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·综　　述·

经尿道前列腺增生手术后尿失禁的研究进展

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［**摘要**］ 良性前列腺增生（benign prostatic hyperplasia, BPH）是老年男性的常见疾病，经尿道前列腺电切术和激光剜除术是目前治疗 BPH 的标准术式，然而，术后有一定比例的患者会并发短期或长期尿失禁，影响其生活质量。术前患有逼尿肌过度活动（detrusor overactivity, DO）或膀胱过度活动症（overactive bladder, OAB）、糖尿病、前列腺体积增大、膜性尿道长度（membranous urethral length, MUL）短、肥胖、括约肌损伤等因素可能增加术后尿失禁的发生风险。尿流动力学（urodynamics, UDS）检查是目前评估术后尿失禁原因的重要手段。药物治疗、盆底运动和电刺激有助于提高术后尿失禁的治愈率。手术治疗如膀胱内注射肉毒杆菌毒素 -A（BYX-A）、可调式吊带系统、可调节植入球囊、人工尿道括约肌等可以缓解术后尿失禁，但需要进一步研究验证其治疗效果。

［**关键词**］ 经尿道前列腺手术；尿失禁；逼尿肌过度活动；膜性尿道长度；尿流动力学
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Research progress of urinary incontinence after transurethral benign prostatic hyperplasia

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［**Abstract**］ Benign prostatic hyperplasia (BPH) is a common disease in elderly men. Transurethral resection of the prostate and laser enucleation of the prostate are the standard methods for the treatment of BPH. However, short-term or long-term urinary incontinence might occur after surgery, which would affect the patients' quality of life. Preoperative detrusor overactivity (DO) or overactivity bladder (OAB), diabetes, enlarged prostate volume, short membranous urethral length (MUL), obesity, sphincter injury and other factors may increase the risk of urinary incontinence after transurethral prostatectomy. Urodynamic examination is an important method to evaluate the causes of postoperative urinary incontinence. Drug therapy, pelvic floor exercise and electrical stimulation could help to improve the cure rate of postoperative urinary incontinence. Surgical treatment, such as intravesical injection of botulinum toxin-A (BYX-A), adjustable sling system, adjustable balloon implantation and artificial urethral sphincter can alleviate postoperative urinary incontinence, but further studies are needed to verify the therapeutic effect.

［**Key Words**］ transurethral prostate surgery; urinary incontinence; detrusor overactivity; membranous urethral length; urodynamics

良性前列腺增生（benign prostatic hyperplasia, BPH）是前列腺间质和腺体成分异常增生导致的结构改变，是老年男性最常见的疾病之一[1-3]。BPH 临床表现以下尿路症状（lower urinary tract symptoms, LUTS）为主，包括储尿期症状（刺激性症状）、排尿期症状（梗阻性症状）和排尿后症状。经尿道前列腺电切或剜除术是目前治疗 BPH 所致膀胱出口梗阻的标准术式，也是本综述讨论的主要术式。

经尿道前列腺术后部分患者可出现尿失禁，虽然发生率不高，一旦发生可影响患者的生活质量[4]。经尿道前列腺术后尿失禁主要有 3 种类型：压力

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性尿失禁（stress urinary incontinence, SUI）、急迫性尿失禁和混合性尿失禁。既往研究[5-8]报道的经尿道前列腺术后尿失禁的诱发因素包括高龄、糖尿病、前列腺体积增大、手术时间长以及术中失血量大。对于此类患者，临床上需要进行系统性的评估以明确尿失禁的原因（括约肌损伤、逼尿肌活动过度、混合性尿失禁、病灶不完全切除、膀胱颈挛缩或尿道狭窄等），并针对性地给予治疗[9-10]。

