Evaluation of control of bleeding by electro cauterization of bleeding points of amplatz-sheath tract after percutaneous nephrolithotomy (PCNL) in Jahrom Peymanieh hospital during year 2015-2016

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Abstract

Introduction: Complications frequently related to percutaneous renal surgery include renal hemorrhage, perforation of the collecting system, urinary tract infection, and injury to adjacent organs. Renal hemorrhage is the most common and worrisome complication after PCNL. In an effort to reduce postoperative hemorrhage after completion of percutaneous renal surgery, we cauterized the bleeding points over the access tract.

Material & Methods: This cross sectional study was carried out on the 85 patients who underwent PCNL between March 2015 and March 2016 in Jahrom Peymanie hospital using census sampling method. Electro cauterization of bleeding points after operation was performed for the participants. Patient's data was collected with a research made questionnaire including clinical and diagnosis characteristics. Data was recorded by Statistics Software (SPSS, Edition14) using chi-square test and Student's t-test.

Results: From 85 patients 58 patients (68.2%) were male and 27 patients (31.8%) were female. The patients age ranged from 20 to 82 years old. The stone size range was from 10 to 35mm. 15 patients had stones located in upper pole, 20 patients had stones located in pelvis and midpole of the kidney, 13 patients had stones located in the lower pole and 37 patients had multiple staghorn stone. The mean hemoglobin (Hb) concentration before operation was 14±0.5 mg/dL while it was 14±0.2 mg/dL after operation. There was no statistically significant correlation between hemoglobin level before and after operation (P>0.05).

Conclusion: Electro cauterization of bleeding points with an electrode probe after percutaneous surgery decreased morbidity. It is an effective and safe procedure and should be considered an option in percutaneous renal surgery.

Key words: bleeding, electro cauterization, percutaneous nephrolithotomy

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Introduction

Nephrolithiasis is a common clinical disorder affecting up to 5% of the general population in the USA (l). The prevalence of renal stone disease has been rising in both sexes, being estimated that about 5% of American women and l2% of men will develop a kidney stone at some time in their life (2). Nevertheless, in certain areas of the world, as in the Middle East, the lifetime risk appears to be even higher (3). There has been heightened awareness of renal stone disease in children as well (4). Recurrence rates of 50% after l0 years and 75% after 20 years have been reported (5, 6). Clinical manifestations are characterized by lumbar pain of sudden onset (the location of pain depends on the location of stone in the urinary tract) that may be accompanied by nausea and vomiting, gross or microscopic hematuria Diagnosis of renal stone in the acute setting is beyond the scope of the present update but in brief, is represented by urinalysis and imaging. Urinalysis often reveals hematuria but the latter is absent in approximately 9% of cases (7). Crystal Luria is occasional and the presence of leucocyturia may suggest associated urinary tract infection. Unenhanced helical computed tomography (CT) scan, the most sensitive and specific radiographic test (8, 9), is becoming the diagnostic procedure of choice to confirm the presence of kidney stone and especially of ureteral stones (10). However, high doses of radiation and elevated costs must be considered (11). Since renal ultrasound (US) provides information about obstruction (12) but may miss ureteral stones, the association of US with conventional abdominal X-ray may help (13). Renal colic must be differentiated from musculoskeletal pain, herpes zoster, pyelonephritis, appendicitis, diverticulitis, acute cholecystitis, gynecologic disease, ureteral stricture or obstruction due to blood clot, polycystic kidney disease. Stone formation usually results from an imbalance between factors that promote urinary crystallization, and those that inhibit crystal formation and growth (14). The main determinants of calcium oxalate (CaOx) super saturation are oxalate and calcium concentration, while the latter associated to urinary pH determines calcium phosphate super saturation. Urinary pH itself is the main determinant of uric acid super saturation (l4).

