MİNİ-PNL ŞU ANDA EN SIK UYGULANAN METOD DURUMUNDA!

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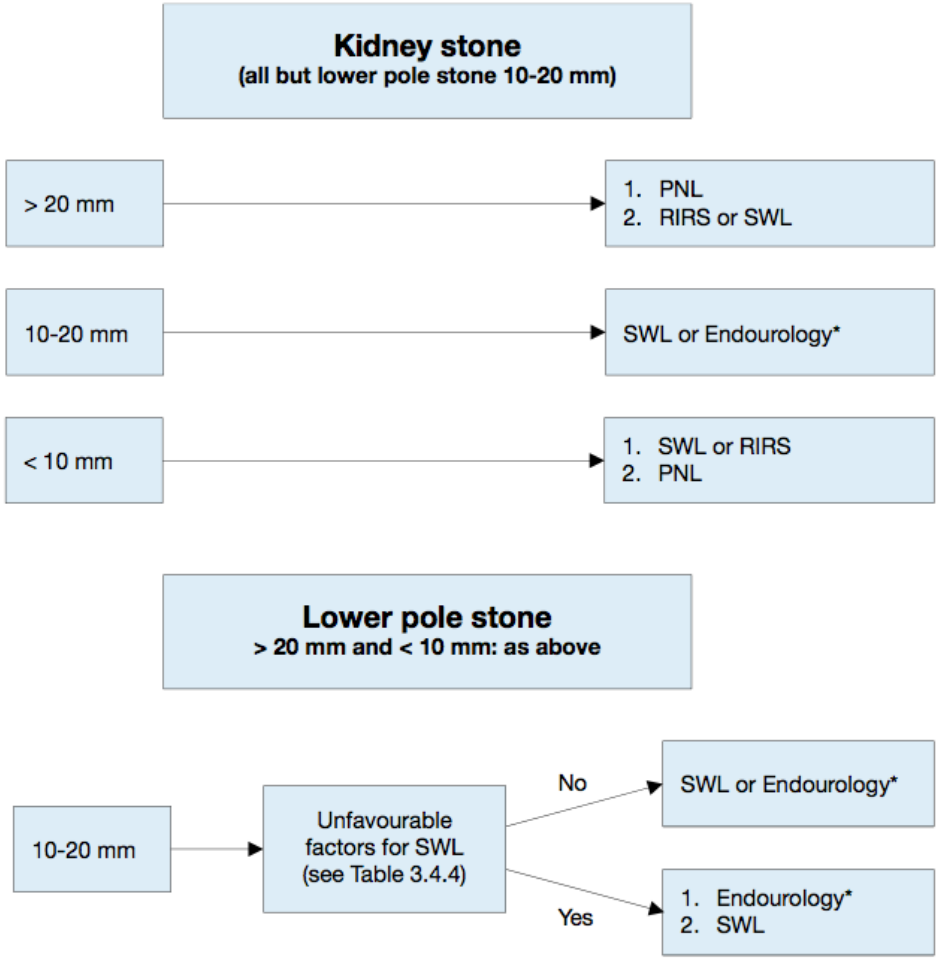
İstanbul

Figure 3.4.1: Treatment algorithm for renal calculi



**The term 'Endourology' encompasses all PNL and URS interventions.*
PNL = percutaneous nephrolithotomy; RIRS = retrograde renal surgery; SFR = stone-free rate; SWL = shockwave lithotripsy; URS = ureterorenoscopy;

EAU – Klavuzları 2017

Perkütan nefrolitotomi

- Mutlak endikasyonlar
  - 2 cm den büyük taşlar
  - 1-2 cm arası taşlar (eswl dirençli olabilir)
  - 1-2 cm arası eswl dirençli alt kaliks taşları

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Perkütan nefrolitotomi

- Kanama
- Ateş
- Organ yaralanması
- Ürinom
- A-V fistül

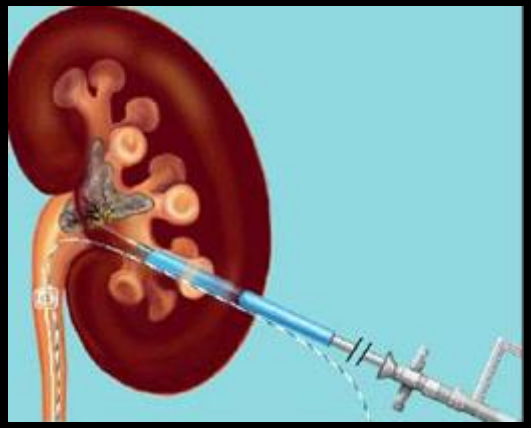

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Table 3.4.2: Complications following PNL [162]

