



Totally Tubeless Percutaneous Nephrolithotomy and Staghorn Calculi; a Mini-Review

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Abstract

Kidney stone is a common problem in population and had medical or surgical treatment. Surgery treatment had many technique, but now, Percutaneous Nephrolithotomy (PCNL) is a standard surgery care of renal calculi. In recent years, surgeons defined modification methods of PCNL such as tubeless PCNL and totally tubeless PCNL. These modified methods were associated with less complication, reduced hospitalization and cost-effectiveness. The safety and efficacy of PCNL and tubeless PCNL in treatment of staghorn calculi were approve by researcher in recent years. The aim of this review is to evaluated the potential role of totally tubeless PCNL in treatment of staghorn calculi. Our finding was very low about this topic but show that totally tubeless PCNL potentially can be safe and effective for treatment patients with staghorn calculi. However, further studies with larger sample size are need to investigate the effectiveness of this technique in patients with staghorn calculi.

Key words: *Percutaneous Nephrolithotomy, Totally Tubeless Percutaneous Nephrolithotomy, Staghorn Calculi*

Citation to This Article: *Hajjalizadeh Kerdabadi E. Totally Tubeless Percutaneous Nephrolithotomy and Staghorn Calculi; a Mini-Review. Journal of Scientific Achievements 2016; 1 (1): 22–24.*

1. Introduction

Kidney stones affected about 10% of people and consider as a most common causes of pain in urology patents. This disease has a high rate of recurrence and about 70% of patients' comeback with this problem (1). There are various invasive and non-invasive options such as open surgery, extracorporeal shock wave lithotripsy (ESWL) or percutaneous nephrolithotomy (PCNL) that used for treatment Renal calculi (2,3). While, PCNL, that was first introduced by Fernstrom and Johansson as a minimally invasive procedure (4), has been accepted as a standard method of care for removal of large and complex renal calculi (2,3). In recent years, many modifications techniques and instrumentation of PCNL results to introduce new methods such as Tubeless PCNL and Totally Tubeless PCNL. The purpose of these modifications were to reduced patient's pain, Time of hospitalization, Time of Surgery, analgesic requirement, post-surgery complication and costs (5-11). The aim of this study is review the possible potential of Totally Tubeless PCNL technique to treatment Staghorn calculi.

2. Methods

A papers search was conducted on Google.Scholar, MEDLINE and Sciencedirect databases using the following keywords: percutaneous nephrolithotomy, totally tubeless percutaneous nephrolithotomy, stone and staghorn. Using these keywords, a long list of references was available. There were no language restrictions, but after calibration of search by available full text and specialty for totally totally tubeless percutaneous nephrolithotomy and staghorn keywords, even in text of articles, only 7 study was founded. Finally, a quick skim through the abstracts of all citations was performed to ensure relevance to this particular review, but only 1 study reported totally tubeless percutaneous nephrolithotomy efficacy in staghorn calculi as a part of their results.

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3. Totally Tubeless PCNL Technique

standard PCNL had four steps that include; access to the kidney, dilatation of the tract (access site), nephroscopy and fragmentation of stones, and finally inserting a nephrostomy tube (7,10). In this procedure, a 30Fr Amplatz sheath is placed after dilatation of the tract and calculi are retrieved after fragmentation. Either a double J (DJ) stent is placed or Ureteric catheter is retained. A nephrostomy tube is placed post procedure for haemostatic tamponade effect and to access the system in case of significant residual fragments. Routinely 20-24 Fr tube nephrostomy drainage is advocated after PCNL (9,11). After some modification, tubeless PCNL was introduced as a standard PCNL without of nephrostomy tubes. This changes, reduce patients pain, hospital stay and post operation infection rate. Finally, totally tubeless PCNL explain as a new type of PCNL procedure without nephrostomy tube and DJ stent or Ureteric catheter replacement. totally tubeless PCN was associated with lower hospitalization time and post-operative pain (12-15).

4. Effectiveness of Totally Tubeless PCNL on Staghorn Calculi

There are some study evaluated the role of tubeless PCNL on treatment of staghorn calculi. Lee et al. (2013) compare the efficacy of tubeless PCNL and Standard PCNL in Patients with staghorn calculi. For this aim, 59 and 106 patients were surgery by tubeless and standard PCNL technique, respectively. There was no significant difference between patient's primary data and stone size. After surgery, stone free rate was reported 78% in tubeless PCNL and 69.8% in standard PCNL technique ($P>0.05$). also, complication such as fever, bleeding and infection were same in two groups. Finally, their research shown tubeless PCNL had the same outcome in compare with conventional PCNL and could be preferred in patients with staghorn calculi (16). Lai et al. (2016) reported single center experience of tubeless PCNL procedure in 1000 cases. In their study, 173 patients with staghorn calculi surgery by tubeless PCNL and their results shown this technique was associated lower stone free rates (45%), longer post-operative hospitalization time (3.8 d) and higher postoperative fever (15%) (5). Wang et al. (2011) before these studies reported that tubeless PCNL was a safe, efficacious, and cost-effective option in renal staghorn calculi and associated with low morbidity, short hospital stay, high stone-free rate, and early return to normal activity (17). In the literature review, only one study by Moosanejad et al. (2016) reported efficacy of totally tubeless PCN on staghorn calculi as a part of their results. Moosanejad et al. compare of totally tubeless percutaneous nephrolithotomy and standard percutaneous nephrolithotomy in a randomized clinical trial study. In their study, 5 patients in standard PCNL group and 7 patients in totally tubeless PCN group had staghorn calculi. Their results shown only two patients with staghorn (one patient in each group) experienced morbidity. Moosanejad et al. concluded totally tubeless PCNL is a safe and effective technique and can be suggested for patients with staghorn stones. They believe that a normal peristaltic ureter is the best drainage tube (7).

Conclusion

This review show that totally tubeless percutaneous nephrolithotomy potentially can be safe and effective for treatment patients with staghorn calculi. However, further studies with larger sample size are need to investigate the effectiveness of this technique in patients with staghorn calculi.

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