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“超声膀胱软镜”可辅助用于膀胱占位性病变的术前诊断

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[摘要] **目的** 采用超声支气管镜作为“超声膀胱软镜”(超声内镜)用于膀胱占位性病变术前诊断,探讨其可行性及临床价值。**方法** 采用超声支气管镜(Olympus BF-UC260F-OL8)对22例B超提示膀胱占位的患者行膀胱超声内镜检查,超声内镜初步诊断后改用传统膀胱镜行膀胱镜检查,对可行活检的19例患者行病变活检术。根据镜检结果进行针对性手术治疗。比较超声内镜、传统膀胱镜检查术中的疼痛视觉评分(visual analogue scale, VAS);分析超声内镜检查结果与传统膀胱镜检查及手术后病理的符合率。**结果** 顺利完成22例超声内镜检查,操作时间4~10 min,平均(6.4±1.2) min,长于传统膀胱镜检查时间(5.1±1.8) min,差异具有统计学意义($P<0.01$);但超声内镜检查VAS为(1.4±0.5)分,低于传统膀胱镜检查的(4.3±1.3)分,差异具有统计学意义($P<0.01$)。超声内镜下膀胱壁黏膜层、肌层、浆膜层层次清晰,诊断非肌层浸润性膀胱癌15例;肌层浸润性膀胱癌3例;左输尿管末端实性占位1例,结合宫颈腺癌病史考虑为局部复发;1例为脐尿管囊肿伴钙化;1例为膀胱肌层平滑肌瘤;1例为腺性膀胱炎。超声内镜诊断与术后病理诊断基本吻合。**结论** “超声膀胱软镜”操作可行,能显示膀胱各层结构及输尿管末端和膀胱外病变,具有痛苦小、无盲区的优点,但在镜头活动度、工作通道设计等方面仍有不足,进一步改进后可用于膀胱占位性病变的术前诊断。

[关键词] 膀胱疾病;膀胱镜检查;超声内镜;诊断

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“Flexible ultrasonic cystoscopy” can help to diagnose space-occupying lesions of the bladder before operation: an initial experience

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[Abstract] **Objective** To evaluate the feasibility of using “flexible ultrasonic cystoscopy” (ultrasound-guided bronchoscopy as substitute) in diagnosing space-occupying lesions of the bladder. **Methods** Totally 22 patients diagnosed as having “space-occupying lesions of the bladder” by routine transabdominal ultrasound were examined by a novel cystoscopy, namely, the “flexible ultrasonic cystoscopy” (ultrasound-guided bronchoscopy). Then all the patients received routine rigid cystoscopic examination, and 19 patients also underwent biopsy. Pertinent surgical procedures were performed according to the cystoscopic results. The visual analogue scales(VASs) were compared between ultrasonic cystoscopy and routine cystoscopy. The findings of the ultrasonic cystoscopy were compared with those of routine rigid cystoscopy and postoperative pathological findings. **Results** The operation time taken by “flexible ultrasonic cystoscopy” examination was 4-10 min in the 22 patients, with a mean of (6.4±1.2) min, significantly longer than that by routine rigid cystoscopy([5.1±1.8] min, $P<0.01$). The VAS of “flexible ultrasonic cystoscopy” was significantly lower than that of routine rigid cystoscopy(1.4±0.5 vs 4.3±1.3,

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$P < 0.01$). Flexible ultrasonic cystoscopy clearly displayed the 3 layers of the bladder wall: mucosa/submucosa, muscle, and adventitia. Fifteen cases were diagnosed as having non-muscle-invasive bladder cancer, 3 having muscle-invasive bladder cancer, and 1 having cervical adenocarcinoma metastasis to the end of left ureter and prolapsing into the bladder; the rest 3 patients had benign lesions of bladder, including 1 with urachal cyst combined with calcification, 1 with leiomyoma of bladder muscle layer, and 1 with cystitis glandularis. The outcomes of preoperative “flexible ultrasonic cystoscopy” were largely consistent with the postoperative pathological findings. **Conclusion** “Flexible ultrasonic cystoscopy” is feasible in clinical practice; it can display the 3 layers of bladder wall and indentify the lesions at the end of urethral tract and outside of the bladder. It has the advantage of minimal pain, without blind area. The range of motion of camera lens and working passage design still need to be improved.