Complications	Transfusion	Embolisation	Urinoma	Fever	Sepsis	Thoracic complication	Organ injury	Death	LE
(Range)	(0-20%)	(0-1.5%)	(0-1%)	(0-32.1%)	(0.3-1.1%)	(0-11.6%)	(0-1.7%)	(0-0.3%)	1a
N = 11,929	7%	0.4%	0.2%	10.8%	0.5%	1.5%	0.4%	0.05%	

Perkütan nefrolitotomi

- Kanamaya neden olan faktörler
  - Taş boyutu,
  - Akses sayısı,
  - Ameliyat süresi
  - Mevcut komorbiditeler
  - **Dilatasyon derecesi**

Kukreja et al, Journal of Endourology, 2004

Perkütan nefrolitotomi

- Ağrı
  - Özellikle nefrostomi ile ilişkili
  - Tüpsüz PNL olgularında
    - Ağrı
    - Hastanede kalış süresi
    - Analjezik ihtiyacı daha az

Grafalo M et al, Urolithiazis, 2013

Perkütan nefrolitotomi

- Pelvikaliksiyel yaralanma
  - %5,2
  - Dilatasyon
  - Ürinoma %0,2

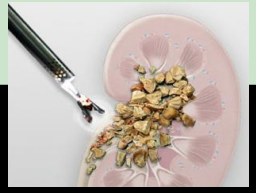
PNL’nin tarihçesi

Percutaneous renal access

Goodwin WE, J Am Med Assoc 1955

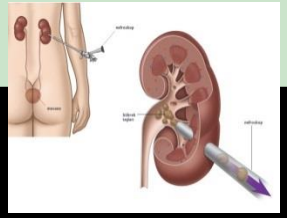
Stone removal through perc. tract

Harris RD, et al. Urology 1975



Percutanoues nephrolithotomy

Fernstrom I, Scand Urol Nephrol 1976

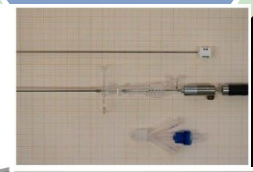


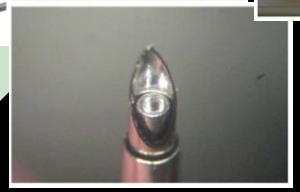
Miniperc

Helal M, J Endourol 1997
Jackman SV, W J Urology, 1998