Material and Methods

Sampling & data collection & statistical analysis:
In a cross sectional study we reviewed the old charts of all patients in whom cauterization of bleeding points of access tract was performed after percutaneous nephrolithotomy (PCNL). We prepared a questionnaire including questions about age, sex, size and location of stone, mean hemoglobin level before and after operation, hemoglobin drop after operation, stone free rate, operating time, length of postoperative hospital stay, postoperative urinary tract infection rate, and blood transfusion rate, presence of per renal hematoma or urinoma. Per renal hematoma or urinoma was detected by KUB sonography the day after PCNL. Stone free patient was defined as those who had no stone or stone smaller than 4mm one week after PCNL. All patients who underwent PCNL between March 2015 and March 2016 in Jahrom Peymanie hospital and who had Electro cauterization of bleeding points after operation was performed participated in this study using census sampling method. Finally 85 patients were elected to participate in this study. Data was recorded by SPSS program using chi-square test and Student's t-test. The most important difficulty in this study especially in data collection is that sometimes the charts of the patients were not complete and we needed to call them.

Operation method:
All the patients underwent regional spinal anesthesia. Renal access was obtained under Fluoroscope guidance with an 18-guage needle and a 0.038 J-tip guide wire after retrograde placement of a SF or 6F ureteral occlusion balloon catheter cystoscopically. The access tract was dilated with metal coaxial dilators to allow for the passage of a 30F-working sheath. The pneumatic lithotripter was used for lithotripsy. After completion of stone extraction, a 6F double-J catheter was inserted in ante grade fashion after withdrawal of the occlusion balloon catheter. The bleeding points were cauterized with an elongated electrode probe connected to the hand piece of a conventional electric cauterizing device. The probe touched the bleeding points gently and cauterized them for a few seconds, as one would in transurethral surgery.

The bleeding points were usually located just beneath the collecting system torn by manipulation of instruments and beneath the urothelium where the access tract entered the collecting system. Most bleeding ceased after cauterization but some did not. To avoid adjacent organ or renal pedicle injury, we never cauterized the bleeding point for too long or too deep, especially for those located over the renal pelvis or ureter.

Results

Totally 85 patients who underwent PCNL and Electro cauterization of bleeding points after their operation participated in this study. From 85 patients, 58 patients (68.2%) were male and 27 patients (31.8%) were female. The patients age ranged from 20 to 82 years old. The stone size ranged from 10 to 35mm.

All the patients underwent regional (spinal or epidural) anesthesia for the operation. From 85 patients; l5 patients (17.6%) had stones located in upper pole, 20 patients (23.5%) had stones located in pelvis of the kidney, l3 patients (15.2%) had stones located in lower pole and 37 patients (43.5%) had multiple staghorn stone.

The mean hemoglobin (Hb) concentration before operation was 14±0.5 mg/dL while it was 14± 0.2 mg/dL after operation. There was no statistically significant correlation between hemoglobin level before and after operation ($P>0.05$).

