

输尿管壁厚度预测肾绞痛后输尿管结石自行排出的可能性研究

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[摘要] 目的:评估输尿管壁厚度(UWT)在预测肾绞痛后输尿管结石自行排出的可能性及有效性。方法:收集2020年8月—2021年6月在南方医科大学第五附属医院通过CT检查诊断的182例输尿管结石引起肾绞痛患者的临床资料,包括结石大小、结石位置、肾盂积水程度、输尿管结石停留处UWT。1个月后复诊,复查CT观察输尿管结石的排出情况,采用受试者工作特征(ROC)曲线分析UWT预测肾绞痛后输尿管结石自行排出的潜力。结果:182例输尿管结石患者中,首次就诊后1个月复查CT结果显示107例排出结石(排出结石组),75例未排出结石(未排出结石组)。其中输尿管上段、中段和下段结石排出率分别为45.7%、59.1%和77.2%。排出结石组患者的UWT为1.33~4.46 mm,平均(2.42±0.72) mm;未排出结石组患者的UWT为1.62~6.12 mm,平均(3.88±0.93) mm。采用ROC曲线分析UWT的曲线下面积(AUC)最大值为0.89,UWT的最佳预测值为2.80 mm,敏感性为76.6%,特异性为88.0%。结论:UWT可作为肾绞痛首次发作后输尿管结石自行排出的有效预测指标,对于肾绞痛发作后输尿管结石治疗方案的制定有一定的参考意义。

[关键词] 输尿管结石;肾绞痛;预测;输尿管壁厚度

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Potential value of ureteral wall thickness in predicting spontaneous passage of ureteral stones after renal colic

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Abstract Objective: To evaluate the potential ability and effectiveness of ureteral wall thickness (UWT) in predicting spontaneous passage of ureteral stones after renal colic. **Methods:** A total of 182 patients diagnosed with renal colic caused by ureteral stones through CT scan in Fifth Affiliated Hospital of Southern Medical University from August 2020 to June 2021 were evaluated. Variables analyzed included stone size, stone location, renal pelvic anteroposterior diameter, UWT measured at the stone site by CT, and a review of CT one month was observed after the initial visit. Receiver operating characteristic (ROC) curve analysis was applied to evaluate the possible predictive value of UWT in spontaneous passage of ureteral stones after renal colic. **Results:** Of the 182 patients with ureteral stones, a review of CT one month after the first visit showed 107 discharged stones and 75 did not. Among them, the upper, middle and lower stone discharge rates of the ureter were 45.7%, 59.1% and 77.2%, respectively. The UWT of patients in stone expulsion group ranged from 1.33 mm to 4.46 mm, with an average of (2.42±0.72) mm, and in the stone not discharged group was 1.62 mm to 6.12 mm, with an average of (3.88±0.93) mm. A cut-off point of 2.80 mm showed highly predictive value. In the receiver operating characteristic (ROC) curve, the best cut-off point of UWT was 2.80 mm with a sensitivity value of 76.6% and specificity value of 88.0% (area under curve: AUC=0.89). **Conclusion:** UWT can serve as an effective predictor of ureteral stones self-excretion after the first attack of renal colic, and guide the formulation of treatment plan for ureteral stones after renal colic attack.

Key words ureteral stones; renal colic; prediction; ureteral wall thickness

肾绞痛是泌尿外科常见病、多发病,且发病率逐年升高,最常见的原因是由输尿管结石梗阻引起,随着内镜技术的快速发展,输尿管结石性肾绞痛治疗方式多样^[1]。但是如何选择最佳的处理手段,仍是泌尿外科医生面临的难题。本研究收集

2020年8月—2021年6月在南方医科大学第五附属医院通过CT检查明确诊断的182例输尿管结石肾绞痛患者的临床资料,通过对患者结石大小、结石位置、肾盂积水程度、输尿管结石停留处输尿管壁厚度(ureteral wall thickness, UWT)等资料进行分析,旨在评估UWT预测肾绞痛后输尿管结石能否自行排出的潜力,UWT的测量方法选择

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CT影像轴上有结石层面且输尿管壁最厚处,将图片放大5倍后在同一位置测量3次取均值(图1)。现报告如下。