Mikroperc

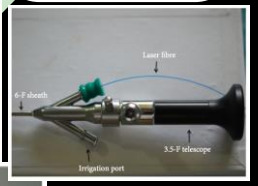
Desai MR, J Urol, 2011





Ultramini-PNL

Desai J, B J Urol, 2013



Innovations in PCNL technique

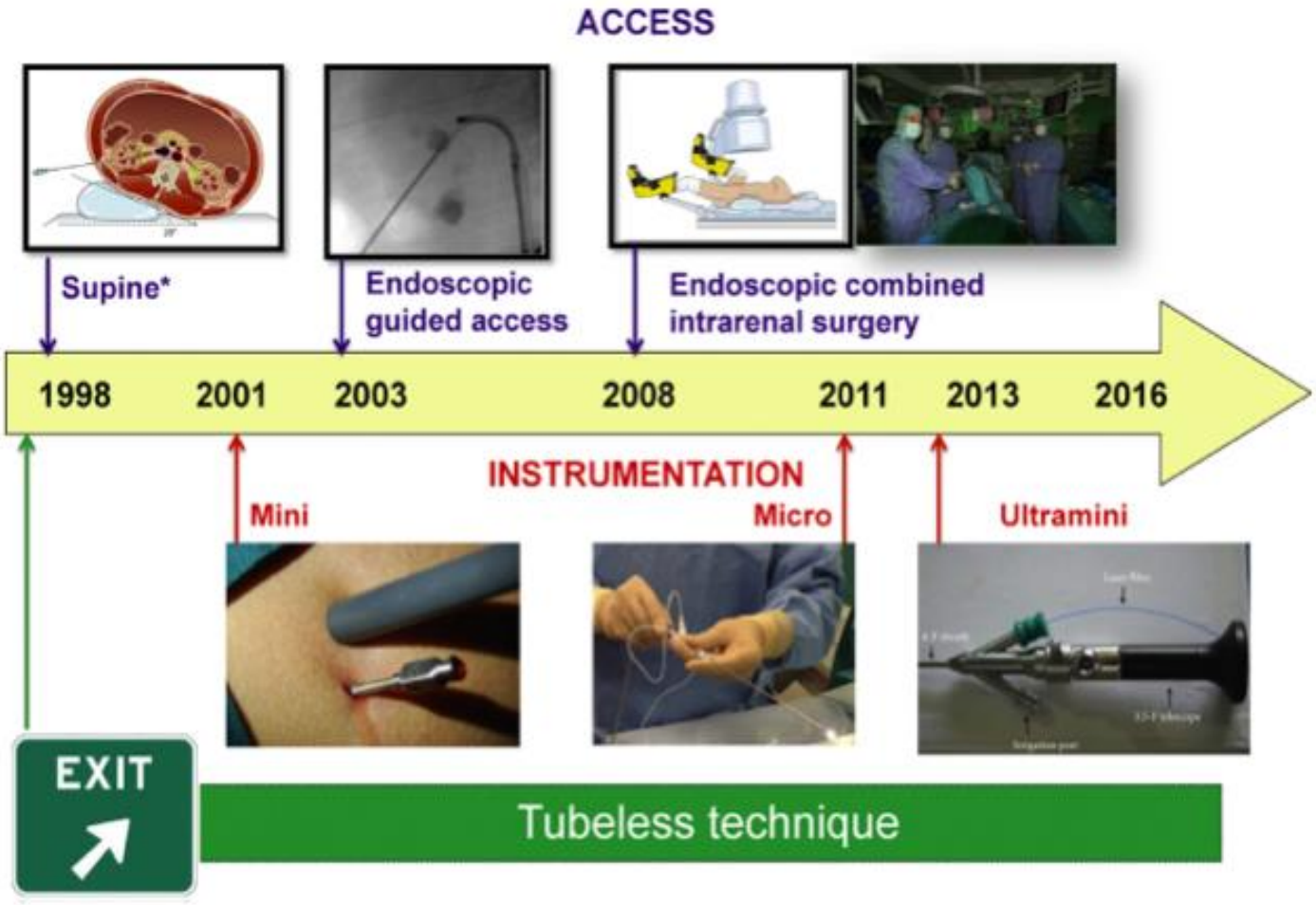


Table 1 – Terminologies for PCNL and miniaturised PCNL.

Procedure	Sheath outer diameter (F)	Study
Conventional categorisation		
Standard PCNL	>22	Knoll et al [11]
Mini-PCNL	≤22	Jackman et al [4]
Minimally invasive PCNL (MIP)	9.5–26	Nagele et al [12]
Ultra-mini PCNL (UMP)	11–13	Desai et al [13]
Super-mini PCNL (SMP)	10–14	Zeng et al [14]
Mini-micro PCNL	8	Desai et al [15]
Micro-PCNL	<5	Desai et al [15]
Schilling [16] categorisation		
XL	≥25	
L	20 to <25	
M	15 to <20	
S	10 to <15	
XS	5 to <10	
XXS	<5	
Tepeler [17] categorisation		
Named according to tract size	PCNL $^{+size}$	

PCNL = percutaneous nephrolithotomy.

Mini PNL- teknik

- Standart PNL'ye benzer
  - Uygun kalisiyel akses
  - Trakt dilatasyonu
    - 22Fr'e kadar Amplatz/metal
  - Nefroskopi (kılıfa uygun çapta-yeterli drenaj*)
  - Taş disintegrasyonu (lazer-pnömotik veya ultrasonik) ve çıkarılması
  - Tüp konulma(ma)sı

Neden mini-PNL?

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journal homepage: www.europeanurology.com

