

# 直径小于 2cm 肾结石的治疗： 输尿管软镜或微通道经皮肾镜？

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**摘要：** **目的** 评估输尿管软镜碎石术对直径小于 2cm 肾结石的疗效。**方法** 2010 年 9 月至 2013 年 6 月, 34 名肾结石直径小于 2cm 患者接受了输尿管软镜碎石术治疗。这些患者的治疗效果与那些接受微通道经皮肾镜碎石术的患者用配对分析方法进行比较。配对参数包括结石的大小、位置、数目, 以及性别、年龄、体重指数、肾积水程度、术前是否有体外碎石史及开放手术史。应用 SPSS16 统计软件行统计学分析。**结果** 输尿管软镜组一期手术后患者的无石率为 82.1%, 经皮肾镜组为 97%。输尿管软镜组中 4 例患者二期接受输尿管软镜碎石术, 术后 3 月随访总的无石率为 94.1%, 而经皮肾镜组为 97%。输尿管软镜组 38 例平均手术时间为(66.5 ± 21.6)分钟, 经皮肾镜组为(38.8 ± 9.7)分钟, 总的并发症率经皮肾镜组及输尿管软镜组均为 8.8%, 经皮肾镜组中 2 例患者需输血, 1 例患者术后发热。输尿管软镜组 3 例患者术后发热。输尿管软镜组术后住院时间(60.4 ± 18.3)小时明显短于经皮肾镜组(192.4 ± 28.6)小时。两组中结石成分主要是草酸钙。**结论** 输尿管软镜碎石术并发症发生率低, 为肾结石大小适中的患者提供了一个安全高效的方法, 与微通道经皮肾镜碎石术比, 在风险、疗效、术后住院时间等方面各具优势。

**关键词：** 输尿管软镜碎石术; 微通道经皮肾镜碎石术

## The Management of Renal Stones Less than 2cm: Flexible Ureteroscopy or Mini – percutaneous Nephrolithotomy?

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**Abstract: Objective** The aim of our study was to evaluate the outcomes of flexible ureteroscopy for renal stones less than 2 cm. **Methods** Between September 2010 and June 2013, a total of 34 patients with renal stones that measured less than 2 cm were treated with flexible ureteroscopy. The outcomes of these patients were compared with those of the patients who underwent mini – percutaneous nephrolithotomy using matched – pair analysis (1:1 scenario). The matching parameters were the size and location of the stone as well as age, sex, body

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mass index, degree of hydronephrosis, presence of previous shockwave lithotripsy, and open surgery. SPSS version 16 was used for statistical analysis. **Results** Stone-free rates after a single procedure were achieved in 82.1% of patients for flexible ureteroscopy and 97% of patients for the Mini-PCNL group. The second flexible ureterorenoscopy procedure was performed for four patients in flexible ureteroscopy group. Finally, stone-free rates during the third month of the follow-up period were 94.1% in flexible ureteroscopy group and 97% in the mini-PCNL group. The mean operative time per patient was  $66.5 \pm 21.6$  minutes in flexible ureteroscopy group after a total of 38 procedures, while it was  $38.8 \pm 9.7$  minutes in the mini-PCNL group ( $P < 0.0001$ ). The overall complication rates for flexible ureteroscopy and mini-PCNL groups were 8.8%. Blood transfusions were needed in two patients in the mini-PCNL group. Transient fever were found in three patients in flexible ureteroscopy group. Hospitalization time of postoperation was significantly shorter in the flexible ureteroscopy group ( $60.4 \pm 18.3$ h versus  $192.4 \pm 28.6$ h;  $P < 0.0001$ ). In both groups, stones were most frequently composed of calcium oxalate. **Conclusions** Flexible ureteroscopy has a low complication rate and represents a safe and effective treatment alternative in selected patients with kidney stones of moderate size.

**Key Words:** Flexible ureteroscopy; Mini-percutaneous nephrolithotomy

在欧美泌尿外科指南中,体外碎石及经皮肾镜碎石均是直径小于2cm或大于2cm肾结石的一线治疗方法<sup>[1,2]</sup>。虽然经皮肾镜碎石有较高的无石率,一些严重并发症,如需要输血的大出血、内脏器官损伤、血气胸也会发生<sup>[3,4]</sup>,微通道经皮肾镜碎石术与标准经皮肾镜碎石术相比,并发症发生率显著降低,其不足之处是碎石效率较低,但对于直径小于2cm肾结石,因碎石所需要的时间并不长,其疗效已经得到广泛认可<sup>[5,6]</sup>。输尿管软镜手术并发症发生率低,尤其能减少出血的发生,另外,输尿管软镜碎石也取得了经皮肾镜碎石所能获得的无石率。

