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摩西钬激光前列腺剜除术治疗 BPH 的疗效研究^{*}

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[摘要] **目的** 探讨摩西技术钬激光前列腺剜除术(M-HoLEP)治疗良性前列腺增生(BPH)的临床效果及安全性。**方法** 回顾性分析 2019 年 8—12 月在贵州省铜仁市人民医院收治的 BPH 患者 32 例,均采用 M-HoLEP,由同 1 名经验丰富医生完成。回顾分析其治疗效果及其并发症等临床资料。**结果** 所有患者均手术成功,没有输血病例。平均手术时间为(49.75±14.41)min,患者术后 3 个月国际前列腺症状评分(IPSS)、生活质量评分(QoL)、膀胱残余尿(PVR)及最大尿流率(Qmax)均较术前明显改善,前列腺特异性抗原(PSA)较术前下降,差异有统计系意义($P<0.05$)。术后无电切综合征发生,术后膀胱痉挛 2 例,暂时性尿失禁 1 例。**结论** M-HoLEP 治疗 BPH 安全高效。

[关键词] 摩西技术;钬激光;经尿道前列腺剜除术;良性前列腺增生;膀胱出口梗阻

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Study on the efficacy of Moses technology holmium laser enucleation of the prostate in the treatment of BPH^{*}

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[Abstract] **Objective** To investigate the efficacy and safety of Moses technology holmium laser enucleation of the prostate (M-HoLEP) in the treatment of patients with benign prostatic hyperplasia (BPH). **Methods** Thirty-two patients with BPH were treated in hospital from August to December 2019 were retrospectively enrolled, all of them were performed M-HoLEP by one experienced doctor. Perioperative medical documents were collected. **Results** All patients were performed successfully. There was no case received blood transfusions. The average operation time was (49.75±14.41)min. Three months after operation, the international prostate symptom score (IPSS), quality of life score (QoL), residual urine volume (PVR) and the maximum urinary flow rate (Qmax) improved significantly, prostate-specific antigen (PSA) was lower than that before surgery, the difference was statistically significant ($P<0.05$). There was no postoperative resection syndrome, while 2 cases occurred postoperative bladder spasm and 1 case occurred temporary urinary incontinence. **Conclusion** M-HoLEP is effective and safe in the treatment of BPH.

[Key words] Moses technology; holmium laser; transurethral enucleation of prostate; benign prostatic hyperplasia; bladder outlet obstruction

良性前列腺增生(benign prostatic hyperplasia, BPH)是导致中老年男性下尿路症状最常见的疾病,有临床进展性特点,临床症状随患者年龄增长而加重,影响患者的生活质量,很多患者最终需要进行手术治疗。目前,治疗 BPH 的主要手术方式是经尿道前列腺电切术(transurethral resection of prostate, TURP)。1998 年,GILLING 等首次报道钬激光前列腺剜除术(Holmium laser enucleation of the pros-

tate, HoLEP),取代了 TURP 成为手术治疗 BPH 的金标准^[1-2]。Lumenis 公司最近推出了新一代钬激光——摩西专利技术,是目前功率最高的钬激光技术平台,最高功率可达 120 W,在尿路结石碎石中表现出很大的优势^[3],而在前列腺剜除术的应用中报道少见。本研究以本院泌尿外科已经施行的摩西技术钬激光前列腺剜除术(Moses technology holmium laser enucleation of the prostate, M-HoLEP)治疗的 BPH

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患者为研究对象,回顾分析其治疗效果及相关并发症发生情况,现报道如下。

1 资料与方法

1.1 一般资料

选取 2019 年 8—12 月于铜仁市人民医院接受 M-HoLEP 术治疗,且术后随访至少 3 个月的 32 例 BPH 患者为研究对象。纳入标准:(1)手术由同 1 名有丰富 HoLEP 操作经验的主任医师完成;(2)术前前列腺特异性抗原(prostate specific antigen,PSA)<4 ng/mL,或 PSA>4 ng/mL,但经术前磁共振及前列腺穿刺活检证实为 BPH 者;(3)尿流动力学检查确诊膀胱出口梗阻。排除标准:(1)神经源膀胱功能障碍患者;(2)合并尿道狭窄、膀胱肿瘤等;(3)膀胱容量小于 50 mL 患者;(4)术后病理证实为前列腺癌患者。患者年龄 53~87 岁,平均(71.4±7.9 岁),剝除时钛激光参数设定为 2 J/40 Hz(80 W),止血时钛激光参数设定为 1 J/30 Hz(30 W)。

