Original Article

Nephrolithotomy

Evaluation of Tube-Less Percutaneous Nephrolithotomy of Patients Suffering from Abnormalities of Kidneys

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ABSTRACT

Objective: The purpose of this study is to evaluate the consequences and secureness of the tube-less Percutaneous Nephrolithotomy in patients suffering from abnormalities of kidneys.

Study Design: Prospective study

Place and Duration of Study: This study was conducted at the Department of Urology, Kidney Center, BV Hospital, Bahawalpur from May 2015 to June 2019

Materials and Methods: Total 60 patients suffering from abnormalities of kidney and nephrolithiasis were the part of this research work. These abnormalities contained of horseshoe kidney, rotational abnormalities of the pyelocalyceal structure and ectopic issue of kidneys. We divided the patients into 2 groups randomly; we performed the totally tube-lessmethods in thirty patients (we did not use internal stent and nephrostomy tube in these patients) and 30 patients had experienced standard procedure of percutaneous nephrolithotomy (we performed this procedure with the utilization of both stent and nephrostomy tube). We compared the prevalence of complications, the requirements of transfusions during hospital stay and stone-free frequencies in the patients of both of these groups.

Results: In the patients group who were undergoing totally tube-less percutaneous nephrolithotomy for the extraction of the stone, the average burden of the stone was 2.54 ± 0.96 cm2. The average stay of the patients in the hospital was 1.3 ± 0.43 days. The mean analgesics need was 4.5 ± 1.6 milligram of morphine. Patients recovered to normal routine activity 10 ± 3.2 days. The complications after the surgery were transfusion of blood in 3.3% (n: 1) patient and high fever in 3.3% (n: 1) patient. The achievement was the rate of free stone as 83.3%. For the standard group of percutaneous nephrolithotomy, the average size of stone was 2.83 ± 0.76 cm2, and average duration of the stay in the hospital was 2.6 ± 0.65 days. The mean analgesics need was 10.4 ± 3.2 milligram of morphine and patients recovered to their normal routine activity in 15.5 ± 3.2 days. There was need of transfusion in only 6.7% (n: 2) patients and 3.3% (n: 1) patient was present with pneumothorax after surgery. Out of thirty patients, 86.7 were free from stones. The disparities among duration of surgery, rates of transfusions, related complications, retreatment andoverall rate of free stone state were not significant in the patients of both groups but there was significant hospitalization stay, analgesics need and duration to recover for normal routine activities.

Conclusion: Totally tube-less percutaneous surgery of kidneys is very secure and affectual method for the abnormalities of kidneys and it is very effective even for the patients having medium to large burden of the stones.

Key Words: Surgery, Tube-Less, Morphine, Analgesics, Pneumothorax, Transfusion, Kidneys.

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INTRODUCTION

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The settlement of the Percutaneous Nephrolithotomy tube after the accomplishment of percutaneous surgery of kidney is the standard practice available in the field. Majority of theendo-urologists currently challenged this method with start of the tubeless procedure for the percutaneous surgery of kidney; the latestmodification is totally tube-less Percutaneous Nephrolithotomy, where there is no use of the internal ureteral stent as well as tubes for drainage[1]. This procedure has many benefits over the method with the placement of the tube and stent including decrease of the stay in

hospital, requirement of analgesia requirements and very early return to the normal routine activities[2,3]. But still there is no evaluation about the role of totally tube-less percutaneous nephrolithotomy in the patients suffering from abnormalities of kidney like horse-shoe kidney, kidney with ectopic anomaly and rotational abnormality of the calyces. In this research work, we divided the patients into 2 groups. The 1st group underwent totally tube-less percutaneous method and thirty patients with standard Percutaneous Nephrolithotomy were in 2nd group.

MATERIALS AND METHODS

From May 2015 to June 2019, 60 patients suffering from various abnormalities of kidneys underwent percutaneous surgery of kidneys. The most common abnormalities were horse-shoe kidney, rotational abnormality of the pyelocalycealstructure and the ectopic anomaly of the kidney. Five students excluded from this research work due to serious complications and other surgical interventions. We took the consent of every patients then we divided the patients into two different groups. We performed the CT scan for every patient of the two groups before surgical intervention. We performed the totally tube-less percutaneous operation of kidney for thirty patients and standard percutaneous nephrolithotomy in the patients of 2nd group. There was no use of the internal stent or the any drainage tube in the group of the totally tube-less.

We performed the 1 or 2 access tracts on every unit of kidney. The dilation of the every tracts carried out to twenty eight French utilizing a balloon to permit for the passage of the thirty French working sheath. The patients who were present with under controlled pain with oral medicines got discharge after one day. We compared the both groups regarding burden of the stones, frequency of the stone-free rate, duration of surgery, total stay in the hospital, analgesics need after the surgery, associated complications and the total duration required to return normal routine activities. SPSS V.15 was in use for the analysis of the collected information.