1 经尿道前列腺增生术后尿失禁的分类

1.1 *术后早期尿失禁* 一般是指术后3个月内发生的尿失禁。术后早期尿失禁的原因可能是电切或剜除时镜体撬动前列腺组织的同时损伤了尿道括约肌。经尿道前列腺剜除术后2周内的尿失禁发生率高于经尿道前列腺电切术；然而，2种手术方式术后3个月的尿失禁发生率差异无统计学意义[11-15]。研究[7,16]显示，经尿道前列腺术后3个月内发生尿失禁的概率为14.5%～40%。根据泌尿系统症状谱（Urinary Symptom Profile, USP）将尿失禁进行分类，其中SUI占31%～49%、急迫性尿失禁占30%～50%、混合性尿失禁占14%～19%、真性尿失禁约0.5%[7]。术后早期尿失禁患者一般选择对症治疗，使用抗胆碱能药物、敏感的抗生素、抗炎药物如双氯芬酸等[17-18]，96.8%的患者通过治疗一般在术后3个月内症状消失[19]。

1.2 *术后长期尿失禁* 指尿失禁的持续时间超过术后6个月，发生率可达4.5%[7]。术后长期尿失禁主要分为SUI（约50%）、急迫性尿失禁（约20%）、混合性尿失禁（约30%）和真性尿失禁（0～5%）[17-18]。

2 经尿道前列腺增生术后尿失禁的影响因素

2.1 *前列腺体积* 前列腺的体积大小是影响术后尿失禁的因素之一[16,20-22]。研究[6,16]显示，前列腺阻塞膀胱出口的患者括约肌发育较差，手术后原压迫位置形成一个大的前列腺窝，容易诱发尿失禁。

2.2 *手术因素* 研究[18]显示，经尿道前列腺术后早期尿失禁主要为急迫性尿失禁和SUI。可能的原因有：（1）手术相关刺激，如伤口愈合和围术期泌尿系感染导致的刺激；（2）长期前列腺增生引起的逼尿肌不稳定。医源性的真性尿失禁发生率不到0.5%，主要原因是术中损伤尿道括约肌[4,10,19]。此外，手术时长和出血量也是影响术后尿失禁的因素之一[23-24]。尤其在大体积前列腺的患者中，手术时间和术中出血量会相应延长和增加，术后并发症的发生风险增加。

2.3 *激光能量* 在激光手术中，过高的能量会影响尿道括约肌周围区愈合继而引起急迫性尿失禁[6,25-28]。研究[26-27,29]显示，低功率前列腺激光剜除术可以显著降低BPH患者的手术风险和并发症。因此，在前列腺尖部剥离时应减少能量传递，减少对尿道括约肌的热损伤。

2.4 *膜性尿道长度*（membranous urethral length, MUL） MUL指前列腺尖部尿道至阴茎球部尿道的长度。研究[23-24]显示，MUL是前列腺术后尿失禁的影响因素，可以预测经尿道前列腺钬激光剜除术（holmium laser enucleation of the prostate, HoLEP）术后尿失禁患者的早期恢复。另外，有较长MUL的患者对经尿道前列腺手术中发生的尿括约肌损伤有更好的耐受性[23]。

2.5 *年龄、体质量指数*（body mass index, BMI）、*糖尿病* 年龄、BMI、糖尿病史是前列腺剜除术后尿失禁发生的预测因素。年龄≥70岁的患者接受前列腺剜除术后发生尿失禁的概率是年龄＜70岁患者的2倍，可能和高龄患者膀胱过度活跃有关[1,5,30]。肥胖（BMI＞26.2）增加了腹部压力和储尿期症状，可能是氧化应激和继发于感染的纤维化所致[7,30-32]。膀胱功能障碍在糖尿病患者中较为普遍，39%～61%的糖尿病患者发生膀胱过度活跃，48%的糖尿病患者发生逼尿肌不稳定[5,26]，这可能是糖尿病患者术后尿失禁发生风险增加的原因。