1.2 方法

1.2.1 手术方法

患者均采用硬膜外阻滞麻醉,取截石位,直视下进镜,确认尿道外括约肌、精阜、膀胱颈部、双侧输尿管开口等解剖位置。在精阜近端 5 点位置为起始,摩西技术钛激光切开尿道黏膜及中叶与左叶间隙,达前列腺外科包膜及膀胱颈部,再沿精阜近端 7 点位置切开尿道黏膜及中叶与右叶的间隙至外科包膜及膀胱颈部,于精阜上方横行切开黏膜,沿前列腺外科包膜利用摩西高功率钛激光爆破切割效果结合镜鞘推挑剥离中叶增生组织,推入膀胱,从 5 点逆时针分离左侧叶至 12 点,再从 7 点顺时针分离右侧叶于 12 点,切开前方 12 点联合部,继续向膀胱颈方向剥离增生腺体,粘连处及纤维条索利用钛激光切开,保留前列腺尖部 12 点处尿道黏膜,剝除增生的前列腺组织推入膀胱。最后以刨削器吸出剝除的前列腺组织。

1.2.2 观察指标

(1)术前 PSA 检测、血常规、生化检查、直肠指检、经直肠超声前列腺体积测定前列腺体积(mL)=横径(cm)×纵径(cm)×前后径(cm)×0.52、国际前列腺症状评分(IPSS)、生活质量指数评分(QoL)、残余尿(PVR)、最大尿流率(Qmax);(2)手术时间、剝除前列腺组织重量;(3)术后即时血常规、生化;(4)术后留置尿管时间、术后出院时间;(5)术后 3 个月 PSA、IPSS、QoL、PVR、Qmax 及术后并发症。

1.3 统计学处理

采用 SPSS25.0 软件进行数据分析,计量资料以 $\bar{x}\pm s$ 表示,比较采用 *t* 检验,以 *P*<0.05 为差异有统计学意义。

2 结 果

2.1 一般资料

6 例术前留置导尿管,合并糖尿病 4 例,合并高血压 9 例,合并膀胱结石 1 例。术前经直肠超声测前列

腺体积(60.12±36.47)mL。术前 PSA(4.52±2.92) ng/mL,考虑与 BPH、入院进行直肠指诊及部分患者留置尿管相关。

2.2 治疗前后各项指标比较

32 例患者均顺利完成手术,手术时间(49.75±14.41)min,剝除前列腺组织重量(61.03±21.40)g,所有手术术中均无输血情况。术后拔除尿管时间(3.13±0.65)d,术后出院时间(4.28±0.76)d。术后 3 个月门诊复诊提示尿路刺激症状均明显改善,IPSS、QoL、PVR、PSA 较术前降低,Qmax 较术前升高,差异有统计学意义(*P*<0.05),见表 1。

表 1 治疗前后各项指标比较($\bar{x}\pm s$)				
项目	术前	术后 3 个月	<i>t</i>	<i>P</i>
IPSS(分)	20.72±2.83	8.34±2.81	17.54	<0.01
QoL(分)	4.53±0.71	2.06±1.08	10.80	<0.01
PVR(mL)	208.44±176.10	16.47±14.38	6.15	<0.01
Qmax(mL/s)	6.29±2.23	16.83±2.53	-17.68	<0.01
PSA(ng/mL)	4.52±2.92	2.50±2.11	3.17	0.02

2.3 术后病理及并发症情况

术后病理均提示 BPH。术后膀胱痉挛 2 例(6.25%),予解痉止痛后症状缓解;暂时性尿失禁 1 例需要穿带纸尿裤(3.13%),予抗感染、提肛训练半个月后缓解;术后无电切综合征、睾丸附睾炎、再次尿潴留病例。