[Key words] urinary bladder diseases; cystoscopy; ultrasonography; diagnosis

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超声内镜技术已普遍应用于消化系统及呼吸系统疾病的临床诊治,对人体腔道内病变具有较高的诊断和治疗价值^[1-3]。膀胱作为人体空腔脏器之一,与胃肠道有相似的结构,且膀胱腔内液体可作为良好的超声传导介质,因此理论上超声内镜在膀胱疾病诊治中的应用具有独特优势。因此,我们提出“超声膀胱软镜”的概念,即将电子膀胱软镜与腔内超声技术相结合,可以同时直观显示内镜图像和超声图像,通过改变超声探头与病变部位的相对位置、距离,以及调整超声探头的频率以获得清晰的图像和更准确的定位定性。我们自2010年6月至2010年9月采用超声支气管镜作为“超声膀胱软镜”(简称超声内镜)对22例B超提示膀胱占位的患者进行检查,观察其诊断符合率,初步评估其可行性及临床价值。

1 材料和方法

1.1 一般资料 2010年6月至2010年9月我院泌尿外科门诊及住院患者22例,年龄17~82岁,中位年龄61岁。男16例,女6例。因血尿就诊15例,血尿合并尿路刺激症状2例,一侧腰部酸胀2例,常规体检发现3例。所有患者行“超声膀胱软镜”(超声内镜)检查前均行常规腹部B超检查提示膀胱占位,体格检查无明显异常。患者均行静脉肾盂造影(IVP)及盆腔增强CT检查,1例因IVP显示不清行磁共振水成像(MRU)。所有患者均知情同意并签署知情同意书。本研究经医院医学伦理委员会审核通过。

1.2 主要器械及消毒条件 Olympus超声支气管镜(BF-UC260F-OL8),外周径为19Fr,操作腔道6Fr,工作长度700mm,前段弯曲角度(up/down)130°/90°,探头超声中心频率7.5MHz。Olympus膀胱硬镜:30°镜(A22002A),外鞘为19.8Fr(A20912A),工作插件(A20972A)。消毒条件:采用

汇日医用灭菌器(WAYWIN-2000),以即时制备的碱性过氧乙酸(过氧乙酸0.75g/L,过氧化氢0.40g/L),在45~53℃的灭菌温度下,对放置于灭菌盘内的超声支气管镜进行30min的循环浸泡灭菌。

1.3 检查方法及观察指标 在尿道黏膜行利多卡因局部麻醉满意后,取截石位,顺利置入灭菌超声支气管镜,注射器连接进水口持续注水保证视野清晰,膀胱内充水约150ml进行超声膀胱镜检查,方法及顺序与膀胱软镜常规检查相同。发现占位后,先采用B超模式,调整超声探头与占位的距离(0.5~2.0cm)以清晰显示膀胱黏膜及黏膜下层、肌层、浆膜层等各层结构,同时观察占位来源、大小、回声、是否侵犯肌层,然后切换至彩色多普勒模式观察占位的血流情况,对拟诊膀胱肿瘤者进行浸润深度的判断。所有患者超声内镜初步诊断后改用传统膀胱镜行膀胱镜检查,对于可以行活检的19例患者行病变活检术,并于镜检过程行疼痛视觉评分(VAS)。比较不同检查的操作时间;分析超声内镜检查结果与传统膀胱镜检查及术后病理的符合率。

1.4 膀胱肿瘤超声内镜分类标准 结合膀胱肿瘤的TNM分期^[4],超声内镜对膀胱肿瘤浸润深度判断标准:非肌层浸润性膀胱癌为肿瘤基底处膀胱黏膜强回声区光滑连续,与膀胱肌层低回声区清晰可辨;肌层浸润性膀胱癌为肿瘤基底处膀胱黏膜毛糙,强回声区连续性中断,与膀胱肌层低回声区界限不清。

1.5 统计学处理 采用SPSS 11.0统计软件,“超声膀胱软镜”和硬镜操作时间的比较采用独立样本t检验,两组疼痛评分的比较采用秩和检验。检验水平(α)为0.05。

2 结果

2.1 操作时间及VAS评分 顺利完成22例超声内镜检查,操作时间4~10min,平均(6.4±1.2)min,长于传统膀胱镜检时间(5.1±1.8)min,

差异具有统计学意义 ($P < 0.01$); 但超声内镜检查 VAS 为 (1.4 ± 0.5) 分, 低于传统膀胱镜检的 (4.3 ± 1.3) 分, 差异具有统计学意义 ($P < 0.01$)。

