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# 输尿管镜钬激光碎石术与气压弹道碎石术治疗下段输尿管结石的临床疗效分析*

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**摘要 目的**:探讨输尿管镜钬激光碎石术与气压弹道碎石术治疗下段输尿管结石的临床疗效。**方法**:选取146例输尿管下段结石患者,将所有患者随机分为试验组和治疗组两组,其中试验组患者均采取输尿管镜钬激光碎石术进行治疗,而对照组患者则采取气压弹道碎石术进行治疗,比较两组患者手术前后的血清肌酐(Serum creatinine,ScR)和血尿素氮(Blood urea nitrogen,BUN)等手术指标。**结果**:对照组患者完成手术所需要的时间和住院时间以及血尿时间均明显长于试验组患者,对照组患者之中的碎石成功率为71.91%(105例),明显低于试验组患者的碎石成功率84.25%(123例),两组患者之间的数据比较均有统计学意义(均P<0.05)。两组患者手术之前的BUN和ScR水平均无明显差异,而在手术之后两组患者的BUN和ScR水平均显著降低,并且试验组患者的降低幅度明显大于对照组患者(均P<0.05)。试验组患者在术后一个月时的结石排净率为94.52%,明显高于对照组患者的83.56%(P<0.05);试验组患者的并发症发生率为3.42%,明显低于对照组患者的13.01%(P<0.05);并且试验组患者的止痛药使用比例为20.00,明显低于对照组患者的34.62(均P<0.05)。**结论**:输尿管镜钬激光碎石术在治疗输尿管下段结石方面效果显著,且具有安全性高和创伤小以及恢复速度快等优势。

**关键词**:输尿管结石;输尿管镜;气压弹道碎石术;钬激光碎石术

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# Clinical Effects of Holmium Laser Lithotripsy and Pneumatic Lithotripsy in the Treatment of Lower Ureteral Calculi*

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**ABSTRACT Objective:** To analyze the clinical curative effects of ureteroscopy holmium laser lithotripsy and pneumatic ballistic lithotripsy in the treatment of lower segment ureteral calculi. **Methods:** 146 patients with lower segment ureteral calculi from our hospital were selected in our study. According to the random number table method, all patients were randomly divided into trial group and control group. Patients of trial group were treated with ureteroscopy holmium laser lithotripsy, while those in control group were treated with pneumatic ballistic lithotripsy. The surgery indicators such as serum creatinine (ScR) and blood urea nitrogen (BUN) of patients were compared between two groups before and after operation. **Results:** Patients in control group had significantly longer surgery time, hospital stay and hematuria time than those in the trial group. In the control group, the success rate of lithotripsy was 71.91% (105 cases), significantly lower than that of the trial group (84.25%, 123 cases). The differences between the two groups were statistically significant (all P<0.05). Before surgery, there were no obvious differences in the levels of BUN and ScR between the two groups. However, the BUN and ScR levels were significantly decreased after surgery in both groups, and they decreased greater in the trial group than in the control group (all P<0.05). In trial group, the stone-free rate was 94.52% at one month after surgery, significantly higher than that of 83.56% in the control group (P<0.05). The incidence of complications was 3.42% in the trial group, significantly lower than that 13.01% of the control group (P<0.05). Moreover, the paregoric using ratio was 20.00 in the trial group, but was 34.62 in the control group. The difference was statistically significant (P<0.05). **Conclusion:** Holmium laser lithotripsy is effective in the treatment of lower ureteral calculi, and it has advantages of high safety, less trauma and quick recovery. It is worth of wide use in clinical practice.

**Key words:** Ureteral calculus; Ureteroscope; Lithoclast Lithotripsy; Holmium laser lithotripsy

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## 前言

输尿管结石的临床表现以血尿与疼痛为主要,发病率高并且多数的患者症状较重,常就诊时就有疼痛难忍的症状,通常

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需要给予止痛药物进行镇痛，是泌尿外科中的一种常见病[1]。对于结石体积较大且情况复杂的输尿管下段结石患者，临床治疗通常采取碎石术进行碎石。我院为了分析探讨输尿管镜钬激光碎石术与气压弹道碎石术治疗下段输尿管结石的临床疗效。

## 1 临床资料与方法

### 1.1 一般资料

选取 146 例输尿管下段结石患者，其中男性患者 85 例，女性患者 61 例，所有患者年龄均处于 22～70 岁之间，平均年龄为(41.6± 4.2)岁。将所有患者随机分为试验组和治疗组两组，平均每组患者 73 例，并且两组患者之间的一般资料比较无明显差异。