图1 CT测量结石处UWT

1 资料与方法

1.1 一般资料

本研究共收集2020年8月—2021年6月在我院通过CT检查诊断的182例输尿管结石引起肾绞痛患者的临床资料,均取得患者知情同意及通过我院伦理委员会批准。其中男76例,女106例,平均年龄(44.83±9.41)岁。81例为输尿管上段结石,44例为输尿管中段结石,57例为输尿管下段结石。轻度肾积水者135例,中度肾积水者47例,无一例重度肾积水。输尿管结石最大横径为2.1~10 mm,平均(5.61±2.64) mm。UWT为1.33~6.12 mm,平均(3.02±1.08) mm。

1.2 研究方法

患者均因肾绞痛首次发作就诊,均行血常规、尿常规、肾功能、下腹部及盆腔CT检查,记录患者性别、年龄、发病时长等一般资料及结石位置、结石最大横径、肾积水程度、UWT。该研究剔除输尿管结石最大直径>1 cm、输尿管多发结石、既往泌尿系结石手术史、输尿管狭窄史、盆腔化疗史、观察期因感染或疼痛难忍改行手术治疗者。疼痛发作时予以止痛药口服或返院行间苯三酚联合曲马多治疗,对所有患者予以结石通胶囊联合坦索罗辛缓释胶囊治疗,嘱患者在观察期间每天饮水量约2000 mL并进行适量运动。1个月后复查CT,如未见输尿管结石,则被认为输尿管结石已排出体外。

1.3 统计学方法

采用SPSS 21.0统计软件进行数据分析。计量资料以 $\bar{X} \pm S$ 表示,比较采用独立两样本 t 检验;计数资料以例(%)表示,比较采用 χ^2 检验。使用受试者工作特征(ROC)曲线评价UWT预测输尿管结石排出的准确度,以 $P < 0.05$ 为差异有统计学意义。

2 结果

本研究共纳入182例输尿管结石患者,根据1个月后复查CT结果将其分为排出结石组(107例)和未排出结石组(75例),两组患者的临床资料见表1。两组在结石位置、结石大小、肾积水程度及UWT方面比较差异有统计学意义($P < 0.05$),而在性别、年龄方面比较差异无统计学意义($P > 0.05$)。UWT的ROC曲线下面积(AUC)为0.89(95%CI:0.85~0.94),使用UWT预测肾绞痛后输尿管结石1个月能否自行排出的最佳预测值为2.80 mm,以该界值预测输尿管结石排出潜力的敏感性为76.6%,特异性为88.0%(图2)。以UWT=2.80 mm为分界标准预测患者排出结石结果,其中排出结石患者(≤ 2.80 mm)93例,真阳性率为89.2%(83例),假阳性率为10.8%(10例);未排出结石患者(> 2.80 mm)89例,真阴性率为73.0%(65例),假阴性率为27.0%(24例)。

3 讨论

目前,对于尚未引起急性并发症的输尿管结石性肾绞痛患者,泌尿外科医生将面临选择积极外科治疗还是保守排石治疗的难题。引起肾绞痛的结石通常很小,且当结石在肾盂、输尿管内急促移动或突发嵌顿引起上尿路急性梗阻时才发生肾绞痛。肾绞痛的发作提示输尿管状态的良好,更易蠕动和收缩,是结石排出的有利因素。这也是我们选择肾绞痛后输尿管结石作为研究对象的原因。对于可能排出的结石采取积极的手术干预治疗不但加重了患者的经济负担,而且增加了手术的创伤及可能带来的并发症。然而,对于需要手术的患者而延迟观察排石时间,可能会引起尿液外渗、肾周积液、急性肾功能衰竭、尿源性脓毒症等一系列并发症。若医生能够根据患者的临床资料,对输尿管结石能否自行排出做出比较准确的预测,对于制定合理有效的输尿管结石治疗方案具有非常重要的指导意义。

目前我们已知,结石梗阻的部位、结石大小是影响结石能否自行排出的重要因素。有文献报道,输尿管上段、中段和下段结石自行排出率分别为12%~48%、22%~60%、45%~75%,而且结石 $\leq 5 \sim 6$ mm的下段输尿管结石自行排出率更高^[2-3]。在我们的研究中,输尿管下段结石的自行排出率为77.2%,高于输尿管中段结石的59.1%及输尿管上段结石的45.7%的排出率。输尿管下段结石颗粒较小结石较输尿管中上段颗粒较大结石的排出率更高,差异有统计学意义。然而,也有文献报道了6 mm输尿管嵌顿结石导致患者尿源性脓毒症而危及生命的病例^[4],这在泌尿外科临床工作中也非常常见。因此仅仅依靠结石大小及梗阻部位预判结石的排出情况尚有一定的局限性。