2.2 超声内镜的诊断符合率 超声内镜下膀胱壁黏膜层、肌层、浆膜层层次清晰(图 1), 诊断非肌层浸润性膀胱癌 15 例(图 2), 肌层浸润性膀胱癌 3 例(图 3), 左输尿管末段实性占位 1 例, 结合宫颈腺癌手术史考虑为局部复发(图 4); 1 例为膀胱肌层平滑肌瘤(图 5); 1 例为脐尿管囊肿伴钙化; 1 例为腺性膀胱炎。

输尿管末端实性占位患者传统膀胱镜下无法窥及病变, 脐尿管囊肿及膀胱肌层囊肿患者膀胱腔内黏膜光滑未取活检, 其余 19 例患者常规膀胱镜下活检成功。根据镜检结果进行经尿道膀胱肿瘤切除术 (TURBT) 17 例, TURBT 患者切除肿瘤后常规取肿瘤基底、肿瘤四周切缘送病理; 根治性全膀胱切除

术 1 例; 腺性膀胱炎电切术 1 例; 左输尿管下段切除 + 再植术 1 例; 脐尿管囊肿切除 1 例; 膀胱平滑肌瘤开放手术切除 1 例。超声内镜诊断与术后病理基本吻合。膀胱肿瘤患者随访 5~8 个月, 未见膀胱肿瘤复发。

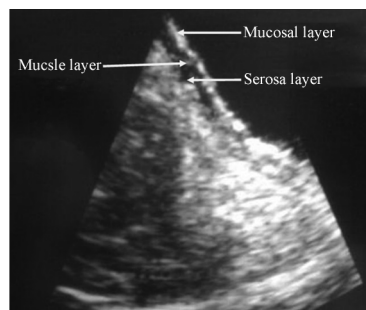


图 1 超声内镜下膀胱壁各层表现
Fig 1 Different layers of bladder wall in the ultrasonic image

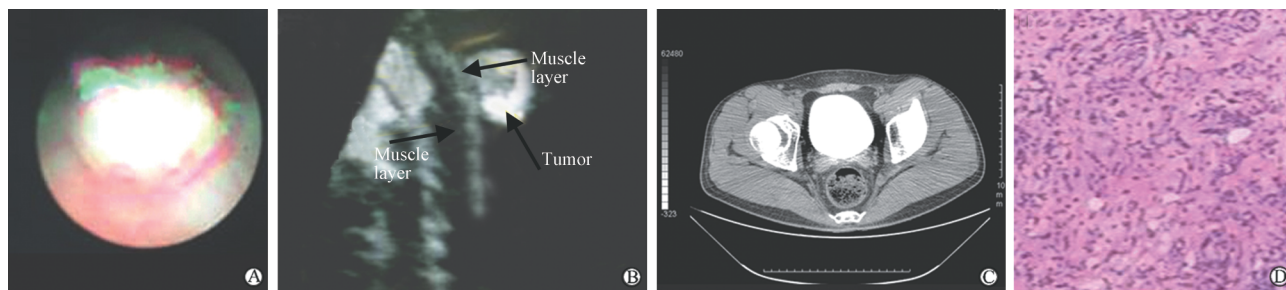


图 2 非肌层浸润性膀胱癌超声内镜、增强 CT 及术后病理表现

Fig 2 Routine imaging, endoscopic ultrasonic imaging, and pathological results for non-muscle-invasive bladder tumor

A: Endoscopic image showing a mass located in the left bladder wall; B: Ultrasonic image showing the tumor located in the mucosal layer, with the base of the tumor not invading the muscle layer; C: Enhanced CT scan indicating no abnormalities; D: Pathological results confirmed the ultrasonic diagnosis of non-muscle-invasive bladder tumor. Original magnification; $\times 40$ (D)