RESULTS

There were 30 patients in the group of Percutaneous Nephrolithotomy with 36.7% (n: 11) females and63.3% (n: 19) males, the average age of these patients was 38.5 ± 13.6 years. The average size of the stone was 2.83 ± 0.76 cm2. The average duration of the surgery was 64 ±14.7minutes. No transfusion was required during surgery but 6.7% (n: 2) patients required transfusion after surgery. Only 3.3% (n: 1) was present with complication of pneumothorax after surgery administered with the insertion of the chest tube. Five patients were present with residual stones. There was achievement of overall 86.7% stone free rate. Analgesics requirement was 10.4 ± 3.2 milligram of morphine. The hospital stay was 2.6 ± 0.65 days. The mean duration to return to the normal routine activities was 15.5 ± 3.2 days.

There were 30 patients in the group of totally tube-less percutaneous nephrolithotomy in which there were 33.3% (n: 10) female and66.7% (n: 20) male patients, with an average age of 39.1 ±12.4 years. Average size of stone was 2.54 ±0.96 cm2. The average duration of the surgery was 57 ± 12.5 minutes. We provided no transfusion of blood during surgery, only single patient needed transfusion after surgery. Only one got complication and one patients suffered high temperature after surgery administered medically. Five patients were present with residual stones which required another surgery. Total 83.3% was the stone free rate. Analgesics requirement was 4.4 ±1.6 milligram of morphine. Average stay in the hospital was 1.3 ± 0.43) days. The duration required to return to normal routine activity was 10 ± 3.2days. Type of the anomalies are present in the Table-1. Table-2 presents the surgery's outcome in the both groups.

Table No.1: Frequency of Anomalies in Each Intervention Group

Intervention	Anomaly						Total	
	Malrotated kidney		Horseshoe kidney		Ectopic kidney			
	No	Percent	No	Percent	No	Percent	No	Percent
Standard PCNL	15	50.0	13	43.3	2	6.7	30	100
TT PCNL	16	53.3	13	43.3	1	3.3	30	100
Total	31	51.7	26	43.3	3	3.0	60	100
PCNL = Percutaneous Nephrolithotomy; TT = Totally Tubeless.								

Table No.2: Surgical Outcomes

Parameters	Standard	Totally Tubeless PCNL	P value
	Mean± SD	Mean± SD	
Age	38.5± 13.6	39.1± 12.4	0.840
Stone size	2.8±0.76	2.5± 0.96	0.190
Operation time	64 ± 14.7	57 ± 12.5	0.080
Analgesics	10.4±3.2	4.4± 1.6	<0.001
Hospital stay	2.6±0.65	1.3± 0.43	<0.001
NL activity	15.5± 3.2	3.2± 3.2	<0.001
Success rate	86.7	0.84	0.710

PCNL = percutaneous nephrolithotomy.

DISCUSSION

Calculi presence in the kidneys with abnormal anatomy are serious challenge for urologists. The beginning of the percutaneous surgery of the kidneys has provided the specialists a negligibly invasive substitute to open management through surgery of the renal abnormalities as kidney stones. Though percutaneous surgery of kidneys has very low rate of morbidity but it contains some serious complications as well as discomfort due to tube. In 2009 and 2011, Bellman and his contemporaries[4,5] tested the need for the routine settlement of the nephrostomy tube after the percutaneous surgical intervention. Tube-less method involved less stay, analgesia needs and time to return to the normal routine activities. These results were similar to the findings of many other research works[6-9].

In one research work conducted by Goh and Wolf[10], they claimed that utilization of an external catheter is better option as compared to the internal stent. Finally, a current research work[1] elaborated the totally tube-less percutaneous nephrolithotomy. Percutaneous method for the anomaly of the horse-shoe kidneysis good after a complete awareness of anatomy. Posteriorcalyx of lowerpole is very anterior andmedial[11]. In 3 cases of the ectopic anomaly of kidney in current case work, under vision of laparoscopy and utilizing a trans-peritonealprocedure, there was avoidance of iatrogenic injuries to the abnormal vasculature. In the tube-less procedure, patients were present with short stay in hospital because of low requirement of analgesia and low rate of the morbidity. This was also very cost effective procedure and there was complete negation of the cost of the nephrostomy stent and removal of stent.

CONCLUSION

Totally tube-less percutaneous surgery of the kidney is very secure and effectual procedure for the abnormalities of the kidney, it provides considerable benefits in morbidity as well as cost effectiveness in comparison with the standard tube-less percutaneous nephrolithotomy methods and it can work even for the patients present with medium to large burden of the kidney stones.

Author's Contribution:

Concept & Design of Study:	Muhammad Amjad
Drafting:	Muhammad Khalid
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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