3 讨 论

BPH 是引起中老年男性下尿路症状的常见良性病变,组织学上表现为前列腺间质和腺体成分的增生,TURP 是 BPH 微创治疗的“金标准”^[4-5],但仍有缺点,如增生腺体切除不彻底、包膜穿孔、出血较多,术后容易复发,甚至发生电切综合征等严重并发症等^[6],且主要适用于前列腺体积低于 80 mL 的 BPH 患者。经尿道前列腺剝除术(transurethral enucleation of prostate,TUEP)融合了开放前列腺摘除术与 TURP 两者的技术优点,在外科包膜层面逆行钝性剥离增生腺体,更加符合 BPH 的解剖、病理组织结构,是一种安全有效的手术方法^[7-8],有研究认为其效果优于 TURP^[9],有切割及止血效应的能量输出平台均可以用于 TUEP 术^[10-11]。首次报道 HoLEP 术后,一些学者研究认为 HoLEP 术中出血更少,切除组织更多,复发性 BPH 的再手术率更低^[12],认为钛激光是 TUEP 的良好能量源。但由于激光装置的总输出功率有限,HoLEP 术的推广受到一定限制。

最近,Lumenis 公司引入了一种新的钛激光脉冲调制技术,即摩西技术,大大提升了钛激光的输出功率。摩西技术为双脉冲模式,第 1 个脉冲可以产生蒸汽通道,在激光光纤与目标物之间形成 1 个无水通道,第 2 个脉冲可以低衰减地通过第 1 个脉冲产生的无水蒸汽通道,直接到达目标组织,对组织进行切割

和爆破,极大减少能量损耗^[3,13],同时减少目标以外的周围组织热损伤^[14]。另外,脉冲形式与光纤尺寸、脉冲范围及光纤与目标之间的距离密切相关,如果光纤尖端与组织的距离大于 0.5 mm,则损伤的可能性很小^[3,14-15]。本研究提示 M-HoLEP 在切割爆破前列腺组织时有明显优势,表现在:(1)组织碳化少,镜下组织结构清晰,可迅速辨认找到外科包膜。(2)有良好的止血效果,前列腺动静脉断端绝大部分能达到一次止血成功,缩短手术时间,在体积大于 60 mL 血管丰富的大前列腺手术中优势明显。术中止血效果好,可缩短术后持续膀胱冲洗、尿管留置时间。(3)摩西技术钬激光的能量特性可使增生腺体与外科包膜爆开,便于剥离层面的维持,减小镜鞘剥离的力量,从而减轻术者手的疲劳感。(4)摩西技术钬激光能量集中,可实现定点切割和爆破,并因为第 1 个脉冲的保护作用,明显减少对周围组织损伤并因此引起的前列腺外科包膜穿孔。(5)摩西技术钬激光的低热量穿透、高效的爆破切割能力使得镜鞘对尿道外括约肌的牵拉频率减少,对尿道外括约肌热损伤几乎没有,也利于膀胱颈部肌肉纤维和前列腺尖部尿道黏膜的保留,患者术后尿控好。(6)无异味产生。本组手术中 3 例患者因为慢性炎症致前列腺外科包膜层面有粘连,钝性剥离增生腺体有一定的困难,使用摩西技术钬激光对粘连组织的切割和爆破,避免了层面的丢失,32 例患者术中无前列腺包膜穿孔和输尿管损伤等发生,无使用等离子电切病例。术后无膀胱颈挛缩病例;术后 2 例出现膀胱痉挛,予解痉止痛后缓解;术后 1 例暂时性尿失禁,经过提肛训练及抗感染后 2 周恢复,提示无外括约肌损伤。

摩西技术钬激光可以快速爆裂碎石,并实现对结石的雾化处理,在尿路结石碎石中表现优越^[15],本研究有 1 例患者合并膀胱结石,直接进行摩西技术钬激光下膀胱结石碎石取石术+M-HoLEP,无需更换操作平台,减少了操作器械反复进出尿道对其造成的损伤。

综上所述,M-HoLEP 治疗 BPH 安全有效。本课题组在剜除前列腺时将钬激光参数设定为 2 J/40 Hz (80W),止血时设定为 1 J/30 Hz (30W),在手术过程中可快速找到前列腺外科包膜,减少平面丢失,减少对尿道外括约肌的暴力牵拉,减少术后并发症等。考虑样本量有限,M-HoLEP 尚需更大样本量和长期随访进一步证实。

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