ORIGINAL ARTICLE

Comparison of Cases Undergoing Percutaneous Nephrolithotomy in Previously Operated Kidneys Versus Non Operated Kidneys in Terms Of Intraoperative Blood Loss

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ABSTRACT

Background: Percutaneous nephrolithotomy (PCNL) is a minimally invasive procedure for removal of kidney stones. Intra-operative bleeding is one of the known complications, especially in previously operated cases. Haemoglobin fall during PCNL with or without a history of prior open renal surgery may differ so we conducted this study.
Aim: To determine the mean drop in haemoglobin in previously operated versus new cases undergoing PCNL.
Methods: This descriptive cross sectional study was carried out in Armed Forces Institute of Urology Rawalpindi from March 2015 to September 2015. A total of 90 patients were selected after taking permission from hospital ethical committee. Non-probability purposive sampling technique was used. Blood samples were taken on 1st day and 24 hours postoperatively to determine haemoglobin levels. Drop-in haemoglobin was calculated.
Results: The mean age was 43.68±13.14 years and ratio of male to female patients was 2.2:1. Mean stone size was 2.54±0.62cm and overall mean fall in Hb was 1.05±0.45mg/dl. 31.11% of the cases were previously operated while 68.89% were new cases. The mean fall in Hb value in previously operated cases was 1.23±0.31mg/dl and mean fall in Hb value in new cases was 0.97±0.49mg/dl which was statistically significant.
Conclusion: It is concluded that statistically significant more drop in the Hb values in previously operated cases as compared to new cases.
Keywwords: Percutaneous nephrolithotomy, Bleeding, Hemoglobin.

INTRODUCTION

Renal stone disease is one of the most common urological affliction with a prevalence of approximately 2-3% in the general population. There is a 12% estimated lifetime risk of developing a renal stone.[1] It is very high incidence of renal stones located in our region.[2] The advent of minimally invasive, endoscopic techniques and extra-corporeal shock were lithotripsy (ESWL) have almost replaced the classically performed open surgery for removal of renal stones.[1] Percutaneous nephrolithotomy (PCNL) is a minimally invasive surgery which is accepted for treating renal stones >2cm and upper ureteric calculi[3,4].

Renal stone tends to recur with a reported recurrence rate of more than 50% in 5-7 years**.** Therefore a large number of patients presenting to us with renal stones requiring PCNL have a history of open surgery for renal stone in past. There are reports of additional technical difficulties, higher failure rates, more operative time and more complication rates in patients undergoing PCNL having the previous history of renal surgery. Distortion of pelvicalyceal and retroperitoneal scaring are some of the responsible factors[1].

Intra-operative bleeding is one of the risks in previously operated cases. Nakamon et al observed a mean drop in Hb in PCNL was 3.34±2.99gm/dl.[5] Gupta et al did a comparative study in 106 patients and found the average drop of haemoglobin by 1.39g/dl±0.590g/dl in old cases compared to 1.1g/d±0.495g/dl in new cases**.**[1] Gupta et al in group of 90 patients found average of fall in haemoglobin level was comparable in patients with and with history of open stone surgery (2.3g/dl vs 2.1g/dl)[6].

Resorlu et al evaluated that PCNL in patients with a previous history of renal surgery has no higher risk of complications and with a stone clearance similar to that of PCNL in patients with no previous[7].

A significant number of patients presenting to our hospital requiring PCNL have the previous history of open renal surgery which renders them to operative difficulties and complication like intra-operative bleeding. This study aims to determine the mean drop in haemoglobin in patients who underwent PCNL with or without a history of prior open renal surgery to better anticipate and prepare ourselves for and potential intraoperative bleeding.

MATERIALS ANDMETHODS

This study was conducted in Department of Urology, Armed Forces Institute of Urology Rawalpindi from March 2015 to September 2015. It was a descriptive case series. A total of 90 cases were included in the study using WHO sample size calculator, keeping confidence 95%, anticipated population mean 3.34±2.99 and absolute precision 1. Sampling technique was non-probability consecutive sampling technique. Adult patients having renal stones >2cm with or without a history of previous renal surgeries on the same side were included. Patients having bleeding disorders, positive cultures (having

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deranged PT/APTT, Platelets <50,000/ml), having horseshoe kidney were excluded from the study.

The study was started after approval of the ethical committee of Armed Forces Institute of Urology, Rawalpindi. All the patients diagnosed to have renal stones requiring PCNL treatment were included in the study after a detailed history and physical examination. Stone size and density were on non-contrast CT KUB. Serum creatinine coagulation profile and urine cultures were done to include or exclude the patients accordingly, complete blood picture was done one day before surgery.

