Management of multiple/ staghorn kidney stones: Open surgery versus PCNL (with or without ESWL)

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Ismail MA, Elleithy TR, El Ghobashy SE, El-Baz AM, Rousdy M, Alkholy AA, et al. Open surgery in the management of multiple and staghorn kidney stones: Its role in the era of minimally invasive techniques.

SUMMARY
This retrospective study comprises of 111 patients with 118 renal units who underwent open-technique surgery and 97 patients with 106 renal units who underwent combined percutaneous nephrolithotomy and extracorporeal shockwave lithotripsy. The authors have retrospectively compared the two in terms of operative time, operative cost, blood loss, stone-free rate, use of single or multiple sessions, hospital stay, complications, total cost and time to return to activity. All patients who presented with multiple or staghorn renal stones were included in this study.

In all patients, detailed history, physical examination, routine laboratory investigations and radiological evaluation in the form of plain X-ray abdomen, kidney, ureter and bladder and ultrasound were carried out. Patients with creatinine <1.5 mg/dl also underwent intravenous urography. In patients with creatinine >1.5 mg/dl, non-contrast spiral computed tomography (CT) was performed. In the post-operative period, X-ray kidney ureter and bladder was performed for all patients for the presence of any clinically significant stone residue, which was defined as stones >4 mm.

In open groups as compared with combined PCNL plus ESWL groups, a statistically significant difference was found in terms of less operative time (P < 0.01), less operative cost (P < 0.01), less number of sessions (P < 0.01) and shorter hospital stay (P < 0.05). On the other hand, more time for convalescence (P < 0.01) and more blood loss (P < 0.01) were found in the open group as compared with the combined PCNL plus ESWL groups. There were fewer incidences of colonic injury, ArterIo-venous fistula and urinary leakage but more incidences of blood loss and pneumothorax and comparable incidence of sepsis in open group as compared with combined PCNL plus ESWL groups.

This study recommends open surgery for the management of complex multiple and staghorn renal calculi, especially in the working conditions of developing countries. According to the authors, there is high patient load and limited resources in these developing countries. Thus, each procedure should be directed in an efficient and cost-effective manner.

COMMENT
Today, shock wave lithotripsy and percutaneous nephrolithotomy have replaced open stone surgery for the management of all but the most complex of staghorn calculi. Most authors have recommended PCNL as the first-line and gold standard treatment for staghorn and complex multiple renal stones because of its low morbidity rate.[1,2] However; other studies give more preference to open surgery in the form of anatrophic nephrolithotomy.[3,4]

After reviewing 110 articles of staghorn calculi, the Nephrolithiasis Clinical Guidelines Panel of the American Urological Association has given the following guidelines: “Percutaneous stone removal, followed by ESWL or repeat PCNL, should be used for most patients with struvite staghorns. Neither ESWL-mono-therapy nor open surgery should be used as first-line treatment for staghorns in most patients.”[5]

The morbidity of open surgery has been reported extensively in the literature, including fever (26-29%), blood transfusions (14-70%), pneumothorax (5%), recurrent bleeding (4%), septicemia (1%), urinoma/fistula (1%), embolism (2%), flank abscess (2%), flank pain (16%), flank bulge (5%), incisional hernia (2%) and wound infections (4%), with a post-operative hospital stay ranging from 11 to 16 days.[6]

Using the modern minimally invasive approach, the morbidity is mainly related to percutaneous surgery, with the need of blood transfusions (5-53%), fever (12-64%), septicemia (2-4%), pneumothorax (2%), A-V malformation requiring superselective embolization (1%), flank abscess (1%) and colon perforation (1%). The hospital stay ranged between 9.5 and 18 days.[6]

The time to normal activity ranged between 44 and 54 days.
after open surgery, which was only 21-30 days after ESWL plus endourology. Complete loss of renal function was seen in 2-8% after open surgery associated with a nephrectomy rate of 7-14%.

The fact that the modern techniques require multiple treatment sessions (2.8 vs. one session) does not represent a disadvantage because it has an impact neither on morbidity nor on the hospital stay.

Most of the literature shows a stone-free rate of around 85% with a stone recurrence of around 30%, using combined PCNL and ESWL. For large-volume staghorn calculi, a percutaneous approach either as monotherapy or in conjunction with shock wave lithotripsy should provide stone-free rates comparable to that of open surgery. Moreover, these minimally invasive approaches offer the benefits of decreased blood loss, decreased growth of residual fragments as well as a more rapid return to normal activity.

When cost considerations alone are discussed, open stone surgery is still cost effective both in terms of residual stone rates and also in terms of the actual bill.

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