Laparoscopic Anatrophic Nephrolithotomy for Complex Staghorn Calculi with Early Unclamping and Controlled Hypotension: An Attempt to Preserve Renal Function

Introduction and Objectives: There are clear indications for the treatment of complex staghorn stones by Anatrophic Nephrolithotomy. When a reasonable number of sittings are unlikely to clear the calculus, b. other endourologic interventions have failed, c. an associated structural anomaly needs correction or d. percutaneous access is technically unfeasible, anatrophic nephrolithotomy is the recommended procedure. Laparoscopy offers a minimally invasive option to these patients.
Materials and Methods: Laparoscopic anatrophic nephrolithotomy was performed in 8 patients with complex staghorn calculi. Mean patient age was 49 years (35-62), mean stone size was 53 mm (35-70). The principles of open anatrophic nephrolithotomy are followed. The hilum is dissected; the artery and vein isolated and controlled with bulldog clamps. An incision is made with a laparoscopic knife in the avascular plane along Brodel's line, approximately 1 cm from the lateral aspect of the kidney. The stone is extracted. The large vessels that are visualized are oversewn individually. Controlled Hypotension is applied minutes prior to hilum release. The clamps are removed within 20 minutes. Any additional bleeding vessels are oversewn. The blood pressure is gradually restored. As hemostasis is confirmed, the parenchyma is closed in a running fashion.
Results: All patients were completed laparoscopically. Mean operative time was 142.5 min, mean warm ischemia time was 20.8 min. Average blood loss was 315 cc, mean average stay was 3.5 days. Complete clearance of the calculus was obtained in 5 patients. The 3 months' post-operative scan showed an average reduction of 6.6%, which returned to normal in the long-term follow-up.
Conclusions: Our goal, besides removing the stone, is to preserve renal function. The technique has evolved achieving excellent hemostasis with an accurate incision along Brodel's line and early unclamping along with controlled hypotension, to reduce ischemia time. Advantages of this technique are that it diminishes ischemia time, ensures hemostasis prior to kidney closure and decreases the risk for arteriovenous fistula or aneurysm formation. We hope this technique leads to preservation of renal function in patients with staghorn calculi.

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