All the patients fulfilling selections criteria underwent PCNL which was done by one of the three consultants trained in the procedure. Pre-operative single-shot antibiotic (Amikacin 15mg/kg body weight) was given intravenously. Standard PCNL was performed in the supine position. Cystoscopy was performed in the lithotomy position and 5Fr ureteric catheter placed. Patient placed in a prone position after securing the ureteric catheter. Access was performed under fluoroscopy using upper pole Bull Eye's technique and lower pole triangulation technique. Olive over a 0.32 J tip metallic guide wire. Track dilation up to 26 Fr using coaxial metallic. 28 Fr Amplatz sheath placed. Standard 16 Fr Nephroscope was used in all cases. Swiss lithoclast master was used to break the stones. Stone fragments were removed with grasping forceps. Stone was clearance confirmed under fluoroscopy. Nephrostomy tube 16 Fr was placed at the end of the procedure and clamped. Ureteric catheter and foley's catheter were removed next day after getting a plain X-ray KUB. Nephrostomy tube clamped on the same day and removed after 24 hours if no leakage or pain. Blood samples were taken on 1st postoperative day 24 hours postoperatively and were sent to Armed Forces Institute of Pathology for determination of haemoglobin in gm/dl. Drop-in Hb in overall patients undergoing PCNL and drop in haemoglobin in both groups were calculated by subtracting post-operative haemoglobin from pre-operative haemoglobin. Descriptive statistics were calculated for both qualitative and quantitative variables. For qualitative like gender frequency percentage was calculated. For quantitative variable like age, mean haemoglobin at baseline of and at first post-operative day, mean drop in haemoglobin overall and new and previously operated cases mean±SD was calculated. Independent samples t-test was used to compare mean fall in haemoglobin. Effect modifies like age, gender, site and size of stones was controlled by stratification.

RESULTS

A total of 90 cases were included in the study. The mean age was 43.9±13.14 years with minimum and maximum ages of 25 & 65 years respectively. The male to female ratio of the patients was 2.2:1 with 68.89% male patients and 31.11% female patients. The mean stone size of the patients was 2.54±0.62cm with minimum and maximum stone sizes of 2-3.5cm respectively. Of all the cases operated 31.11% (n=28) had previous surgeries on the same side for renal stones (open pyelolithotomy) while 68.89% (n=62) had no history of any intervention on the same side.

Mean Hb values pre and postoperatively and minimum and maximum Hb levels (Table 1). In our study, the mean fall in Hb of the patients was 1.05±0.45mg/dl with minimum and maximum values of 0 and 2 respectively. The mean fall in Hb value in previously done surgery patients versus patients without previous surgery (Table 2). Statistically, a significant difference was found between the fall in Hb values with previous and without previous surgery (P 0.003).

The results showed that in below 40 years patients, the mean fall in Hb value with previous open surgery patients was 1.27±0.39mg/dl and in without surgery patients its mean value was 0.87±0.50, similarly in above 40 years patients, the mean fall in Hb value with surgery patients was 1.21±0.27mg/dl and in without surgery patients its mean value was 1.06±0.46. Statistically, a significant difference was observed between the fall in Hb with and without previous surgery in patients with below 40 years of age (P 0.022).

Table1: Descriptive statistics of Hb at baseline and at post readings

		Baseline reading	Post reading
Hemoglobin	n	90	90
	Mean	11.71	10.66
	SD	0.45	0.34
	Minimum	11.0	9.5
	Maximum	12.5	11.4

Table2: Comparison of fall in Hb with previous surgery

		Previous surgery	
		Yes	No
Fall in Hemoglobin	n	28	62
	Mean	1.23	0.97
	SD	0.31	0.49

Table 3: Comparison of fall in Hb with previous surgery stratified by sex

Sex	Previous surgery	Mean	SD	P value
Male	Yes	1.24	0.38	0.029
	No	0.95	0.46	
Female	Yes	1.21	0.18	0.244
	No	1.01	0.56	

Table 4: Comparison of fall in Hb with previous surgery stratified by stone size

Stone size	Previous surgery	Mean	SD	P value
≤2.5cm	No	1.15	0.19	0.457
	Yes	1.02	0.51	
>2.5Cm	No	1.28	0.37	0.013
	Yes	0.95	0.49	