### 1.2 纳入与排除标准

所有患者均经过 CT 或泌尿系平片和 B 超进行检查，确诊为输尿管下段结石患者，并且所有患者均明确存在需要进行碎石治疗的手术指征；经过我院医学伦理委员会批准后，所有患者均知情同意并且自愿参与本次研究。排除患有合并有其他输尿管及肾脏基础疾病的患者；排除合并有严重脏器功能障碍的患者；排除因为各种原因无法配合完成本次研究的患者。

### 1.3 研究方法

本次研究中试验组患者均采取输尿管镜钬激光碎石术进行治疗，而对照组患者则采取气压弹道碎石术进行治疗。其中试验组患者在常规消毒铺单后，均采用截石位，运用连续硬膜外麻醉的方式进行麻醉，将输尿管镜用润滑油润滑后置入患者膀胱处插入其输尿管，随后采取加压注水的方法扩张患者的输尿管以及其壁间段。在插入斑马导丝后，缓慢引导输尿管镜至患者结石下方，从操作孔探入钬激光光钎实施碎石，将患者体内结石碎至直径低于 3 毫米，同时在确认未造成输尿管损伤及无残余结石后，在患侧放置双 J 管[2]。完成手术后，对患者进行常规的抗炎和对症治疗。

### 1.4 观察指标

记录两组患者手术前和手术 7 天后的血清肌酐及血尿素氮等手术指标；观察比较两组患者完成手术所需要的时间，以及住院时间、血尿时间和碎石成功率；此外，比较两组患者实施手术一个月后的止痛药使用比例和并发症情况以及手术排净率等。

### 1.5 统计学方法

试验所得数据均用 $\bar{x}\pm s$ 形式表示，组间比较采用 t 检验，计数资料之间对比采用 $x^2$ 检验，以是否 $P<0.05$ 来比较差异是否具有统计学意义。

## 2 结果

### 2.1 比较两组患者之间的手术指标

从表 1 可以获知对照组患者完成手术所需要的时间和住院时间以及血尿时间均明显长于试验组患者，并且对照组患者之中的碎石成功率为 71.91%(105 例)，显著低于试验组患者的碎石成功率 84.25%(123 例)，两组患者之间的数据比较均有统计学意义(均 $P<0.05$)。

表 1 比较两组患者之间的手术指标

Table 1 Comparison of surgical parameters between the two groups

| Groups | Operation time(min) | Success rate of lithotripsy (n,%) | Hematuria time(d) | Length of stay(d) |
|---|---|---|---|---|
| Control group(n=73) | 55.76± 10.32 | 105(71.91) | 4.71± 1.82 | 5.28± 1.78 |
| Trial group(n=73) | 45.72± 8.18[a] | 123(84.25)[a] | 2.21± 1.52[a] | 3.15± 1.66[a] |

Notes: Compared with the control group, [a]P<0.05.

### 2.2 比较两组患者之间的肾功能指标

从表 2 可以获知两组患者手术之前的 BUN 和 ScR 水平均无明显差异，而在手术之后两组患者的 BUN 和 ScR 水平均显著降低，并且试验组患者的降低幅度明显大于对照组患者(均 $P<0.05$)。

表 2 比较两组患者之间的肾功能指标

Table 2 Comparison of renal function between the two groups

| Groups | n | Period | ScR(μmol/L) | BUN(mmol/L) |
|---|---|---|---|---|
| Control group | 73 | Preoperative | 237.21± 111.45 | 9.32± 2.19 |
| | | Postoperative | 132.45± 45.28[a] | 7.55± 1.89[a] |
| Trial group | 73 | Preoperative | 248.26± 102.38 | 9.82± 2.49 |
| | | Postoperative | 100.27± 30.12[ab] | 5.19± 1.62[ab] |

Notes: Compared with preoperative, [a]P<0.05; Compared with the control group, [b]P<0.05.

### 2.3 比较两组患者的随访结果

从表 3 可以获知试验组患者在术后一个月时的结石排净率为 94.52%，明显高于对照组患者的 83.56%，两组患者之间的数据比较差异具有统计学意义($P<0.05$)；试验组患者的并发症发生率为 3.42%，显著低于对照组患者的 13.01%，差异具有统计学意义($P<0.05$)；并且试验组患者的止痛药使用比例为 20.00，明显低于对照组患者的 34.62，差异均具有统计学意义(均 $P<0.05$)。

## 3 讨论

输尿管下段结石患者如果经过碎石治疗后仍然不能得到有效的治疗，很有可能会出现诱发肾积水和梗阻以及发生继发

表 3 比较两组患者的随访结果

Table 3 Comparison of two groups of patients with follow-up results

| Groups | Stone drainage rate (n,%) | Complication rate (n,%) | Use of analgesics |
|---|---|---|---|
| Control group(n=73) | 122(83.56) | 19(13.01) | 34.62 |
| Trial group(n=73) | 138(94.52)[a] | 5(3.42)[a] | 20.00[a] |

Notes: Compared with the control group, [a]P<0.05.

