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Original Article

# Totally tubeless percutaneous nephrolithotomy is feasible in morbidly obese patients

## *Morbid obez hastalarda tamamen tüpsüz perkütan nefrolitotomi uygulanabilir*

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**ABSTRACT**

**Objective:** Regarding technical difficulties that obese body habitus might impose to percutaneous nephrolithotomy (PNL) success and higher risk of peri-operative complications in this group of patients, we decided to retrospectively gather data from our patients during past 8 years to determine the stone free and complication rates.

**Material and methods:** Between January 2007-December 2015, seventy-eight obese patients with body mass index over 35 who had indication for PNL including stones larger than 2 cm in pelvi- calyceal system or smaller extracorporeal shock wave lithotripsy (ESWL) resistant stones or who were not a fit candidate for ESWL due to increased skin to target distance, with no contraindication of PNL (including bleeding diathesis, inability to be positioned in prone) were enrolled. They were randomly assigned to group 1 (standard PNL with nephrostomy and ureteral stent) or group 2 (totally tubeless PNL with no ureteral stent and no nephrostomy). The outcomes were compared.

**Results:** The transfusion rate, operation time, and the hemoglobin drop were same across the groups (p>0.05). Total analgesic use was equivalent of 33.8 vs. 14.7 mgs of morphine sulfate (18-77 mg) and was significantly lower in total tubeless group (p=0.001). Return to normal activity was described as total number of in-patient and outpatient days from time of admission to the point which the patients returns to normal life activity such as going to job or school and was 19.4 vs. 9.3 days (6-30 days, p=0.001).

**Conclusion:** Totally tubeless PNL in obese subjects would have lower analgesic use and return to normal activity versus standard PNL. Totally tubeless PNL is recommended for obese patients

**Keywords:** Obesity; outcomes; percutaneous nephrolithotomy.

**ÖZ**

**Amaç:** Obezite perkütan nefrolitotominin (PNL) başarısını etkileyen teknik zorluklara yol açmakta ve bu hasta grubunda daha yüksek perioperatif komplikasyonlar gözlenebilmektedir. Taşsızlık ve komplikasyon oranlarını belirlemek için son 8 yıl içinde obez hastalarımızın verilerini geriye dönük olarak toplamayı kararlaştırdık.

**Gereç ve yöntemler:** Ocak 2007 ile Aralık 2015 arasında vücut kitle indeksi 35'in üzerinde olan 78 obez hasta çalışmaya alınmıştır. Çalışmaya alınma kriterleri pelvikaliseal sistemde 2 cm'den büyük taşların olması, bedendışı şok dalgalarıyla taş kırmaya (ESWL) dirençli daha küçük taşların varlığı, deri ile hedef arasında mesafenin uzun olması, ESWL'ye uygun aday olmama ve PNL için herhangi bir kontrendikasyonu (örn: kanama diyatezi, hastanın yüzüstü konuma getirilememesi) bulunmamasıdır. Bu hastalar, Grup 1 (nefrostomi ve üreteral stent yardımıyla standart PNL) veya Grup 2'ye (üreteral stent ve nefrostomi kullanmaksızın tamamen tüpsüz PNL) randomize edilmiştir. Sonuçlar karşılaştırılmıştır.

**Bulgular:** Gruplar arasında transfüzyon oranı, ameliyat süresi ve hemoglobinde düşüş aynıydı (p>0,05). Total analjezik kullanımı 33,8'e karşın 14,7 g morfin sülfata (18-77 g) eşdeğer olup tamamen tüpsüz grupta anlamlı derecede daha düşüktü (p=0,001). Normal aktiviteye dönüş, hasta kabülden itibaren hastanede yatış ve ayaktan tedavi günlerinin toplamına hastanın işe veya okula gitmek gibi normal aktiviteye dönüşe kadar geçen sürenin eklenmesi olarak tanımlanmış olup 19,4 güne karşın 9,3 gün (6-30 gün; p=0,001) idi.

**Sonuç:** Obez hastalarda, tamamen tüpsüz PNL standart PNL'ye göre daha düşük oranda analjezik kullanımı ve normal aktiviteye daha çabuk dönüş gibi avantajlara sahip olacaktır. Tamamen tüpsüz PNL, obez hastalar için önerilebilir bir yöntemdir.

**Anahtar Kelimeler:** Obezite; sonuçlar; perkütan nefrolitotomi

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## Introduction

Obesity is a known risk factor urolithiasis urolithiasis[1] beside being an overgrowing global health issue afflicting up to one third of general population.[2] Obesity imposes certain extra risks to surgical patients and their surgeons; obesity plays a role in surgical site infections complications, probable anesthetic challenges, complications related to patient positioning at the surgical

table and post operational complications such as increased risk of deep vein thrombosis and pulmonary emboli.[3]

Kidney stones in obese are decision making challenges for the urologist because extracorporeal shock wave lithotripsy (ESWL) is not as effective as in patients with normal body habitus due to long stone to skin distance which contributes to fragmentation failure.[4]

Totally tubeless technique (no nephrostomy and no ureteral stent after operation) was introduced as a more convenient alternative for selected patients but as it has been used, more applications continue to emerge.[5,6] It's safety has been compared to standard and tubeless (no nephrostomy) percutaneous nephrolithotomy (PNL) in children, anomalous or multiple access cases.[7,8]

Regarding technical difficulties that obese body habitus might impose to PNL success and higher risk of peri-operative complications in this group of patients, we decided to retrospectively gather data from our patients during past 8 years to determine the stone free and complication rates.