We also observed a statistically significant difference between the fall in Hb with and without previous surgery in male patients P=0.029 (Table 3).The study results showed that in patients below ≤2.5cm stone size, the mean fall in Hb value without previous surgery patients was 1.15±0.19mg/dl and in with previous surgery patients mean a drop in Hb was 1.02±0.51mg/dl. Similarly, in patients with >2.5cm stone size, the mean fall in Hb without previous

surgery was 1.28±0.37mg/dl and in with previous surgery patients, mean drop in Hb was 0.95±0.49mg/dl. Statistically, insignificant difference was observed between the fall in Hb with and without previous surgery in patients with stone size ≤2.5cm (P 0.457). However, a significant difference was observed between the fall in Hb with and without previous surgery in patients with stone size >2.5cm (P 0.013) (Table 4).

DISCUSSION

This descriptive cross-sectional study was carried out at Department of Urology, Armed Forces Institute of Urology Rawalpindi to determine the mean drop in haemoglobin in patients undergoing PCNL and the difference in the mean drop in haemoglobin in previously operated versus new cases undergoing PCNL.

PCNL, which was first performed in the late 1970s, heralded a breakthrough in the treatment of renal stones.[8] It has remained the preferred technique and has become the gold standard for large (>2cm) or stag-horn stones that are difficult to treat.[9,10] Significant bleeding is an uncommon but dreadful complication of PCNL. The incidence of significant haemorrhage requiring a blood transfusion after PCNL had been variably reported between 2-45%.[11-16]

According to our study, the mean Hb value at baseline of the patients was 11.71±0.45mg/dl and the mean Hb value at post-op was 10.66±0.34mg/dl, the mean fall in Hb of the patients was 1.05±0.45mg/dl.

Nerli et al[17] in their study observed that the mean rise in serum creatinine at discharge was 0.05±0.03mg/dl and the mean fall in serum haemoglobin was 1.63±0.77g/dl. At 3 months after surgery, the stone-free rate was 100%.Kefer et al[18] assessed the safety and efficacy of PCNL in patients requiring long-term anticoagulant therapy during the period of from 2000 to 2007. They showed that the mean hemoglobin decrease was 1.5g/dl (range, 0-4.1g/dl) and the mean change in serum creatinine was 0.03mg/dl (range, 0-0.4mg/dl). Two patients (7%) had significant bleeding and 1 (4%) had a thromboembolic complication.

Another study showed that the mean drop in Hb in PCNL was 3.34±2.99gm/dl.[5] Shah et al[19] described that difference in the mean drop in haemoglobin, transfusion requirement, and complication rate between the two groups was not statistically significant. In our study mean fall in Hb value in previously done surgery patients was 1.23±0.31mg/dl and the mean fall in Hb value in without previous surgery patients was 0.97±0.49mg/dl. Statistically lower fall values of haemoglobin were observed in patients of without history of surgery.

Basiri et al[20] enrolled patients of two groups in their study. One group patients were those who had undergone nephrolithotomy at least once and the other group patients were those who are presenting for the first time. They concluded that the history of open nephrolithotomy does not adversely affect the efficacy or morbidity of PCNL. Gupta et al did a comparative study in 106 patients and found the average drop of haemoglobin by 1.39g/dl+0.590g/dl in old cases compared to 1.1g/d+0.495g/dl in new cases.[1]

Gupta et al in a group of 90 patients found average of fall in haemoglobin level was comparable in patients with and with history of open stone surgery (2.3g/dl vs 2.1g/dl).[6] Kurtulus et al[21] showed that significant difference was not observed when the results were compared with the primary cases in terms of tract numbers (multiple tracts: 8.5% v 10.2%), operative time (2.3 v 2.2 hours) (P >0.05), transfusion rate (540 v 495mL) (P >0.21), hospitalization time (4.4 v 4.2 days) (P 0.94), complication rate (1.4% v 3%) (P >0.05), and residual stones (5% v 3%) (P >0.05).

Resorlu et al evaluated that PCNL in patients with a previous history of renal surgery has no higher risk of complications and with a stone clearance similar to that of PCNL in patients with no previous surgery.[7] Zehri et al[22] concluded that the factors such as age, hypertension, previously treated urinary tract infection, Diabetes mellitus, ischemic heart disease, size of the Amplatz, multiple punctures, were not significant and did not correlate with bleeding.

CONCLUSION

It is concluded that statistically significant lower drop in the Hb values in new cases as compared to previous cases indicating that previous renal surgery is an additional risk factor for intra-operative bleeding in previously operated cases undergoing PCNL.

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