2.6 *逼尿肌过度活动*（detrusor overactivity, DO）*或膀胱过度活动症*（overactive bladder, OAB） 前列腺术前存在DO或OAB的患者，SUI或前列腺梗阻的手术效果会受到影响，尿失禁手术的失败率增加，混合性尿失禁患者的治愈率低于40%～50%，且术后逼尿肌不稳定或OAB症状可能持续存在[32-33]。一项探讨前列腺增生术后尿失禁发生原因的研

究[33]显示，根据术后尿流动力学（urodynamics, UDS）检查的结果，仅40%的患者有真正的SUI，约60%的患者尿失禁的主要原因是膀胱功能障碍。诸多研究[32-34]探讨了OAB与DO之间的相关性，但UDS诊断结果不如人意。在OAB患者中，UDS检测DO的灵敏度为35%～96%，特异度为21%～97%。

3 尿失禁检查方法

前列腺手术后持续的尿失禁需要仔细评估，相关检查包括尿常规、泌尿系超声、尿路造影、膀胱尿道镜检查和UDS检查。

3.1 UDS检查 对有尿失禁的BPH患者术前行UDS评估是有效的，UDS可以区别膀胱出口梗阻和膀胱逼尿肌功能障碍[35]。如果检出有明显梗阻，提示对手术反应良好。另外，UDS可以进一步明确OAB和DO的相关性。与标准膀胱测量法相比，UDS具有更高的灵敏度，能够检测出更多的DO病例。研究[36]显示，在无症状的健康对象中，60%（6/10）的女性受试者和89%（25/28）的男性受试者表现出至少1项UDS检查异常。

影响UDS检查的因素较多，比如排尿时的体位、液体灌入和流出的速度、灌入的溶液温度或酸碱程度等。体位的改变可以改变本体脊髓神经元的兴奋性，改变骶部脊髓灰质中间外侧细胞柱中逼尿肌运动神经元细胞的兴奋性。研究[11,36]显示，站立位比平卧位更有利于检出DO，平卧位可能会遗漏8%～80%的DO病例。

3.2 其他检查 （1）膀胱镜检查可以了解有无尿道狭窄、膀胱颈挛缩，观察尿道括约肌有无瘢痕化，括约肌能否收缩，收缩时尿道能否闭合。（2）排尿日历有助于监测尿失禁治疗的效果，但必须连续记录尿失禁频率至少3 d。（3）体格检查一般包括腹部和直肠检查、简要的神经系统检查和外生殖器检查。

4 经尿道前列腺术后尿失禁的治疗

4.1 药物治疗 对于经尿道前列腺术后的SUI和急迫性尿失禁，药物治疗是重要的治疗手段[11,32-34,36-37]。抗胆碱能药物、β_3肾上腺素受体激动剂、度洛西汀可以有效减少并改善前列腺切除术后尿失禁的发生，有研究报道抗胆碱能药物有效率可达61%。

4.2 电刺激、运动和行为疗法 前列腺术后肛提肌训练可以改善盆底功能，降低前列腺切除术后尿失禁（尤其SUI）的发生率，改善尿失禁的严重程度，缩短恢复时间[4,38]。电刺激也被认为是治疗前列腺术后尿失禁的一种方法[39-40]。行为、生活方式的改变，例如低脂饮食、减少咖啡因和烟草的摄入、有规律的体育活动等，都可以改善术后尿失禁的症状[38-43]。

4.3 手术治疗

4.3.1 肉毒杆菌毒素-A（BTX-A） 内镜手术下膀胱内注射BTX-A是一种有效且耐受性良好的治疗方法，可用于治疗经尿道前列腺术后出现尿失禁且同时患有OAB的患者。研究[44-45]显示，BTX-A可用于治疗经尿道前列腺电切术（transurethral resection of the prostate, TURP）术后仍有储尿期症状的患者，术后12周和36周急迫性尿失禁的发生率显著减少。

