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【临床研究】

输尿管软镜与微创经皮肾镜碎石术治疗直径 ≤ 2 cm肾结石的对比分析

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摘要: 目的 对比分析输尿管软镜碎石术(F-URS)与微创经皮肾镜碎石术(Mini-PCNL)治疗直径 ≤ 2 cm肾结石的临床疗效。方法 回顾性分析2013年4月至2015年8月新乡医学院第一附属医院收治的117例直径 ≤ 2 cm肾结石患者的临床资料及治疗方法,其中54例采用F-URS(F-URS组),63例采用Mini-PCNL(Mini-PCNL组),比较分析2组患者的碎石时间、结石清除率、住院时间、住院费用和并发症发生情况。结果 F-URS组碎石时间为(43.0 ± 28.3) min,初始结石清除率为73.93%,3个月结石清除率为92.57%,住院时间为(3.0 ± 1.7) d,住院费用为($15\,483.0 \pm 1\,186.35$)元;Mini-PCNL组碎石时间为(38.0 ± 26.5) min,初始结石清除率为91.42%,3个月结石清除率为93.56%,住院时间为(6.0 ± 2.6) d,住院费用为($23\,158.0 \pm 698.2$)元。2组患者碎石时间和3个月结石清除率比较差异无统计学意义($P > 0.05$);初始结石清除率、住院时间及住院费用比较差异均有统计学意义($P < 0.05$)。F-URS组患者术后出现发热3例;Mini-PCNL组患者术后出现发热3例,术中出血1例,造瘘管压迫止血痊愈,术后明显出血1例,经选择性肾动脉栓塞治愈。结论 F-URS结石清除率与Mini-PCNL相近,且F-URS具有创伤小、住院时间短、费用低及并发症少的优势,可作为直径 ≤ 2 cm肾结石的首选治疗。

关键词: 输尿管软镜;微创经皮肾镜碎石术;肾结石

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Comparative analysis of the flexible ureteroscopic lithotripsy and minimally invasive percutaneous nephrolithotomy for renal calculi ≤ 2 cm in size

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Abstract: **Objective** To compare the therapeutic efficacy of the flexible ureterscopic lithotripsy (F-URS) and minimally invasive percutaneous nephrolithotomy (Mini-PCNL) for treatment of patients with renal calculi ≤ 2 cm. **Methods** The clinical data and therapeutic method of 117 patients with renal calculi (≤ 2 cm) who from the First Affiliated Hospital of Xinxiang Medical University from April 2013 to August 2015 were analysed retrospectively. Fifty-four patients were treated with F-URS (F-URS group), while the other sixty-three patients were treated with Mini-PCNL (Mini-PCNL group). The operation time, stone clearance rate, hospital stay, hospitalization expense and complications were compared between the two groups. **Results** The operation time of patients in F-URS group and Mini-PCNL group was (43.0 ± 28.3) min and (38.0 ± 26.5) min respectively; the initial stone clearance rate of patients in F-URS group and Mini-PCNL group was 73.93% and 91.42% respectively; the clearance rate after postoperative three months of patients in F-URS group and Mini-PCNL group was 92.57% and 93.56% respectively; the average hospital stay of patients in F-URS group and Mini-PCNL group was (3.0 ± 1.7) d and (6.0 ± 2.6) d respectively; and the hospitalization expense of patients in F-URS group and Mini-PCNL group was ($15\,483.0 \pm 1\,186.35$) RMB and ($23\,158.0 \pm 698.2$) RMB; there were no statistic difference of operation time and clearance rate after postoperative 3 months between the two groups ($P > 0.05$); there were statistic difference of the initial stone clearance rates, average hospital stay, hospitalization expense between the two groups ($P < 0.05$). In F-URS group, three patients occurred fever after operation; in Mini-PCNL group, three patients occurred fever after operation, one patient occurred intraoperative hemorrhage which was cured by fistula oppression, and one patient occurred postoperative hemorrhage which was cured by selective renal artery embolization. **Conclusion** The effect of F-URS is equivalence to Mini-PCNL in the stone clearance rate, and F-URS has the advantages of less trauma and complication, fewer hospital stay and lower expenses. F-URS should be as the preferred treatment method for renal calculi ≤ 2 cm.