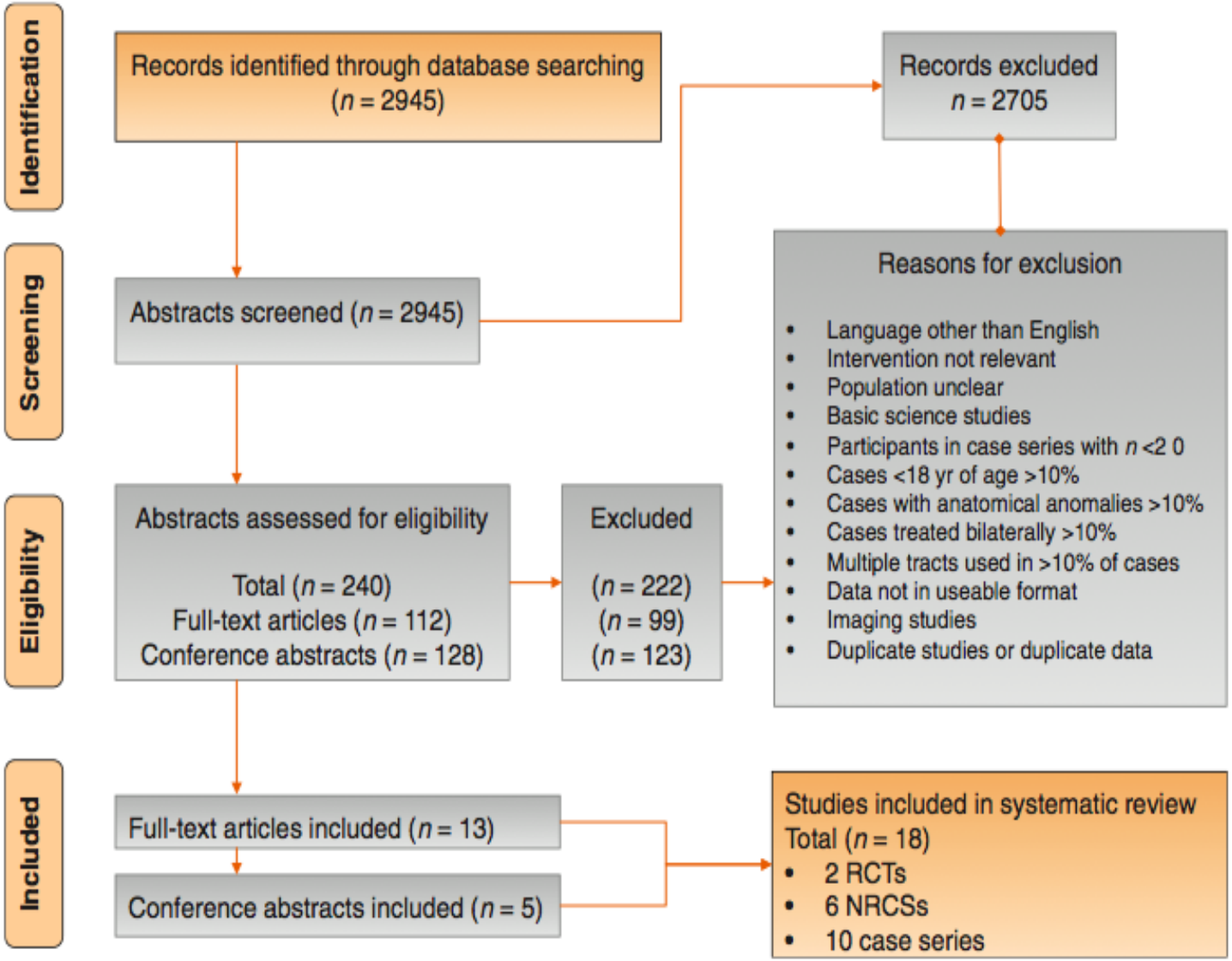
European Association of Urology

Platinum Priority – Stone Disease

Editorial by XXX on pp. x–y of this issue

Tract Sizes in Miniaturized Percutaneous Nephrolithotomy: A Systematic Review from the European Association of Urology Urolithiasis Guidelines Panel

Yasir Ruhayel[a], Abdulkadir Tepeler[b], Saeed Dabestani[a], Steven MacLennan[c], Aleš Petřík[d,e], Kemal Sarica[f], Christian Seitz[g], Andreas Skolarikos[h], Michael Straub[i], Christian Türk[j], Yuhong Yuan[k], Thomas Knoll[l,]*


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 2945)
Records excluded n = 2705
Abstracts screened (n = 2945)
Reasons for exclusion
Language other than English
Intervention not relevant
Population unclear
Basic science studies
Participants in case series with n <2 0
Cases <18 yr of age >10%
Cases with anatomical anomalies >10%
Cases treated bilaterally >10%
Multiple tracts used in >10% of cases
Data not in useable format
Imaging studies
Duplicate studies or duplicate data
Abstracts assessed for eligibility
Total (n = 240)
Full-text articles (n = 112)
Conference abstracts (n = 128)
Excluded
(n = 222)
(n = 99)
(n = 123)
Full-text articles included (n = 13)
Conference abstracts included (n = 5)
Studies included in systematic review
Total (n = 18)
2 RCTs
6 NRCSs
10 case series

Taşsızlık??