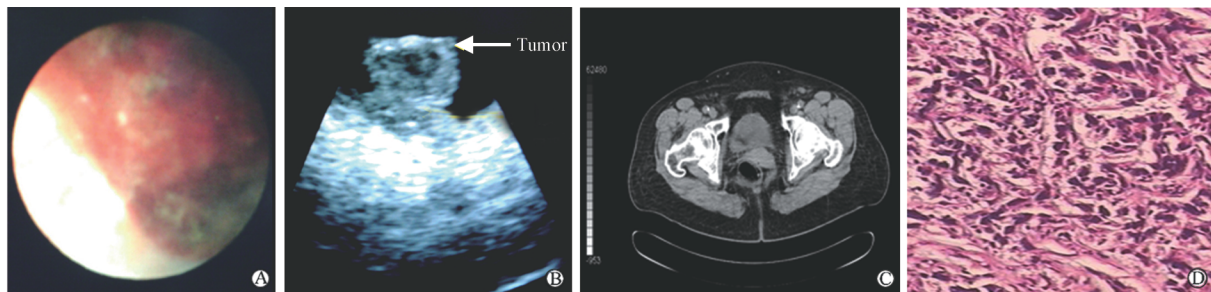


图 3 肌层浸润性膀胱癌超声、增强 CT 及术后病理表现

Fig 3 Routine imaging, endoscopic ultrasonic imaging, and pathological results for muscle-invasive bladder tumor

A: Endoscopic image showing a mass located in the right bladder wall, accompanied by hemorrhage and necrosis; B: Ultrasonic image showing the tumor invading the muscle layer; C: CT scan indicating a mass located in the right bladder wall, with muscle invasion; D: Pathological results confirmed the ultrasonic diagnosis of muscle-invasive bladder tumor. Original magnification; $\times 100$ (D)



图 4 左输尿管末端实性占位的超声内镜、MRI 及术后病理表现

Fig 4 Routine imaging, endoscopic ultrasonic imaging and pathological results for a mass occupying the end of left ureter

A: Endoscopic image showing a mass located in the end of left ureter, bulking into the bladder(arrow); B: Ultrasonic image showing a mass located in the end of left ureter, accompanied by calcification, necrosis, and tumor invasion into muscle and serosa layer(arrow); C: MRI scan indicating a mass located in the end of left ureter, accompanied by dilation of the left ureter(arrow); D: Pathological results confirmed the tumor breaking into the serosa layer and a diagnosis of “recurrent cervical adenocarcinoma”. Original magnification: $\times 40$ (D)

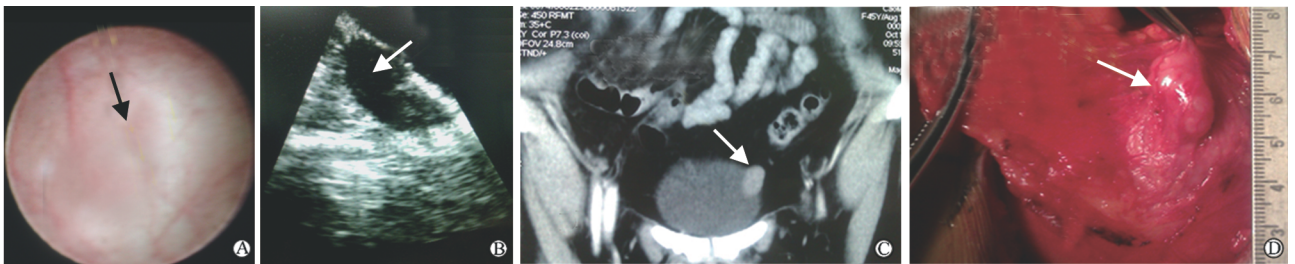


图 5 膀胱肌层平滑肌瘤超声内镜、增强 CT 及术中表现

Fig 5 Routine imaging, endoscopic ultrasonic imaging, and intraoperative findings for leiomyoma of bladder

A: Endoscopic image showing a mass with smooth surface bulking into the bladder(arrow); B: Ultrasonic image showing an encapsulated mass located between the mucosal layer and serosa layer, with homogenous echo(arrow); C: CT scan indicating a mass located in the left bladder wall, suspected of malignant mesenchymal tumor(arrow); D: Intraoperative findings confirmed the tumor locating in muscle layer, with no adhesion to the surrounding(arrow), the pathological diagnosis was “leiomyoma of bladder”

