMY IN THE MANAGEMENT OF LARGE STAGHORN RENAL CALCULI

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ABSTRACT
Objective: To assess the efficacy of anatrophic nephrolithotomy in the management of large staghorn renal calculi.
Design & Duration: Retrospective case series from January 2001 to December 2007.
Setting: Ziauddin University Hospital, Jamal Noor Hospital, Liaquat National Hospital, and some other private hospitals where the authors practice.
Patients: One hundred patients with renal staghorn calculi undergoing anatrophic nephrolithotomy.
Methodology: All the patients were preoperatively evaluated, and were operated via lumbar approach, through the bed of 12th rib. Cold ischemia was achieved by packing the perirenal space with sterile crushed normal saline. The calculus was removed and complete stone clearance was checked by direct visualization and later on by radiology. The patient was followed-up in the out-patients department for 12 weeks.
Results: Out of 100 patients, 56 were male and 44 female, with a mean age of 41.33 years. The mean operating time was 76.93 mins. and mean cold ischemia time was 22.44 mins. Seven patients had secondary haemorrhage; four required required angiembolization. In one patient peroperative nephrectomy had to be carried out. Twelve patients required blood transfusion.
Conclusion: Anatrophic nephrolithotomy is a valid option to achieve complete stone clearance in large staghorn renal calculi.

KEY WORDS: Renal Calculi, Anatrophic Nephrolithotomy, Nephrectomy

INTRODUCTION

Urinary tract stones are amongst the most painful afflictions of mankind and constitute a significant proportion of the workload of a surgeon. Until the last quarter of the previous century, open surgery remained the only option in treating stones. Drastic changes have taken place in the management of urinary stones in the last two decades.

These days majority of patients with kidney stones can be managed without open surgery. However, large staghorn calculi still pose a problem and may need multiple sessions of PCNL or Sandwich approach i.e. PCNL+ESWL combined, which is time consuming and expensive. Hence this study employed the technique of anatrophic nephrolithotomy, which is open renal lithotomy with cold ischaemia and renal pedicle clamping to control haemorrhage.

PATIENTS & METHODS

This retrospective case series was conducted on 100 patients who underwent anatrophic nephrolithotomy for staghorn renal calculi at different hospitals of Karachi from January 2001 to December 2007. Apart from clinical workup, all the patients were preoperatively evaluated with complete blood picture, urine analysis, blood sugar and urea, serum creatinine and electrolytes, ultrasonography and intravenous urography.

After appropriate preparation all patients were operated via lumbar approach, through the bed of 12th rib. The
kidney was mobilized meticulously; particular attention was paid to preserve the renal capsule and skeletonise the renal pedicle. Cold ischemia was achieved by packing the perirenal space with sterile crushed normal saline for 10 minutes after which the renal pedicle was cross clamped with Satinsky’s vascular clamps. The kidney was opened at the convex border and the calculus was removed. Complete stone clearance was confirmed by direct visualization and palpation. Haemostasis was secured under vision by partially releasing the clamp and under running bleeders with 3/0 vicryl. Renal substance was approximated with mattress sutures of either 0-vicryl or chromic catgut, while the convex surface was closed with continuous 2/0 vicryl or chromic catgut. The retroperitoneum was drained. Stone clearance was confirmed with X-ray KUB on the third post-operative day. The patient was followed-up in the out-patients department for 12 weeks.

**RESULTS**

During the study period 100 patients, 56 males and 44 females, underwent anatrophic nephrolithotomy. Their mean age was 41.33 years (range 12 to 77 years). The mean operating time was 76.93 mins. (range 45 to 190 mins.), whereas the mean cold ischemia time was 22.44 mins. (range 15-25 mins.).

One patient had uncontrollable haemorrhage perioperatively, hence nephrectomy had to be performed. Seven patients had secondary haemorrhage between the 14th to 21st postoperative day and needed readmission. Out of these four required angiembolization; the remaining three settled on hydration, blood transfusion and antibiotics. Overall 12 patients required blood transfusion.

All patients underwent X-ray KUB on the third post operative day to confirm stone clearance. Seven patients had residual stone fragments, out of which four cleared spontaneously. The other three patients had fragments from 8mm to 1cm and required ESWL later on.

**DISCUSSION**

Calculous disease of the urinary tract is of common prevalence in our country. Important reasons being non-availability of clean drinking water, malnutrition, hot climate and poor accessibility to health care setup.

Staghorn calculi can be asymptomatic and sometimes incidental findings. Various approaches are being practised for staghorn calculi including ESWL with or without DJ stenting, PCNL, combined PCNL and ESWL (Sandwich approach) and anatrophic nephrolithotomy.

Flank incision excising the 12th rib provides suitable access to the kidney. Meticulous attention should be given to mobilize the kidney and isolate the renal pedicle. Every effort should be made to preserve the renal capsule to ensure adequate closure of the nephrectomy. Our mean operative time of 79.63 minutes is significantly shorter than various other authors. Cold ischemia is necessary to reduce the nephron damage. It should ideally be not more than 30 minutes. However ischemia time of up to 45 minutes has been reported. The mean ischemia time in this study was 22.44 minutes.

Troublesome haemorrhage requiring transfusions have been reported. Conservative approach can be adopted in haemodynamically stable patients. However those non-responsive to conservative treatment may need angiembolization or very rarely nephrectomy. In the present series four patients required angiembolization for secondary hemorrhage.

Various rates of stone clearance have been documented with different procedures, highest being for anatrophic nephrolithotomy. The stone clearance rate in this study was 93%. Only three patients had to undergo ESWL for residual fragments measuring 8mm to 1cm. The remaining four cleared spontaneously during the first 12 weeks.

ESWL, PCNL or both combined are less invasive in managing staghorn calculi. However, their limited availability, need for repeat/multiple sessions and financial constraints result in lesser patient compliance. In these situations anatrophic nephrolithotomy can achieve highest stone free rates with a single procedure.

**CONCLUSION**

Anatrophic nephrolithotomy is a valid option to achieve complete stone clearance in large staghorn renal calculi.

**REFERENCES**