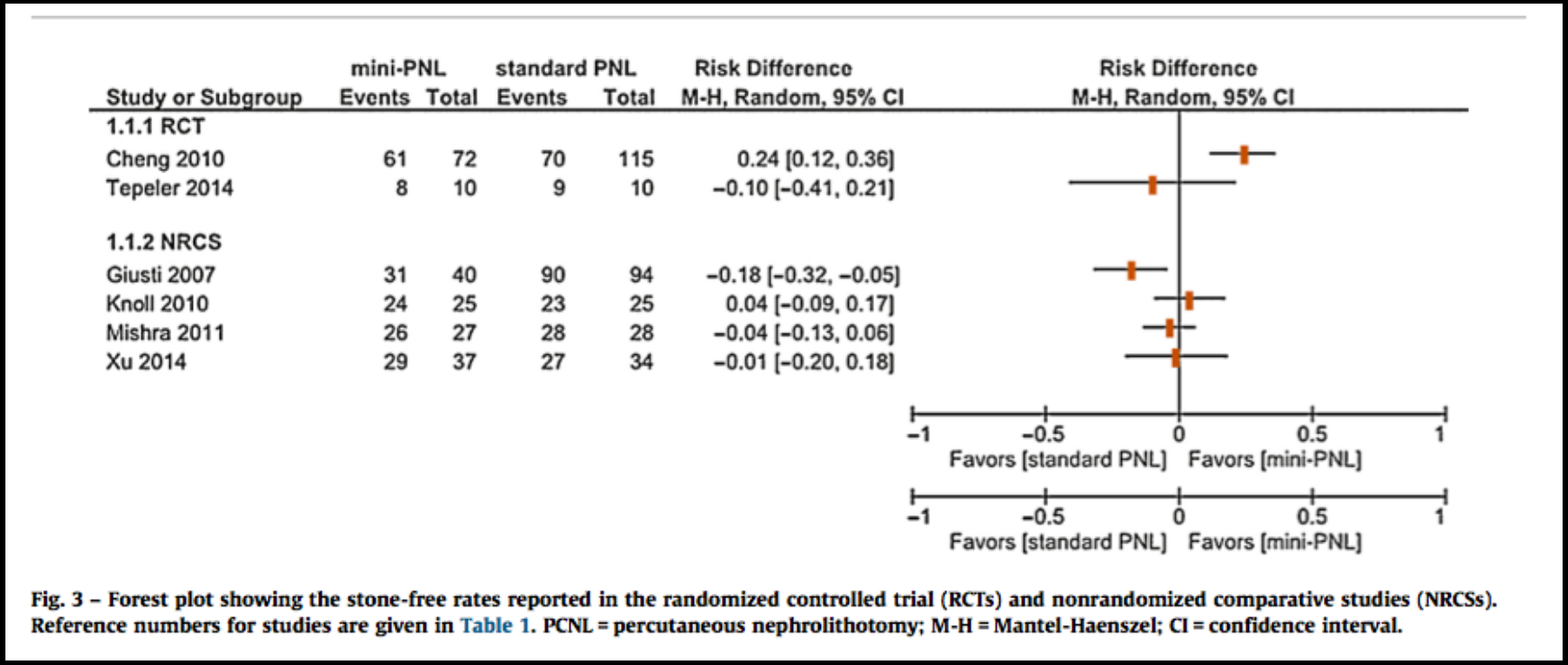
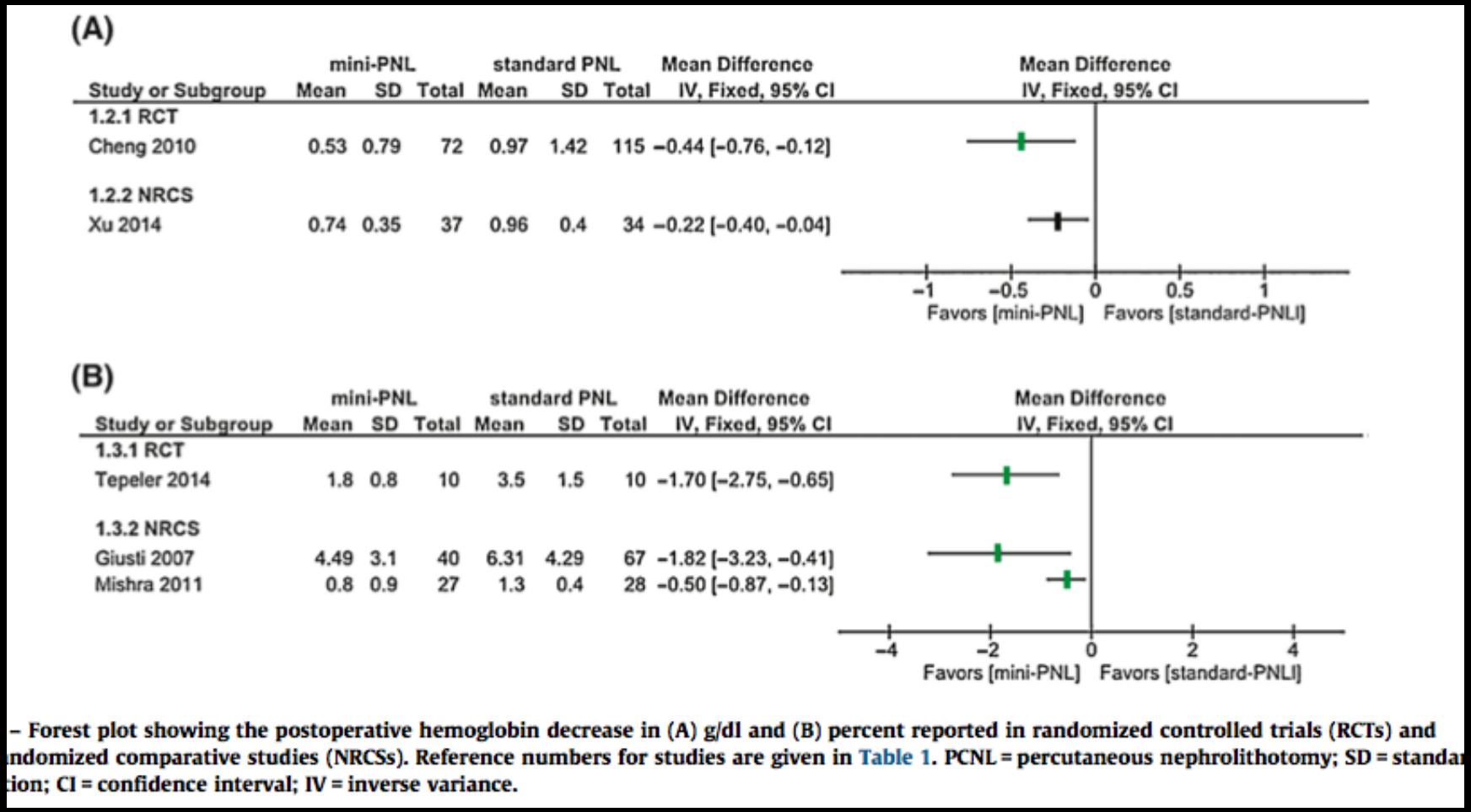