Figure 1: Percentage of patients with renal stone in each sex

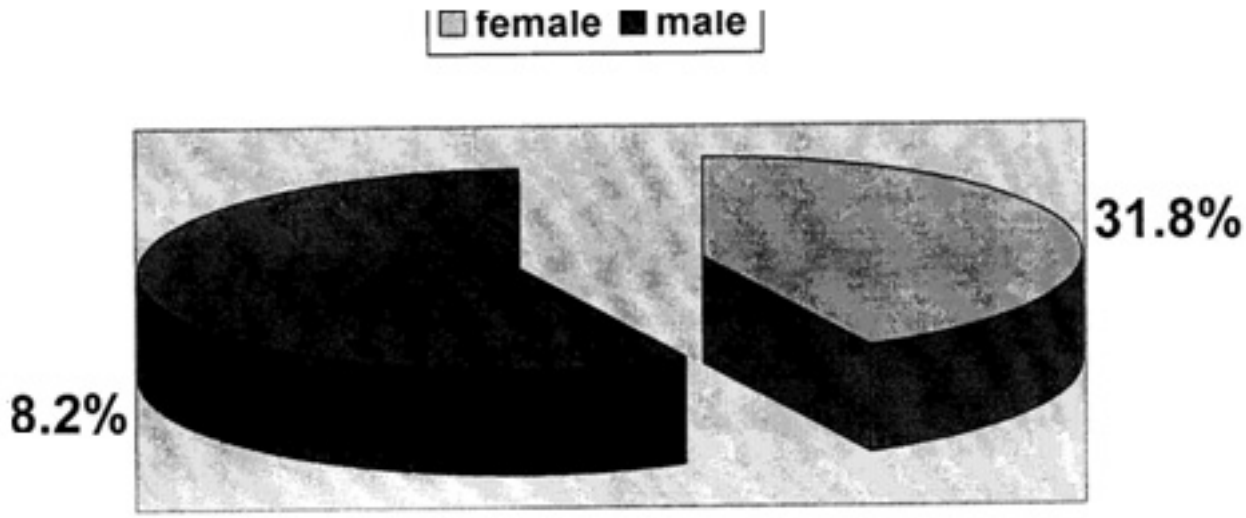


Figure 2: Stone location

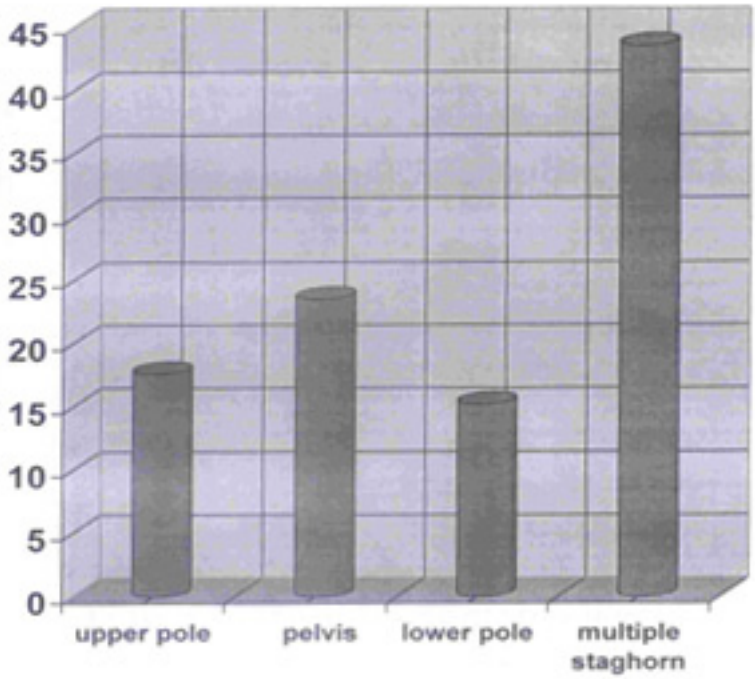
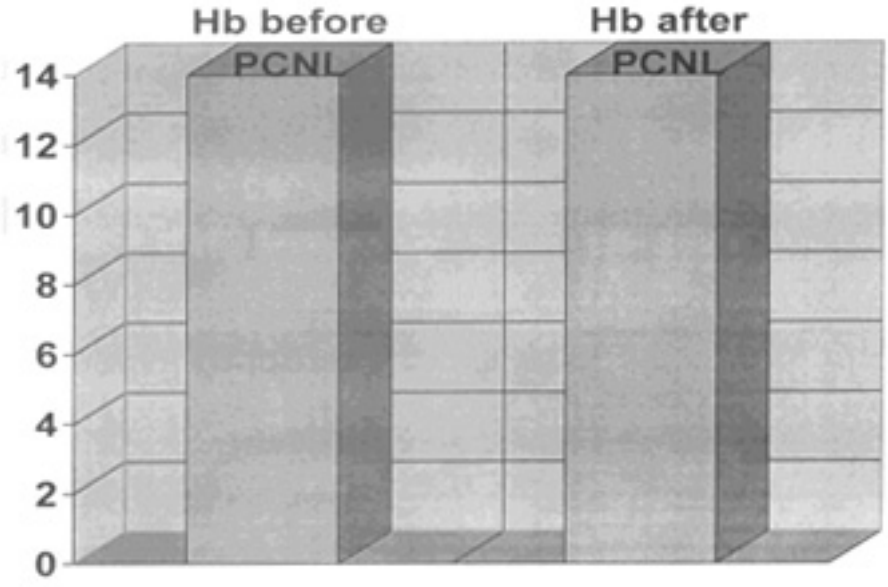