Key words: flexible ureterscopic; minimally invasive percutaneous nephrolithotomy; renal calculi

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经皮肾镜碎石术(percutaneous nephrolithotomy, PCNL)因其安全有效一直作为治疗肾结石的首选方法。近年来,随着输尿管软镜手术技术及软镜设备的不断改进,结石负荷大小及部位已不再成为结石治疗的主要障碍^[1]。输尿管软镜尤其是电子软镜的应用在 ≤ 2 cm的肾结石治疗中正不断得到发展及认同,但有研究表明,输尿管软镜在 ≥ 2 cm肾结石的治疗价值中存在争议^[2]。本研究回顾性分析输尿管软镜碎石术(flexible ureteroscopic lithotripsy, F-URS)治疗 ≤ 2 cm肾结石患者资料,并与同期行微创经皮肾镜碎石术(minimallyinvasive percutaneous nephrolithotomy, Mini-PCNL)治疗患者资料进行比较,现将结果报道如下。

1 资料与方法

1.1 一般资料 回顾性分析新乡医学院第一附属医院2013年4月至2015年8月伴有症状或无症状肾结石患者117例,结石直径 ≤ 2 cm。患者均经B超、腹部平片及CT检查明确结石大小及位置。根据手术方法不同分为F-URS组和Mini-PCNL组,其中F-URS组患者54例,男34例,女20例,年龄18~51岁,平均 (41.5 ± 4.9) 岁;上盏结石14例,中盏结石9例,下盏结石8例,肾盂结石23例;左肾31例,右肾23例,结石直径为 (1.5 ± 0.7) cm; Mini-PCNL组患者63例,男37例,女26例,年龄21~59岁,平均 (45.5 ± 5.8) 岁;上盏结石19例,中盏结石6例,下盏结石12例,肾盂结石26例;左肾40例,右肾23例,结石直径为 (1.8 ± 0.5) cm。86例患者曾经体外冲击波碎石治疗(extracorporeal shock-wave lithotripsy, ES-WL)失败。常规心、肺功能检查等均无手术禁忌证。2组患者性别、年龄、结石部位等一般资料比较差异无统计学意义($P > 0.05$),具有可比性。

1.2 手术方法 F-URS组患者采用全身麻醉,取截石位,采用Fr 5.9/8.9输尿管软镜(日本Olympus公司);采用科医人120 W钬激光碎石,软镜采用200 μ m光纤;F-URS手术患者均术前留置D-J管2

周,软镜经输尿管扩张鞘抵达肾盂,寻及目标肾盏。激光碎石功率以10~20 W [$(0.5 \sim 1.0)$ J $^{-1} \times 20$ Hz]进行碎石,辅以网状或三角套石篮取石,术后患侧输尿管置4.8 F双J管。

Mini-PCNL组患者采用全身麻醉,取截石位,经膀胱镜输尿管留置6 F输尿管导管后改俯卧位,腰部垫高,经输尿管导管注入生理盐水充盈集合系统,应用B超定位,将穿刺针刺入结石肾盏,置入超滑导丝在导丝引导下逐步扩张穿刺通道至16 F,将16 F Peel-away鞘置入肾盏,应用Storz肾镜或输尿管镜550 μ m光纤及40~60 W钬激光碎石,异物钳、套石篮辅助取石。术后患侧输尿管置4.8 F双J管,留置14 F肾造瘘管。2组患者术后均常规留置双J管4周,术后第2天复查腹部平片明确碎石效果及双J管位置。拔除双J管后2个月再次行B超及腹部平片检查了解结石残留情况。清石成功标准:B超及腹部平片复查残石或结石残屑 ≤ 4 mm,且无临床症状。双侧肾结石患者均采用相同碎石方法,分别记录碎石、取石时间。

1.3 观察指标 记录2组患者的碎石时间、初始清石率(术后第3天复查排石情况)、3个月清石率、术后住院时间、住院费用和并发症。

1.4 统计学处理 应用SPSS 13.0软件进行数据处理,计量资料以均数 \pm 标准差($\bar{x} \pm s$)表示,2组间比较采用 t 检验,率的比较采用 χ^2 检验, $P < 0.05$ 为差异有统计学意义。

2 结果

F-URS组和Mini-PCNL组患者碎石时间、3个月清石率比较差异无统计学意义($P > 0.05$);F-URS组与Mini-PCNL组患者初始清石率、住院时间及住院费用比较差异有统计学意义($P < 0.05$);见表1。2组患者均顺利完成手术,F-URS组患者出现术后发热3例;Mini-PCNL组患者出现术后发热3例,术中出血1例,造瘘管压迫止血痊愈,术后明显出血1例,经选择性肾动脉栓塞治愈。

Tab. 1 Comparison of clinical correlation indices between F-URS group and Mini-PCNL group

组别	n	碎石时间/min	初始清石率/%	3个月清石率/%	住院时间/d	住院费用/元
F-URS组	54	43.0 \pm 28.3	73.93	92.57	3.0 \pm 1.7	15 483.0 \pm 1 186.3
Mini-PCNL组	63	38.0 \pm 26.5	91.42 ^a	93.56	6.0 \pm 2.6 ^a	23 158.0 \pm 698.2 ^a

