

· 临床研究 ·

经尿道蓝激光治疗膀胱尿酸结石 2 例报告

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Transurethral blue laser treatment of bladder stones: a report of 2 cases

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ABSTRACT: Objective To report the clinical data of two patients with prostatic hyperplasia and bladder uric acid stones, so as to provide reference for clinical practice. Methods Clinical data of two patients successfully undergoing blue laser lithotripsy in Department of Urology, Zhenba County People's Hospital were retrospectively analyzed, including clinical manifestations, surgical methods, treatment outcomes and complications. Results Both patients sought medical care due to progressive dysuria or hematuria. B ultrasound and magnetic resonance imaging confirmed bladder calculi and prostatic hyperplasia. One patient also had large blood clots in the bladder cavity. Both patients received transurethral blue laser prostate vaporization + transurethral bladder stone holmium laser lithotripsy. The stone surface was dark yellow, with no obvious pores, fine particles or spike protrusion. Blue laser produced an "ablative" phenomenon similar to vaporization, and then stones became smaller and fragmented. The lithotripsy lasted for 11 min and 8 min, respectively. There were multiple bladder mucosal injuries due to constant drift of stones during operation. Stone composition analysis suggested uric acid stones. After 3 months of follow-up, both patients had smooth postoperative urination, good urine control, and no stone recurrence. Conclusion Blue laser can be applied to crush uric acid stones, and the bladder mucosa should be protected during lithotripsy.

KEY WORDS: blue laser; bladder stone; uric acid stone; transurethral surgery; benign prostatic hyperplasia

摘要: 目的 报道 2 例采用蓝激光治疗良性前列腺增生合并膀胱尿酸结石患者的临床资料, 为该类结石的治疗提供参考。方法 回顾陕西汉中镇巴县人民医院泌尿外科成功实施蓝激光碎石术的 2 例良性前列腺增生合并膀胱尿酸结石患者的临床资料, 对患者症状、病情特点、手术经过、治疗结果及并发症进行分析。结果 2 例患者均以进行性排尿困难加重或血尿就诊, 经 B 超和磁共振成像均确诊为膀胱结石及良性前列腺增生, 患者 2 同时伴有膀胱腔内大量血凝块。对患者拟行经尿道蓝激光前列腺汽化术 + 经尿道膀胱结石钬激光碎石术, 术中见 2 例患者的结石表面均为暗黄色, 无明显孔隙, 无细颗粒及棘刺样突起, 尝试应用蓝激光(150 W)进行碎石, 结石产生类似汽化的“烧蚀”现象, 而后变小、碎裂。患者 1、2 碎石过程用时分别为 11 min 及 8 min, 但术中因结石不断漂移, 均有多处膀胱黏膜损伤。2 例患者的结石成分分析均提示为尿酸结石。随访 3 个月 2 例患者术后排尿通畅、控尿良好, 结石无复发。结论 对于尿酸结石, 可以尝试应用蓝激光进行碎石, 碎石过程中应注意保护膀胱黏膜。

关键词: 蓝激光; 膀胱结石; 尿酸结石; 经尿道手术; 良性前列腺增生

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良性前列腺增生(benign prostatic hyperplasia, BPH)是老年男性常见疾病^[1], 合并膀胱结石是其手术指征之一, 约有 10% 的患者在进行 BPH 手术的同时接受碎石治疗^[1-3]。除了少数结石体积较大、数量较多、以及因各种原因需接受前列腺开放手术的患者术中采取摘取结石外, 多数合并膀胱结石的 BPH 患者需通过经尿道碎石治疗^[4-5]。常用的碎石方式有钬

激光碎石以及气压弹道碎石等。在 BPH 合并膀胱结石的手术过程中, 术者需要不断地更换内鞘以完成光纤、电切环或者组织粉碎器等切换, 手术操作复杂、副损伤发生率高。国产蓝激光手术系统因其汽化效率高、止血效果好, 自 2022 年上市以来, 已被全国多个中心成功应用于 BPH 手术^[6-8]。尚未见其用于结石治疗的报道, 因其更适用于汽化组织而不是碎石。然而, 我们在使用蓝激光对 BPH 合并膀胱结石的患者进行手术时, 意外地发现蓝激光对于以尿酸为主要成分的结石具有较好的碎石效果, 现报道如下供同行参考。