4.3.2 可调式吊带系统 ATOMS系统又称男性吊带，吊带经闭孔内肌穿过后固定于后尿道的下方，通过提拉尿道，不剥离球海绵肌而达到治疗尿失禁的效果。研究显示，从短期疗效和患者满意度看，ATOMS可以作为前列腺切除术后尿失禁的治疗方案[41,46-50]。ATOMS的风险和成本比人工括约肌低，可作为前列腺术后轻至中度SUI的一种治疗选择[42,50]。

4.3.3 可调节植入球囊 ProACT系统是一种使用2个体积可调节的气囊放置在膀胱颈附近的尿道周围，在排尿时增加尿道阻力的植入性治疗SUI的装置。一项多中心研究[51]为29例TURP术后尿失禁的患者植入了可调节球囊，结果显示，ProACT是安全有效的，入组患者每天使用护垫的次数显著减少。另一研究[52]显示，在治疗男性SUI方面，ATOMS比ProACT更有效，患者满意度更高、持久性更好。

4.3.4 人工尿道括约肌（artificial urinary sphincter, AUS） 对于手术过程中损伤尿道外括约肌的患者，外尿道括约肌功能不全，如果通过盆底运动等

保守治疗无法显著改善，可植入AUS[53]。虽然关于AUS治疗术后尿失禁的报道大多集中于前列腺癌根治术患者，但有部分研究[13,53]显示，AUS植入术是治疗经尿道前列腺术后中重度尿失禁的有效方法。医生应确保患者有足够的认知能力来操作该装置，另外术前对患者下尿路功能全面评估及术后密切随访有助于提高手术成功率[12,46,53]。

4.3.5 注射填充物 研究[13-14]显示，尿道周围或尿道内注射填充物可以治疗前列腺术后的尿失禁，主要原理是通过增加尿道连接来产生对尿液流动的阻力。可使用的填充物包括牛胶原蛋白、硅酮、碳、透明质酸、自体脂肪、塑料、聚二甲基硅氧烷和非硅酮聚乙烯吡咯烷酮。前列腺治疗后仍有尿频尿急或出现尿失禁的患者，若长期生活质量无法获得改善，且有迫切需求，可以考虑尿流改道，但并非常规选择[17,38,41]。

4.3.6 骶神经刺激（sacral nerve stimulation, SNS） 目前国内外关于骶神经调控经尿道前列腺术后尿失禁的研究较少。对于顽固性的急迫性尿失禁或DO、OAB引起的尿失禁患者，可以尝试SNS治疗。与膀胱内注射BTX-A和外周胫神经刺激（peripheral tibial nerve stimulation, PTNS）相比，SNS可以最大程度地减少尿失禁发作和排尿频率，但是该治疗手段成本较高[15,54-55]。

5 总结与展望

通过手术根治前列腺增生，改善排尿功能，减少术后并发症的发生是患者和泌尿外科医师的共同期望。尿道括约肌的解剖学和生理学研究显示，位于黏膜下和外括约肌附近的平滑肌组织参与了尿液控制。为了尽可能减少对外括约肌的刺激或损伤，国内外完成了许多改良手术方式的研究，如12点切断尿道黏膜、精确的低能止血、低能量处理尖部等[26,48,56-57]。此外，有研究通过经尿道汽化或水囊扩张等简化手术的方式处理前列腺来降低经尿道前列腺术后尿失禁及其他并发症的发生率[29,57-59]。然而，目前没有手术方案可以完全避免术后尿失禁的发生。无论使用单极、双极或激光的经尿道前列腺切除技术，均有尿失禁的发生[16,60]。药物、盆底锻炼及手术的综合治疗可以提高术后尿失禁的治愈率，但是这些治疗手段的证据等级大多较低，未来有待进一步研究提供更充分的临床证据[1,3,42]。相信随着技术的改良和手术器械的迭代，治疗前列腺增生的手术方式会不断优化，术后尿失禁的发生率能随之降低，从而改善患者的生活质量。

利益冲突：所有作者声明不存在利益冲突。

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