表 1 输尿管结石排出组与未排出组患者的临床资料比较

例(%), $\bar{X} \pm S$

项目	总数(n=182)	排出结石组(n=107)	未排出结石组(n=75)	P 值
年龄/岁	44.83±9.41	45.59±9.69	43.76±8.94	0.197
性别				0.479
男	76	47	29	
女	106	60	46	
结石位置				0.001
上段	81(44.5)	37(34.6)	44(58.7)	
中段	44(24.2)	26(24.3)	18(24.0)	
下段	57(31.3)	44(41.1)	13(17.3)	
结石大小				0
≤0.6 cm	110(60.4)	93(86.9)	17(22.7)	
0.7~1.0 cm	72(39.6)	14(13.1)	58(77.3)	
肾积水				0
轻度	135(74.2)	97(90.7)	38(50.7)	
中度	47(25.8)	10(9.3)	37(49.3)	
重度	0	0	0	
UWT/mm	3.02±1.08	2.42±0.72	3.88±0.93	0

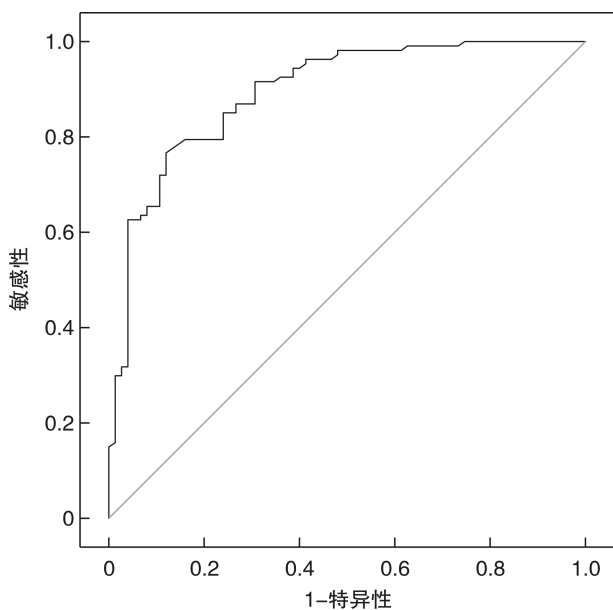


图 2 输尿管壁最大厚度预测肾绞痛后结石排出的 ROC 曲线

本研究结果显示,CT 测得输尿管结石停留处的 UWT 与结石能否自行排出密切相关,结石未排出组患者的 UWT 高于结石排出组,差异有统计学意义。这可能与结石停留处的输尿管壁炎症反应有关。正常成年人 UWT 为 1 mm 左右,停留在输尿管的结石及引发的肾绞痛均会刺激输尿管壁发生炎症反应,导致黏膜水肿、间质纤维化,进而引起输尿管息肉,甚至侵及输尿管周围组织,使结石停留部位 UWT 增加,形成嵌顿性结石,降低了结石通过该段输尿管的可能性^[5-7]。Sarica 等^[8]研究发现 C 反应蛋白及血沉可辅助 UWT 对输尿管结石是否嵌顿进行预测,提示高 UWT 增加了结石嵌顿的风险,可能和输尿管炎症密切相关。刘彼得等^[9]

研究显示高 UWT 与输尿管黏膜病理改变、手术时间及手术并发症的发生率呈正相关。Yoshida 等^[10-11]研究发现嵌顿性结石和 UWT 的增加密切相关,输尿管镜下观察见输尿管水肿、息肉,甚至结石嵌入黏膜内,且高 UWT 的输尿管结石保守治疗疗效较差。在我们的研究中,ROC 曲线计算出 UWT 最佳预测值为 2.80 mm,以该界值预测输尿管结石排出潜力的敏感性为 76.6%,特异性为 88.0%。

本研究也存在一些局限性。我院行 CT 平扫的层厚约为 5 mm,无法保证每例患者均扫描到最佳的 UWT。理论上越薄层的 CT 扫描对于测量 UWT 测量会越精确。另外,CT 扫描并非测量 UWT 的精准方法,其精度不如 MRI,在结石高密度影的干扰下也容易产生伪影。

综上所述,测量肾绞痛发作时结石停留处 UWT 对于预测输尿管结石自行排出潜力具有较高的参考价值,其结合输尿管结石大小、位置等其他因素,为输尿管结石治疗方案的制定提供一定的参考价值。

利益冲突 所有作者均声明不存在利益冲突

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