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1 病例报告

患者1男性,72岁,以“进行性排尿困难5年、加重2d”就诊于镇巴县人民医院泌尿外科;患者2男性,73岁,以“进行性排尿困难6年、血尿1周”就诊于镇巴县人民医院泌尿外科。2例均经B超和磁共振成像(magnetic resonance imaging, MRI)确诊为膀胱结石和BPH,此外患者2还发现膀胱腔内存在大量血凝块,遂术前先清除膀胱内血块。2例患者拟采用硬膜外麻醉下经尿道蓝激光前列腺汽化术+经尿道膀胱结石钬激光碎石术。术中观察到结石外形与常见的草酸钙结石不同,表面呈暗黄色,无明显孔隙,无颗粒及棘刺状突起,尝试应用蓝激光(150 W)进行碎石,发现激光可以“烧蚀”结石表面,并有气泡冒出,逐层反复“烧蚀”后结石变小、崩裂并变脆,残余结石用光纤轻触后裂开。患者1、2碎石过程用时分别为11 min及8 min。术中因结石不断漂移造成膀胱黏膜多处损伤变白。术后将2例患者的结石送至西安交通大学第一附属医院泌尿外科进行成分分析,结果均为无水尿酸,未检出其他草酸钙类、碳酸钙类、磷酸镁铵和胱氨酸成分。2例患者术后3个月随访,排尿通畅,控尿良好,复查B超未见明显结石残留。

2 讨论

合并膀胱结石是BPH的重要手术指征之一,手术应解除膀胱出口梗阻并清除膀胱结石。BPH手术经过多年的发展,除经典的经尿道前列腺电切手术之外,激光技术的应用也越来越多^[1,9-10]。

蓝激光手术系统由我国自主研发,具有汽化效率高、止血效果好的优势。应用以来蓝激光手术的适应证不断扩展,手术效率、疗效不断提升,并被证实可有效保护BPH患者的勃起和射精功能^[11]。

检索文献发现目前尚未见蓝激光碎石的报道,本文可能系首例报道。一方面是因为高功率蓝激光手术系统上市不久,应用报道的数量有限;另一方面与蓝激光的物理特性有关。蓝激光波长为450 nm,易被血红蛋白及组织蛋白吸收,但不被钙盐等结石成分吸收,因而非常适用于汽化组织,而不适用于碎石治疗^[12]。此外对于蓝激光连续光而言,其能量极少被水吸收,不会在光纤末端形成微小气泡,理论上不具备碎石作用。

本文报道的2例蓝激光成功碎石的患者,其结石成分分析均为尿酸结石。术中在蓝激光粉碎尿酸结石时,有一个显著的“烧蚀”过程,像是将结石直接“汽化”。这可能是由于尿酸结石富含有机成分,一定程

度上类似于组织。

单纯尿酸结石的发病率不高,约占到所有结石的5%~10%^[13-14],而草酸钙、磷酸钙、磷酸镁铵等结石占有膀胱结石的90%以上,可能大多数患者并不适用蓝激光碎石。尿酸结石在外形上与常见的草酸钙结石不同,其表面无棘刺及细颗粒状突起,没有孔隙,质地硬,呈淡黄色或暗黄色。在手术过程中如果碰到这种外形的结石,在未取得结石标本进行结石成分分析之前,也可尝试用蓝激光进行碎石,但在手术过程中应注意保护膀胱黏膜。

综上所述,蓝激光除了应用于前列腺组织的汽化外,也可用于粉碎尿酸结石。对于合并膀胱结石的BPH患者,在注意保护膀胱黏膜的前提下,可以积极尝试蓝激光碎石。如果能有效碎石,应注意临床数据的保留,并对结石标本进行成分分析,为进一步探索蓝激光碎石的原理提供参考。

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