Fig. 3 – Forest plot showing the stone-free rates reported in the randomized controlled trial (RCTs) and nonrandomized comparative studies (NRCSs). Reference numbers for studies are given in Table 1. PCNL = percutaneous nephrolithotomy; M-H = Mantel-Haenszel; CI = confidence interval.

Kan kaybı & transfüzyon ihtiyacı



– Forest plot showing the postoperative hemoglobin decrease in (A) g/dl and (B) percent reported in randomized controlled trials (RCTs) and ndomized comparative studies (NRCSs). Reference numbers for studies are given in Table 1. PCNL = percutaneous nephrolithotomy; SD = standa tion; CI = confidence interval; IV = inverse variance.

Operasyon & hastanede kalış süresi

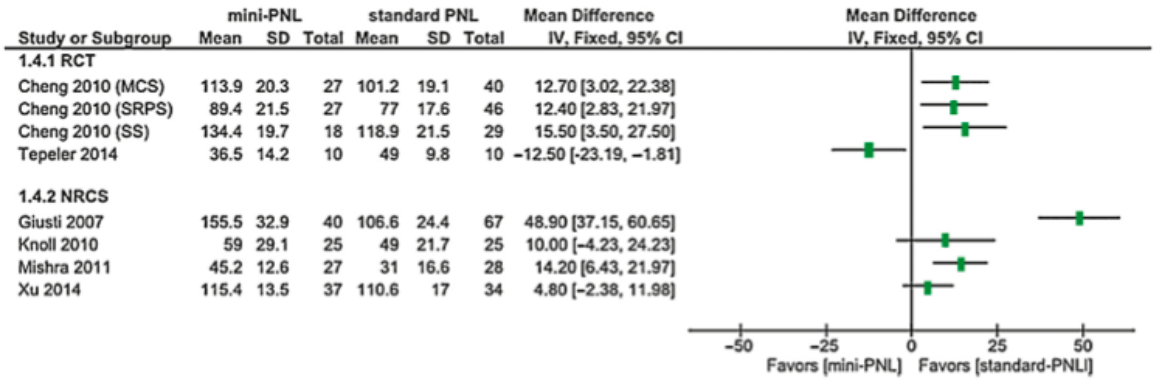


Fig. 5 – Forest plot showing the duration of the procedure (min) reported in randomized controlled trials (RCTs) and nonrandomized comparative studies (NRCS). Reference numbers for studies are given in Table 1. PCNL = percutaneous nephrolithotomy; SD = standard deviation; CI = confidence interval; IV = inverse variance.

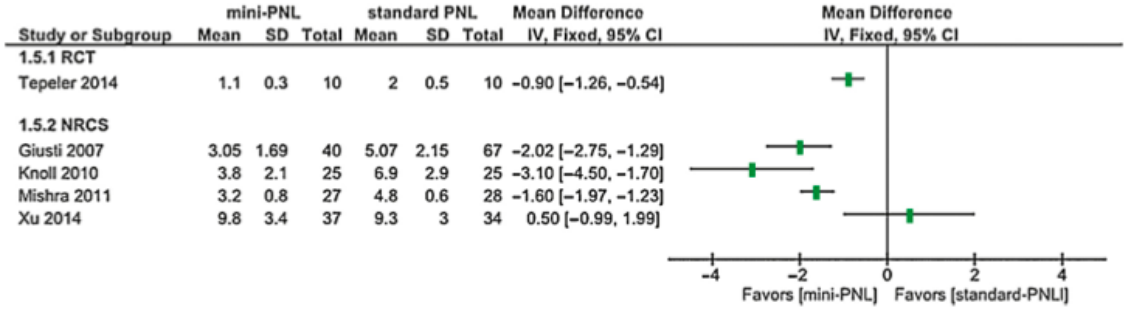


Fig. 6 – Forest plot showing the length of hospital stay (d) reported in randomized controlled trials (RCTs) and nonrandomized comparative studies (NRCS). Reference numbers for studies are given in Table 1. PCNL = percutaneous nephrolithotomy; SD = standard deviation; CI = confidence interval; IV = inverse variance.