注:与F-URS组比较^a $P < 0.05$ 。

3 讨论

泌尿系结石是泌尿系常见病之一,其中肾结石占40%~50%,多数患者需行体外碎石或PCNL治

疗^[3]。对于直径 ≥ 2 cm的肾盂结石,文献报道^[4]及美国泌尿外科协会(American Urological Association, AUA)指南倾向于首选PCNL;而对于 ≤ 2 cm的肾结石,尤其是肾下盏结石,国内外文献表明,Mini-PCNL

及F-URS均可作为首选治疗方案^[5-9]。大量研究表明,F-URS甚至可作为较大肾结石(2~4 cm)PCNL治疗的选择性替代治疗方案^[10-13]。F-URS具有创伤小、恢复快、操作简单方便、手术相对安全、禁忌证少等优点。输尿管软镜技术的不断进步使其适应证不断扩展,由于其末端可多向运动,可以顺利进入与输尿管长轴成锐角的肾盏,配合直径较小的激光光纤,使其碎石能力大为增强。本研究结果表明,Mini-PCNL与F-URS对于 ≤ 2 cm肾结石治疗手术时间及3个月结石清除率并无统计学差异,这与SABNIS等^[14]研究结论一致,但SABNIS等^[14]认为F-URS后对于输尿管内支架管依赖性更高,其主要原因可能是由于F-URS后一期结石清除率低于Mini-PCNL组,这与本研究结论一致,且输尿管内支架管的留置可以明显促进碎石排出及减少术后疼痛、发热等并发症的发生;Mini-PCNL在一期结石清除率方面虽具有一定优势,但本研究F-URS组住院时间及住院费用均明显低于Mini-PCNL组,且F-URS组无需变换体位,患者具有更好的耐受力,这与国外文献^[15]结论一致。2组患者均顺利完成手术,Mini-PCNL组术后发热3例,术中出血1例,造瘘管压迫止血痊愈,术后明显出血1例,经选择性肾动脉栓塞治愈,术后并发症发生率为7.9%;F-URS组术后发热3例,并发症发生率为5.6%,与文献^[16]报道结果类似。其主要原因可能与术后菌血症发生有关,二者并发症比较并无明显统计学差异。虽然并发症的发生原因还跟术者经验、输尿管镜操作熟练程度、结石大小、硬度、在集合系统内的分布情况、腔内碎石器械的优劣等有关,但输尿管软镜经人体正常腔道手术的特点使其具有更高的安全性,通过该组病例体会,作者感受在手术过程中,为尽可能排净结石,减少输尿管软镜的并发症发生:(1)明确要行F-URS患者,术前置入D-J管2周,可以扩张输尿管,便于术中置入通道鞘,缩短手术时间,减少围术期感染性并发症的发生。(2)术前需通过CT密度值了解结石硬度,缩短手术时间;术前必须重视尿常规及尿培养结果,严格控制感染。(3)术中尽可能选用粗(F14)扩张鞘有利于回流,放置扩张鞘阻力较大时,不可强行置管,可在导丝引导下甚至可以在输尿管硬镜直视下留置扩张鞘;术中尽量缩短手术时间(≤ 60 min),术中采用人工注射器脉冲式冲洗,减少注水量;术中发现结石或肾盂有脓苔存在,立即终止手术。(4)对于肾下盏的结石,为避免输尿管软镜的损耗,可用取石网篮兜住结石将结石推入肾上盏或是肾盂,再行钬激光下碎石,有利于粉碎结石并促进结石排出。(5)碎石时先用高频低能量从结石边缘

将结石粉碎成粉末,当结石裂成大碎片时,改用低频高能量。(6)输尿管软镜镜体进出过程中应保持直线,避免镜体外壳损伤;钬激光光纤插入时务必保持输尿管软镜末端处于伸直状态,光纤进入视野后,退回镜体内2~3 mm,待重新找到结石后,再将钬激光光纤伸出镜体外3~5 mm进行碎石。(7)对于部分肾下盏软镜操作或碎石困难结石,助手可于患者腰背部局部垫高、托起或叩击改变结石位置,便于操作。(8)为了提高输尿管软镜碎石后初始清石率,让部分患者术后第3天应用体位辅助排石机治疗,但其疗效尚待进一步统计分析。

综上所述,对于 ≤ 2 cm的肾结石,F-URS结石清除率与Mini-PCNL疗效相近,且F-URS经自然腔道内镜手术具有创伤小、住院时间短、费用低及并发症少的优势,对于此类肾结石,尤其是Mini-PCNL有禁忌的情况下,F-URS可作为其首选治疗方案。对于复杂性肾结石,输尿管软镜的独立治疗效果尚待进一步研究,文献表明,输尿管软镜联合经皮肾镜可能是处理复杂性结石的最佳选择^[17]。

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