## Material and methods

Between January 2007-December 2015 seventy eight obese patients with body mass index (BMI) over 35 who had indication for PNL including stones larger than 2 cm in pelvi- calyceal system or smaller SWL resistant stones or who were not a fit candidatefor ESWL due to increased skin to target distance, with no contraindication of PNL (including bleeding diathesis, inability to be positioned in prone) were counseled to choose PNL and informed consent was obtained including the possibility of totally tubeless variation regarding multiple ongoing clinical trials on totally tubeless PNL under supervision of Tehran University of Medical Sciences Ethics Committee.

Patients were randomly assigned to group 1 (standard PNL with nephrostomy and ureteral stent) and group 2 (totally tubeless PNL with no ureteral stent and no nephrostomy). PNL was done in prone position under fluoroscopic retrograde pyelogram via ureteral stent placed at the beginning of the surgery. Twenty five centimeter Storz nephroscope was used with standard Amplatz sheaths through the tract dilated by coaxial metallic dilators (Alken). Amplatz sheath was tagged with silk sutures in order to facilitate withdrawal in case of inward migration. At the end of the operation according to randomization group 1 left the operation room with a nephrostomy and a ureteral stent or DJ stent and in group 2 no nephrostomy were inserted and ureteral stent was removed and patient left the OR only bearing a bladder Foley catheter.

Age, stone burden ($cm^2$ according to computed tomography scan), hemoglobin drop, total morphine and analgesic use, BMI, time to return to normal activity, stone free rates were recorded. Patients with pelvi-calyceal perforation, severe bleeding, need for more than one percutaneous access were excluded.

**Statistical analysis**

Oneway ANOVA and PAWS v 18 was used for data gathering and analysis.

## Results

Seventy eight patients were enrolled, 43 in group 1 (standard PNL) and 35 in group 2 (totally tubeless PNL), 23 females and 55 males, mean age was 44.3 and 42.3 years (p=0.57), mean stone burden was respectively 9.4 and 9.3 $cm^2$ (range 2-31, p=0.9) and BMI was 35.3 vs. 35.7 (p=0.31 95% CI 34.8-35.8). Only 6 patients in standard group and 2 in tubeless group (total of 8 patients) needed transfusion which were not significantly different between groups (p=0.21). Average hemoglobin drop was 2.1 and 1.7 mg/dL (maximum 4.5 mg/dL) p=0.08 (95% CI 1.7-2.0), stone free rates were 89.3 vs. 89.2 (p=0.9, 95% CI 86.5-92.1).

Operation time was not different among groups and was between 35.0 and 165.0 minute in group 1 and 40 to 185.0 minutes in group 2 (p=0.7).

Total analgesic use was equivalent of 33.8 vs. 14.7 mg of morphine sulfate (18-77 mg) and was significantly lower in total tubeless group (p=0.001).

Return to normal activity was described as total number of inpatient and outpatient days from time of admission to the point which the patients returns to normal life activity such as going to job or school and was 19.4 vs. 9.3 days (6-30 days, p=0.001).

## Discussion

Concerning some technical difficulties in obese patients under PNL and higher risk of peri-operative complications in this group of patients, the stone free and complication rates among obese patients under totally tubeless and standard PNL were compared. It was seen that return to normal activity and analgesic use were significantly lower in patients under totally tubeless procedure. However the transfusion rate, operation time, and the hemoglobin drop were same across the groups.

In the study by Yang et al.[9] 133 patients under tubeless PNL were enrolled including 24.9% obese subjects and the success rate was same across the obese and none-obese subjects. Also the obese subjects in our study demonstrated good outcomes in our study. Agrawal et al.[10] reported in a review study that PNL results are not related to BMI and obesity among under-operation subjects.[11]

Kuntz et al.[11] assessed 268 subjects under tubeless PNL and reported no association between outcomes and reported no effect

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by obesity on therapeutic outcomes as shown in our study. Another review study by Agrawal et al.[12] demonstrated that obese and non-obese subjects had same results in tubeless operations. Alyami et al.[13] reported among 114 subjects under PNL that BMI was not contributing for outcomes. However no clinical trial was done in obese subjects under totally tubeless PNL.

Totally according to the obtained results, it may be concluded that totally tubeless PNL in obese subjects would have lower analgesic use and return to normal activity versus standard PNL and use of totally tubeless PNL is recommended for obese patients. However further studies with larger sample size and multi-center sampling is required to attain more definite results.

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