感染,从而对患者的肾功能造成较大伤害[3]。因此临床上及时解除输尿管下段结石患者的结石梗阻,进而防止其肾功能受到损伤是治疗的主要目的。既往治疗输尿管下段结石的患者通常采取的是开腹手术治疗,但是该类手术创伤较大而又不易恢复[4]。随着近年来内镜技术的不断发展,输尿管镜凭借其创伤小、恢复快的优势得以在临床上广泛使用。在输尿管镜的引导下配合激光碎石术或者气压弹道碎石术,不仅创伤小恢复快、其碎石成功率也得到明显增高[5]。但是由于气压弹道碎石术是依靠压缩气体所产生的动能对患者体内结石进行冲击,从而达到碎石的治疗效果,在击碎较大的结石的时候容易导致结石移位或者碎块过大无法完成清除[6,7]。而输尿管镜下钬激光碎石术则是依靠稀有元素 Ho 激发出脉冲式红外线激光,无需冲击和震荡即能轻易粉碎多种类型的结石,避免了结石移位的出现以及大大降低了手术过程对输尿管黏膜造成的损伤[8,9]。输尿管镜钬激光碎石术还具有一定的止血和切割作用,粉碎后的结石体积更小,更能够轻易排出体外[10]。并且输尿管镜钬激光碎石术不仅仅安全性高,其运用范围也更加广泛,在手术过程中还可以同时对患者的输尿管息肉和狭窄等并发症进行治疗处理[11-13]。

在本次研究结果中,采用气压弹道碎石术的对照组患者完成手术所需要的时间和住院时间以及血尿时间均明显长于采用输尿管镜钬激光碎石术的试验组患者,并且对照组患者之中的碎石成功率为 71.91%(105 例),显著低于试验组患者的碎石成功率 84.25%(123 例)。由此提示了钬激光碎石术对于输尿管下段结石的患者具有更好的治疗效果,不仅可以明显缩短手术及住院时间,还能够大大提高患者治疗的成功率[14,15]。而且在手术之后两组患者的 BUN 和 ScR 水平均显著降低,并且试验组患者的降低幅度明显大于对照组患者。说明对于输尿管镜下段结石患者而言,钬激光碎石术更能有效地改善其肾功能[16,17]。经过我院对两组患者术后一个月的随访,试验组患者在术后一个月时的结石排净率为 94.52%,明显高于对照组患者的 83.56%;试验组患者的并发症发生率为 3.42%,显著低于对照组患者的 13.01%;并且试验组患者的止痛药使用比例为 20.00,明显低于对照组患者的 34.62。说明了钬激光碎石术在术后随访疗效方面也明显优于气压弹道碎石术,其原因可能与两种碎石术的碎石机制有关,钬激光碎石术采取蚕食的方式有效避免了结石被冲出肾盂或被冲出视野的情况,同时避免了物理冲击对患者输尿管黏膜的机械损伤,因此安全性更高,疗效更佳[18-20]。

综上所述,作为一种较为先进的治疗手段,输尿管镜钬激光碎石术比气压弹道碎石术在治疗输尿管下段结石方面效果更为显著,安全性更高和创伤小以及恢复速度更快等优势,值得在临床上加以广泛推广使用。

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检,另一方面只有大型医疗机构才具备进行超微病理诊断的设备和能力，加之费用不菲，所以国内目前确诊的 PCD 并不多见。金贝贝等对我国 1994 至 2009 年报道的 178 例 PCD 患者进行分析,发现仅 1 例进行了支气管或鼻黏膜活检电镜病理检查[10]。尽管 PCD 属于少见病,但我国人口基数大,此类病人的数量可能不容忽视,尤其对于呼吸道感染迁延不愈并发内脏反位者,应当及时进行纤毛超微病理学检查及相关基因检测。

总之,目前 PCD 无根治方法,以对症治疗为主,通过抗感染治疗和精心的护理可延缓肺部疾病的进展。结合本例 PCD 患者临床、病理等相关资料与相关文献进行分析总结,在临床工作中,对于呼吸道感染迁延不愈并发内脏反位者,无论有无鼻窦炎和支气管扩张,均应考虑 PCD 存在可能,应当及时进行呼吸道黏膜超微病理学检查及相关基因检测,以便尽早进行诊断和干预,减少和延缓并发症的发生。

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