## 1 资料与方法

2010年9月至2013年6月,34例肾结石直径小于2cm患者接受了输尿管软镜治疗。所有患者均行逆行肾盂造影及CT检查,患者的参数包括性别、年龄、体重指数、同侧肾体外碎石史及外科手术史、以及肾结石的大小、位置、数目均记录。术前实验室检查包括肌酐、血红蛋白、血小板、凝血实验、尿培养。同时55例肾结石大小相似的患者接受微通道经皮肾镜碎石术,笔者从中选择34例患者进入对照组。依据结石的大小、位置、以及性别、年龄、体重指数、肾积水程度、既往有无同侧体外碎石及开放手术史,回顾性地按照1:1比例将34例患者与输尿管软镜组病例进行配对。

**1.1 微通道经皮肾镜碎石术** 手术在全麻下进行,先截石位逆行患肾盂置入输尿管导管;然后,取健侧卧位,B超定位,穿刺成功后逐级扩张,最终置入16F或18F剥皮鞘。使用气压弹道或钬激光进行

碎石,结石碎片钳夹或水冲出。14F造瘘管留置于肾盂或通道经过的肾盏。平均手术时间计算从穿刺建立通道至肾造瘘管留置完成。

**1.2 输尿管软镜手术** 所有患者均接受广泛报道的标准输尿管软镜碎石术<sup>[7]</sup>。手术过程各阶段均在截石位并在C型臂透视下进行。手术开始先用输尿管硬镜进入输尿管腔内检查,然后置入输尿管软镜鞘。从输尿管起始至末端任何部位可以影响输尿管软镜鞘置入的狭窄,均需进行球囊扩张术。28/34例患者成功置入输尿管软镜鞘,剩余的患者由于输尿管狭窄而未能置入输尿管软镜鞘。

手术使用8.7F数字软镜,230微米光纤。钬激光功率设定1.2J,频率设定8Hz。手术结束后结石碎片<2mm的采用自然排石,结石碎片>2mm应用套石篮取石。手术结束时对结石收集系统进行仔细检查证实取出足够结石。术后常规留置4.8F双J管,4周后取出。平均手术时间计算从输尿管硬镜进入开始至支架管留置完成。

最初的术后无石率根据出院时KUB平片判断,最终的无石率主要由3个月门诊复查CT的结果判断。如果患者术后无石,则认为手术成功。

## 2 结果

所有微通道经皮肾镜术均通过单通道完成。7例上极肾盏结石患者采用肋间经皮肾通道。所有患者均未采用无管化经皮肾镜碎石术。输尿管软镜组平均手术时间明显较长(表1),根据Clavien分类系统,输尿管软镜组及经皮肾镜组的次要并发症发生率均是8.8%,两组均无主要并发症发

生。输尿管软镜组 2 个患者由于结石碎片排出而发生肾绞痛,治疗效果满意。输尿管软镜组未出现与支架管相关并发症。输尿管软镜组平均术后

住院时间明显更短,因为结石碎片残留或结石粉尘所致视野模糊,输尿管软镜组 11.8% 的患者接受二期输尿管软镜碎石术。

表 1 两组患者资料的比较

	输尿管软镜组	经皮肾镜组	P
平均手术时间(分钟)	66.5 ± 21.6	38.8 ± 9.7	<0.0001
术后住院时间(小时)	60.4 ± 18.3	192.4 ± 28.6	<0.0001
发热(例)	3	1	
输血(例)	0	2	
肾绞痛(例)	2	0	

V 一期手术后无石率输尿管软镜组为 82.1%, 经皮肾镜组为 97%。输尿管软镜组有 4 例患者需接受二期输尿管软镜手术。最后,术后 3 月随访输尿管软镜组无石率为 94.1%。经皮肾镜组为 97%。输尿管软镜组 76.5%、经皮肾镜组 97% 的病例结石分析获得结果,两组中草酸钙是结石主要成分。

### 3 讨论

虽然经皮肾镜碎石术在治疗较大肾结石时被认为是一种安全有效的方法,但最近的研究报道了其重要并发症问题<sup>[4,9]</sup>。Skolarikos 及 de la Rosette<sup>[8]</sup> 报告经皮肾镜碎石术后主要并发症发生率是:败血症 0.9% ~ 4.7%,需要介入治疗的出血 0.6% ~ 1.4%,胸膜损伤 2.3% ~ 3.1%,结肠损伤 0.2% ~ 0.8%。微通道经皮肾镜碎石术可显著降低标准通道经皮肾镜碎石术的并发症发生率,缺点是对较大肾结石其碎石效率低,结石碎片靠钳夹或水流冲出,增加术后发热及败血症的发生率。对于 <2cm 肾结石,因碎石及取石所需要的时间并不长,故微通道经皮肾镜更适合这类结石的治疗<sup>[5,6]</sup>。