3 讨论

自 1980 年第一台电子线阵超声胃镜研制成功以来^[1], 超声内镜在临床的应用日渐广泛, 其价值已获肯定。超声胃镜、超声支气管镜已成为无法替代的重要诊疗工具^[2-3]。膀胱也属于空腔脏器, 传统超声检查在膀胱疾病诊治中的应用具有一定的局限性; 经腹部超声简便易行, 但准确性受腹壁厚度、膀胱充盈程度的影响; 经尿道膀胱腔内超声检查不受腹壁厚度影响, 高频腔内超声探头的应用可以更加清楚显示膀胱各层结构, 但因存在无法同步显示腔内内镜图像和超声图像, 对宽基、直径 > 2 cm 的膀胱占位的定性诊断准确性较差等不足, 目前仍未广泛推广^[5-8]。与之相比, 超声内镜可能具有潜在的优势: 可以同时直观显示内镜图像和超声图像, 通过改变超声探头与病变部位的相对位置、距离, 以及调整超声探头的频率, 获得清晰的图像, 更准确地定位定性。因此, 我们提出了“超声膀胱软镜”的概念。

应用“超声膀胱软镜”对膀胱病变进行诊断, 首先必须对膀胱壁声像图进行准确的分层显示。膀胱壁可分为黏膜、黏膜下层、肌层、浆膜层 4 层结构^[9], 膀胱肿瘤根据肌层是否受侵犯而分为肌层浸润性膀胱癌和非肌层浸润性膀胱癌, 两者的治疗原则迥异^[10-11]。据此我们将膀胱壁的超声内镜图像显示分为 3 层: (1) 黏膜及黏膜下层, 表现为强回声区; (2) 膀胱肌层, 表现为低回声, 与黏膜及黏膜下层容易鉴别; (3) 浆膜层, 较菲薄, 与膀胱外脂肪组织一起呈高回声表现, 与肌层形成明显界限。即膀胱腔由内向外依次表现为强回声—低回声—高回声, 有助区分各层组织。彩色多普勒超声可以显示组织血流情况, 有助于显示病变血供及毗邻血管, 通过对不同结构仔细辨认, 有利于鉴别病变来源、性质、浸润深度等。结合膀胱肿瘤的 TNM 分期, 本研究初步提出了膀胱肿瘤超声内镜分期标准以供参考。

我们初步临床经验发现, “超声膀胱软镜”在以下情况容易出现肿瘤分期的偏差, 应加以注意: (1)

肿瘤表面钙化明显,肿瘤下方易形成声影,对浸润程度的判断有一定影响,此时可通过调整超声频率尽量减少钙化影对浸润深度的干扰;(2)TURBT术后短期原位复发的肿瘤,由于电切手术已破坏了正常黏膜和肌层结构,局部瘢痕使浸润深度较难判断。

“超声膀胱软镜”结合了膀胱软镜和腔内超声的优点,对患者创伤较小,疼痛感较膀胱硬镜明显减轻,有助于增加患者检查及定期随访的依从度。此外,在膀胱内出血常规膀胱镜和膀胱软镜无法获得满意视野时,“超声膀胱软镜”仍可清晰地对病变进行定位和初步定性。与传统膀胱镜或膀胱软镜相比,“超声膀胱软镜”对膀胱肌层病变的定位和定性具有显著优势。本研究膀胱肌层平滑肌瘤和脐尿管囊肿伴钙化患者在“超声膀胱软镜”下可清楚显示病变位置、大小、包膜、血供以及质地是否均匀,而传统膀胱镜下无法窥及病变。因此,我们认为:当“超声膀胱软镜”检查技术成熟完善时,对于包膜完整,回声均匀,无明显血供的膀胱肌层病变采用“超声膀胱软镜”密切随访的方案是可行的。

目前,尚无真正意义上的“超声膀胱软镜”问世,本研究以超声支气管镜作为替代进行检查,应用中存在以下不足:(1)进水通道直径较小,因此需要通过50 ml空针连接进水口加压注水以维持视野清晰;(2)操作通道不足;(3)超声支气管镜配套的穿刺活检装置价格昂贵,无法用以常规行膀胱病变的活检,必须换用膀胱镜并以活检钳取组织送检。

本研究所采用的超声支气管镜是成熟应用于临床的内镜器械,其材质与目前广泛应用于泌尿外科的膀胱软镜相同,对人体无毒无害,不增加患者的创伤,符合医疗伦理。我们已在镜头活动度、工作通道设计等方面进行改进,使其更适用于临床应用。

综上所述,“超声膀胱软镜”综合了膀胱软镜和腔内超声的优点,具有独特的优势和较大的临床应用潜力,随着器械的改进有望成为膀胱占位性病变一种的新的诊疗工具。

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