4. Conclusions

The available evidence indicates that mPNL is at least as efficacious and safe as standard PNL for the removal of renal calculi, with a limited risk of significant (Clavien grade ≥ 2) complications. However, the quality of the evidence was poor and drawn mainly from small studies, the majority of which were single-arm case series and NRCSs, and only two of which were RCTs. Hence, the risks of bias and confounding were high. Furthermore, the tract sizes used and the types of stones treated were heterogeneous. Thus, more reliable data from well-designed and adequately sampled and powered RCTs are warranted.

Mini-PNL

- ✓ Daha düşük komplikasyon oranı
- ✓ Daha az kanama
- ✓ Artmış tüpsüzlük (düşük postoperatif ağrı)
- Uzamış operasyon süresi
- Benzer/düşük taşsızlık oranı

- **Daha az nefron hasarı yaptığı kanıta muhtaç**

World Journal of Urology
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ORIGINAL ARTICLE

Should mini percutaneous nephrolithotomy (MiniPNL/Miniperc) be the ideal tract for medium-sized renal calculi (15–30 mm)?

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Received: 9 August 2017 / Accepted: 9 November 2017

Abstract

Introduction Reducing the percutaneous nephrolithotomy (PCNL) tract size reduces the morbidity associated with the procedure. Prolonged procedure time is a concern. Modification in technique required is to fragment the stone into smaller particles and remove them using the vacuum cleaner effect. This prospective study compares the efficacy and morbidity of reducing the tract size from the standard 24–16.5 Fr for stones sized from 16 to 30 mm.

Methods 123 patients were enrolled in this prospective study and distributed into 2 groups based on the tract size used (group A 16.5/17.5 Fr Miniperc, $N = 61$ and group B: 22/24 Fr standard PCNL, $N = 62$). Critical factors assessed were procedure time, fluoroscopy time, blood loss, pain score, stone clearance status and complications.

Results Both the groups were comparable with respect to age, creatinine and stone size. The blood loss (hemoglobin and PCV drop) was significantly less for group A ($p < 0.001$). Both the groups were comparable with regards to the pain score ($p > 0.05$). Nephrostomy was placed in 3 patients in group A and 14 patients in group B ($p = 0.01$). There was no significant difference in the procedure time amongst the 2 groups. A total of 9 patients (4 in group A and 5 in group B) had residual fragments greater than 3 mm.

Conclusion The 16.5 Fr Miniperc tract offers lower morbidity in terms of blood loss and maintains stone clearance comparable to larger 24 Fr tract size. It should be the ideal size used for medium sized renal stones.