Figure 3: Mean hemoglobin level before and after PCNL



Discussion

Percutaneous renal surgery is a common urologic procedure. It has been widely used for the removal of renal and upper ureteral stones and also for the treatment of pelvi-ureteral stricture and management of tumor of the upper urinary tract. Improvements in instrumentation and technology in recent years have decreased the complication rate of percutaneous renal surgery dramatically. However, complications do occur. Renal hemorrhage after percutaneous renal surgery is one of the most common complications. Bleeding may occur during any point of theprocedure. Venous bleeding is the most common type and can be controlled by clamping the nephrostomy tube. Excessive bleeding during percutaneous renal surgery may result from renal vessel injury, such as to a segmental branch. For excessive bleeding during percutaneous renal surgery, in addition to nephrostomy tube clamping, several techniques can be used to minimize bleeding Intravenous administration of mannitol with hydration leads to forced diuresis, dilation of renal tubules, swelling of the renal capsule, and increased intra renal pressure, which may enhance the effect of tamponed. Application of the Kaye tamponade balloon catheter is an alternative to minimize postoperative hemorrhage, and the device can be placed and inflated to control bleeding in the access tract (4). Angiography and embolization is required in persistent and active bleeding, in addition to the above-mentioned conservative treatment. Despite these efforts, percutaneous renal surgery still has a greater transfusion rate than other common urologic procedures. Because of the potential risks associated with blood transfusion, including transfusion reactions and transmission of the human immunodeficiency virus, hepatitis, and other infectious diseases, it is important to develop a procedure to minimize renal hemorrhage after percutaneous renal surgery.

Serial reports about tubeless percutaneous renal surgery for selected patients have recently been published. After draining with a double-J catheter or externalized ureteral catheter on removal of the nephroscope with a Working sheath and completion of the percutaneous renal procedure, the guidewire over the nephrostomy site was still in place. The guidewire was removed, and the wound was closed if no bleeding was evident at the nephrostomy site. The advantages of tubeless percutaneous renal surgery include earlier discharge, lower analgesic requirement, faster recovery to resume normal activities, and greater cost benefits. In literature and Medline there is only one article performed by Yeong-Chin J Ou et al in Chiayi Christian Hospital, Chiayi, Taiwan (1). In their study Electro cauterization of bleeding points with an elongated electrode probe was performed in 249 patients. The age, height, weight, preoperative hemoglobin level, stone burden, operating time, stone free rate, length of postoperative hospital stay, postoperative urinary tract infection rate, and blood transfusion rate were recorded by retrospective chart review. There was no statistically significant differences in age, height, weight, stone burden, operating time, stone free rate, or length of postoperative hospital stay found between patients with or without Electro cauterization. No increase occurred in the postoperative urinary tract infection rate in patients who received Electro cauterization, and these patients had a statistically significant decrease in the transfusion rate. No nephrostomy tube was inserted at the completion of surgery in 84 (33.7%) of the 249 operations in which Electro cauterization was performed. They finally concluded that Electro cauterization of the bleeding points at the end of percutaneous renal surgery decreases the blood transfusion rate without causing an increase in morbidity. This procedure is safe and effective and may make more patients suitable for tubeless modification (1). Encouraged by the positive results, many institutions have expanded the use of tubeless modification for percutaneous renal surgery. After cauterization of the bleeding points in percutaneous renal surgery, 84 (33.7%) of 249 PCNLs were performed with a tubeless modification without any sequelae. In 2002, Limb and Bellman (12) reported that of 398 patients undergoing percutaneous renal surgery, 112 (28.1%, 86 undergoing PCNL and undergoing ante grade endopyelotomy) underwent a tubeless modification. The stone burden of their patients who underwent tubeless PCNL was 330-279 mm2. In our study, after cauterization of bleeding points, the percentage of patients undergoing tubeless modification was greater (33.7% versus 28.1%), even though the stone burden was large in our patients.