现代输尿管软镜外径更细小,而腔内工作通道更大更坚固耐用,且有双向可弯曲能力。输尿管软镜技术结合及钬激光碎石使肾结石治疗更加微创,是技术的进步<sup>[10,11]</sup>,输尿管软镜碎石术并发症,尤其出血发生率低。虽然有输尿管软镜用于治疗 >2cm 肾结石的报道<sup>[12-14]</sup>,但考虑其碎石效率,目前使用范围仍然受限。

小于 2cm 肾结石治疗方法中,对比经皮肾镜碎石术与输尿管软镜碎石术的有限研究都显示二者有相似的术后无石率<sup>[16-18]</sup>。Chungi<sup>[16]</sup> 及其助手评估了 1 ~ 2cm 大小肾结石病人 15 例经皮肾镜碎石术及 12 例输尿管软镜碎石术的结果,报道其术后无石率分别是 87% 及 67%。最近的研究, Akman<sup>[18]</sup> 及其同事比较了 28 例 15 ~ 30mm 老年肾结石患者经皮肾镜碎石术及输尿管软镜碎石术的结果。其结论是输尿管软镜碎石术无石率 92.8%, 经皮肾镜碎石术无石率为 96.4%。

笔者的研究显示输尿管软镜碎石术对 <2cm 肾结石患者是安全有效的方法。一期术后总的无石率输尿管软镜组为 82.1%, 经皮肾镜组为 97%。另一方面,输尿管软镜组有 18% 患者需行二期输尿管软镜碎石术,笔者的病例中 4 例返院接受二期手术,2 例患者其术后虽有残石,但拒绝再次手术治疗。二期手术是因为一期术中视野模糊、手术时间延长、结石较大。Hyams<sup>[13]</sup> 及其同事报道了多个研究中心输尿管软镜碎石术治疗 2 ~ 3cm 肾结石的结果,报告术后结石碎片在 0 ~ 2mm 的患者为 66%, 结石碎片 <4mm 的病人为 83%。他们为 83% 的患者行一期输尿管软镜碎石术,而剩余 17% 的患者需行二期或多期碎石术。

输尿管软镜组主要并发症例如严重出血、输尿管撕脱、穿孔未出现。输尿管软镜组 2 例出现肾绞痛者再次入院,治疗效果满意。输尿管软镜术后再入院与结石碎片排出及术后支架管疼痛有关。文献报道经皮肾镜碎石术后并发症率接近

8%<sup>[3,4]</sup>。在所有并发症中,需要输血的出血是最重要的并发症之一,因为的确有出血不能被控制,且需要血管栓塞或肾切除<sup>[20,21]</sup>。目前研究发现需要输血的严重出血占有经皮肾镜碎石术的7.1%。采用微通道经皮肾镜碎石术,通道出血减少,肾内镜体摆动时,意外损伤黏膜、肾柱也减少,故能明显减少出血的发生,当然技术的熟练程度也是重要影响因素。

目前研究报道,输尿管软镜碎石术的总手术时间较长于经皮肾镜碎石术。笔者术中用输尿管硬镜先对输尿管腔内情况进行评估。事实上,这样增加了输尿管软镜碎石术的手术时间。与笔者的报道相似,Breda<sup>[21]</sup>及其同事报道输尿管软镜治疗13~36mm肾结石的平均手术时间为65.1分钟。结石越大手术时间越长,Mariani<sup>[22]</sup>用输尿管软镜治疗大于4cm的肾结石,证明了这点。另一方面,手术时间增加可能导致经皮肾镜碎石术出血增加<sup>[19,23]</sup>,但对于输尿管软镜碎石术而言,出血风险并不明显增加,而术后发热及败血症的风险加大,因为经常出现的情况是,当软镜碎石视野不清时,需要增加冲洗流速,甚至使用高压冲洗泵冲洗。

总的来说,输尿管软镜碎石术较经皮肾镜碎石术风险明显减少,拔除导尿管后,外科医师可以放心让患者早日出院,笔者的患者平均术后住院时间60.4小时。而经皮肾镜组明显较长。造成这种差别的主要原因是肾造瘘管,且术后有出血时,通常的做法是延长肾造瘘管留置时间。外科医生的审慎考虑也可能是影响住院时间的因素。

因为是回顾性分析,本研究有一定的局限性。首先,病例数量相对有限,再者,对输尿管软镜碎石术后远期并发症的情况,本研究没能涉及,因为笔者的随访只有3个月,尤其是术中输尿管镜鞘置入困难及输尿管球囊扩张后置入输尿管软镜鞘的病人,其拔除双J管后输尿管是否会发生狭窄。

总之,输尿管软镜碎石术并发症发生率低,为肾结石大小适中的病人提供了一个安全高效的方法,与微通道经皮肾镜碎石术比,在风险、疗效、术后住院时间等方面各具优势。

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典型的 CT 表现,故 CT 尤其是多层螺旋 CT 可作为 TSC 全身脏器受累筛查的有效影像学检查方法。

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