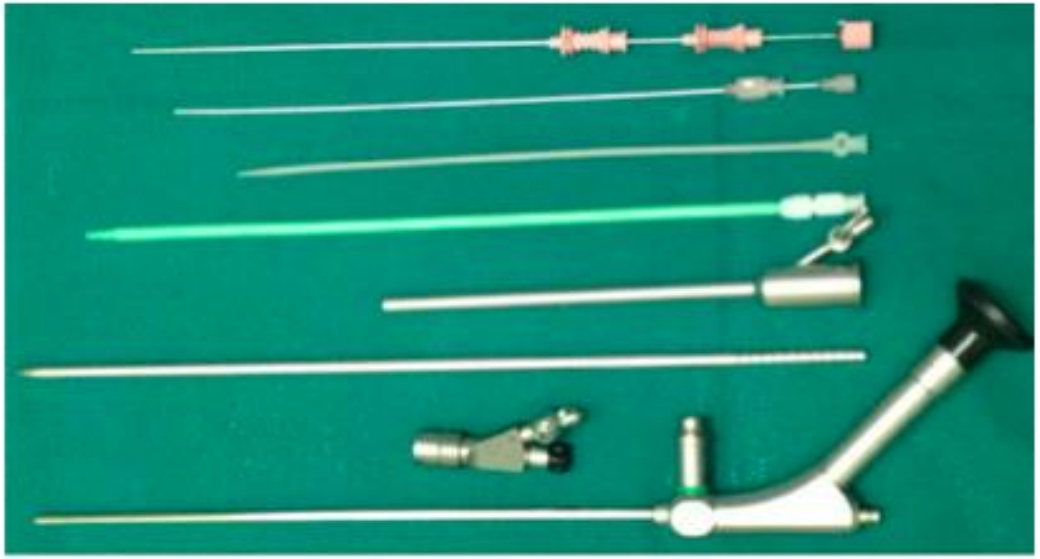

Fig. 1 Miniperc set

Fig. 2 Standard PCNL set

Table 1 Demographic details

	Miniperc	Standard PCNL	*p*
Tract size (Fr)	16.5/17.5	22/24	
No cases	61	62	
Age	41.95 ± 13.53 (range 10–69 years)	40.3 ± 14.2 (range 14–68 years)	0.26
BMI	27.1 ± 5.87	25.54 ± 3.58	0.1
Stone size (mm)	20.6 ± 3.47 (range 16–30 mm, median 20 mm)	21.5 ± 3.53 (range 16–30 mm, median 22 mm)	0.1
Creatinine (mg%)	1.15 ± 0.49	1.22 ± 0.73	0.27
Side (left/right)	28/33	32/30	0.5
Stone location	Renal pelvis 49, lower calyceal 4, middle calyceal 3, upper calyceal 2, partial staghorn (pelvis and lower calyceal extension) 3	Renal pelvis 48, lower calyceal 3, middle calyceal 3, upper calyceal 3, partial staghorn (pelvis and lower calyceal extension) 5	0.9
Puncture site (upper calyx/ middle calyx/lower calyx)	7/16/38	8/13/41	0.8

Table 2 Critical factors evaluated

	Miniperc	Standard PCNL	*p*
Tract size (Fr)	16.5/17.5	22/24	
No cases	61	62	
Procedure time (min)	25.46 ± 11.9	24.68 ± 12.45	0.36
Fluoroscopy time (s)	170.98 ± 68.00	180.48 ± 78.12	0.24
Nephrostomy placed (14 Fr)	3/61 (2 with ureteric catheter; 1 with DJ stent)	14/61 (5 with ureteric catheter; 9 with DJ stent)	**0.01**
No nephrostomy drainage (tubeless)	58/61 (95.08%) (tubeless with ureteric catheter 34; tubeless with DJ stent 24)	48/62 (77.41%) (tubeless with ureteric catheter 27; tubeless with DJ stent 25)	**0.01**
Hb drop (g%)	0.87 ± 0.72	1.48 ± 0.83	**< 0.001**
PCV drop (%)	2.65 ± 2.14	4.25 ± 2.47	**< 0.001**
Pain 6 h	2.26 ± 0.68	2.47 ± 0.95	0.07
Pain 24 h	1.54 ± 0.99	1.73 ± 1.01	0.15
Analgesic requirement (1 unit assigned for 1 dose of 75 mg diclofenac or 100 mg tramadol)	0.3 ± 0.54	0.43 ± 0.65	0.08
Stone clearance status	57/61 (93%)	57/62 (91.9%)	0.99

Bold values indicate significant values

Table 3 Analyses of pain score

	N	Pain score 6 h	Pain score 24 h
Tubeless	106	2.29 ± 0.76	1.30 ± 0.97
Nephrostomy present	17	2.82 ± 1.01	1.76 ± 0.97
p value		**0.01**	**0.05**
Tubeless with DJ stent	45	2.09 ± 0.42	1.59 ± 0.82
Tubeless with ureteric catheter for 24–48 h	61	2.39 ± 0.9	1.1 ± 1.00
p value		0.54	**0.001**
Miniperc tubeless	58	2.24 ± 0.66	1.28 ± 1.06
Standard PCNL tubeless	48	2.34 ± 0.87	1.33 ± 1.07
p value		0.25	0.36

Bold values indicate significant values

Lange and Gutierrez [14] in a comparative study for stones ranging from 1 to 3.5 cm found no significant difference in residual stone burden, operative time, or postoperative analgesic use between standard PCNL (30 Fr) and mini-PCNL (16.5 Fr). There was significantly less blood loss ($p = 0.02$) in the mini-PCNL group. Our study demonstrated no difference in the procedure time between the 2 groups (25.46 ± 11.9 min for Miniperc group vs 24.68 ± 12.45 for standard PCNL; $p > 0.1$, nonsignificant) (Table 2). We believe that mastering the proper technique of stone fragmentation and retrieval helps reducing the operative time and also reduces the chances of fragment migration. Laser energy was used for stone fragmentation in all the Miniperc cases in our study. We used a 365 µm fiber. The aim

Conclusion

Miniperc has reduced the morbidity of standard PCNL in terms of reduced blood loss without compromising the stone clearance rates. Dusting the stone with laser into small fragments, use of the vacuum cleaner technique for stone retrieval and use of the modular MIP system help reducing the need of accessory stone retrieval devices, fragment migration rate and hence reducing the operative time. The longer time taken to dust the stone in Miniperc is balanced by the reduced time to retrieve the dust, absence of repeated movements of stone grasping and removal as in standard PCNL and reduced fragment migration. Reduced bleeding and improved vision also contribute to bringing down the operative time in Miniperc. It should be recommended procedure when considering single tract PCNL for stones ranging from 1.5 to 3 cm in size.

Sonuçlar

- Mini PNL
  - Alt kaliks taşları <20mm (f-URS-SWL başarısızlığında)
  - Böbrek taşları >20mm
  - Staghorn taşlar (tek ve/veya çoklu trakt)
  - Proximal üreter taşları (büyük ve impakte olan)
  - Standart PNL'de ikincil akses durumunda
  - **Çocuk hastalarda (infant-okul öncesi)**