Conclusions

Electro cauterization of bleeding points with an elongated electrode probe after percutaneous surgery decreased the transfusion rate without causing any increase in surgical morbidity. The procedure also made more patients undergoing percutaneous renal surgery suitable for a tubeless modification. It is an effective and safe procedure and should be considered an option in percutaneous renal surgery.

References

1. Jou YC, Cheng MC, Sheen JH, Lin CT, Chen PC. Cauterization of access tract for nephrostomy tube-free percutaneous nephrolithotomy. J Endourol. 2004 Aug;18(6):547-9.
2. Stamatelou KK, Francis ME, Jones CA, Nyberg LM, Curhan GC. Time trends in reported prevalence of kidney stones in the United States: 1976-1994. Kidney Int 2003;63(5):1817-23.
3. Moe OW. Kidney stones: Pathophysiology and medical management. Lancet 2006;367:333-44.
4. Pak CYC, Resnick MI, Preminger GM. Ethnic and geographic diversity of stone disease. Urology 1997; 50(4):504-7.
5. Heilberg IP, Boim MA, Schor N. Biochemical differences between stone formers and normal subjects. In: Segura J, Conort P, Khoury S, Pak C, Preminger GM, Tolley D (eds). Stone Disease (1 st International Consultation on Stone Disease). Editions 21. France: Health Publications, 2003; pp. 61-4.

6. Trinchieri A, Ostini F, Nespoli R, Rovera F, Montanari E, Zanetti G. A prospective study of recurrence rate and risk factors for recurrence after a first renal stone. J Urol l999;162(1):27-30.
7. Sutherland J W, Parks JH, Coe FL. Recurrence after a single renal stone in a community practice. Miner Electrolyte Metab l985;l l(4):267-9.
8. Li J, Kennedy D, Levine M, Kumar A, Mullen J. Absent hematuria and expensive computerized tomography: case characteristics of emergency urolithiasis. J Urol 200l;l65(3):782-4.
9. Abramson S, Walders N, Applegate KE, Gilkeson RC, Robbin MR. Impact in the emergency department of unenhanced CT on diagnostic confidence and therapeutic efficacy in patients with suspected renal colic: a prospective survey. Am J Roentgenol 2000;175:1689-95.
10. Shokeir AA, Abdulmaaboud M. Prospective comparison of unenhanced helical computerized tomography and doppler ultrasonography for the diagnosis of renal colic. J Urol 2001;165:1082-4.
11. Teichman JM. Clinical practice. Acute renal colic from ureteral calculus. N Engl J Med 2004;50(7):684-93.
12. Grisi G, Satcul F, Cuttin R, Rimondidi A, Meduri A, Dalla Palma L. Cost analysis of different protocols for imaging a patient with acute flank pain. Eur Radiol 2000; 1011620-7.
13. Gandolpho L, Sevillano M, Barbieri A, Ajzen S, Schor N. Ortiz V, et al. Scintigraphy and doppler ultrasonography for the evaluation of obstructive urinary calculi. Braz J Med Biol Res 200l;34(6):745-5l.
14. Catalano O, Nunziata A, Altei F, Siani A. Suspected ureteral colic: primary helical CT versus selective helical CT after unenhanced radiography and sonography. Am J Roentgenol 2002; l 78:3 79-86.