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经直肠超声在直肠癌术前分期中的应用及进展*

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摘要: 直肠癌治疗手段主要为根治性切除术为主并辅以放化疗治疗;肿瘤浸润的范围、淋巴结及远处转移的有无构成了临床 TNM 分期并影响着直肠癌的治疗和判断预后。经直肠超声检查术(Transrectal ultrasound, TRUS)可以显示直肠壁各层组织的变化,不仅对肿瘤浸润深度诊断准确性较高,而且提高了术前对肠周淋巴结转移诊断的准确性,对直肠癌术前的 TNM 分期具有重要的意义,从而指导医师选择最佳的手术方式及是否需要术前放化疗以达到根治直肠癌、提高患者生活质量与延长寿命的目的。

关键词: 直肠癌;经直肠超声;TNM 分期

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The Application and Advance of Transrectal Ultrasound in Preoperative Staging of Rectal Cancer*

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ABSTRACT: The main method for the treatment of rectal cancer is radical resection and auxiliary radiation and chemotherapy. The range of tumor, lymph node and distant metastasis make up the clinical TNM staging of rectal cancer and affecting the treatment and prognosis. Transrectal ultrasound (TRUS) technique can display the intestinal wall straightly and demonstrate the layers of organizational change, not only on the depth of tumor invasion diagnosis accuracy is higher, and improve the preoperative diagnostic accuracy for perirectal lymph nodes metastasis. The preoperative TNM staging of rectal cancer has important significance. So as to direct doctors to choose the best mode of operation and whether need preoperative radiation or chemotherapy to achieve the purpose of radical rectal cancer and improve patients' quality of life and prolong life.

Key words: Rectal cancer; Transrectal ultrasound; Staging

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前言

经直肠超声检查术(Transrectal ultrasound, TRUS)最早应用于前列腺疾病的检查,现已广泛应用于肛门、直肠感染(肛瘘、肛周脓肿等)位置及范围的评估、括约肌的检查、直肠肿瘤的分期等方面,已经成为肛门直肠疾病的重要辅助检查手段,对于直肠癌的诊断尤其是术前分期具有重要的诊断意义。随着 TRUS 仪器的改进和技术的发展与成熟,近年来三维腔内超声(Three-dimensional Transrectal Ultrasound, 3D-TRUS)也被用于直肠癌术前的 TNM 分期,使得 TRUS 在直肠癌的诊断和治疗中有着举足轻重的地位。

1 TRUS 对直肠癌 TNM 不同分期的应用评价

1.1 T 分期

TRUS 对直肠癌的 T 分期是以 Hildebrandt 和 Feifel 提出的 5 层直肠壁模型为基础^[1],可以清楚地显示在直肠壁横截面上显

示出肿瘤侵犯的最深位置与正常肠壁结构进行比较并予以分期,详细的文献回顾显示 TRUS 在直肠癌 T 分期中的准确率为 65%-94%,但大多数的报道其 T 分期的准确率为 80%-95%^[2,3],虽然超声波对深部肿瘤的穿透力有限而使层次鉴别率降低^[4],但是相关的一些国内外资料结果并没有显示出一致的 T1 到 T4 逐期递减的规律性,但整体准确率的趋势是下降的^[5,6];部分学者认为 TRUS 在高位直肠癌和低位直肠癌的准确率也可能出现类似的下降趋势,国外的 Albert Stepansky 等^[7]在此问题上做了详细的研究并最终得出结论为 TRUS 在高位直肠癌 T 分期的准确率高于低位,但没有统计学意义;国内 ShiYong Lin 等人^[8]也在直肠癌位置对 TRUS 准确率的问题上进行了比较,证实其没有差别,同样也证实了年龄及性别对 TRUS 的影响也无明显不同。TRUS 在 T 分期中存在着不足有:(1)过渡分期:原因主要是 TRUS 无法对癌性组织和纤维结缔组织、炎性组织、淋巴滤泡进行区分,此外肠壁和肿瘤组织的坏死和出血也可以导致 TRUS 过渡分期^[8,9],潜在的癌前病变腺瘤性息肉也可能被

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误认为是多数癌的前体^[10,11];(2)分期不足:肿瘤的类型--缩窄型直肠癌导致分期不足的原因是肿瘤体积过大导致了超声波严重衰减和遮蔽,妨碍了肿瘤充分的可视化;溃疡型肿瘤的准确率明显低于非溃疡型病灶,绒毛状隆起病灶仅仅应用 TRUS 分期也比较困难,微小癌灶的浸润也可以使超声无法准确的探测到;超声媒介--直肠壁附着的粪便可产生超声尾影从而使分期不足,因此检查前的清肠是必要的;Tseng 等人^[12]使用附带水囊作为媒介的超声探头可以提高 T 分期的准确率;超声探头的频率--由于超声波衰减原因使高频探头探测的距离有限,对较大的实质脏器的深部病变的诊断有一定限制,易造成漏诊;行 TRUS 操作者的经验也是影响 TRUS 准确率的最主要因素之一,Orrom 等人^[13]报道不同的操作者行 TRUS 的准确率为 58%,当这些操作由同一个有经验的操作者完成后可提高到 95%。

1.2 N 分期

在术前分期中转移性淋巴结的识别无疑是最大的挑战^[14-16],因超声波衰减的特点,致使 TRUS 对 N 分期的准确率普遍低于 T 分期,相关文献显示 TRUS 对 N 分期的准确率大约为 58%-86%^[3,17]。恶性淋巴结通常位于临近的原发肿瘤位置,超声图像多呈圆形或椭圆形、光滑、边界清楚的低回声,反射波特点与原发肿瘤相似,通常转移性淋巴结直径 >5 mm,但是直肠癌淋巴侵犯中淋巴结的大小并不是一个作为淋巴结转移的可靠依据,因为在正常大小的淋巴结中微小转移很常见^[18,19],因此任何毗邻肿瘤的淋巴结被 TRUS 检出都应被认为是可疑的转移淋巴结^[20]。另外探头探查角度、超声束经过介质或组织时可能影响 TRUS 检出淋巴结;骶骨及肠腔肿瘤使探头活动受限,不易对肠周全面扫查;此外场内残留气体及粪渣的干扰影响超声图像质量;直肠上端的肿瘤,其淋巴结声像图不典型也可导致 N 分期准确率过低。

1.3 M 分期

TRUS 探头距盆腔脏器较近,可显示肿瘤与骨盆、腹膜关系的影像,此信息可帮助临床医师决定是否可局部切除或必须进行术前的放化疗;高频探头成像效果好,与经腹超声检查相比,提高了诊断的准确率,但是由于 TRUS 的穿透力有限,使其对于肝脏、腹膜后等远处部位的转移诊断准确率较差,需联合腹部超声、CT、MRI 等检查评估有无远处脏器转移。

2 TRUS 在直肠癌术后复发检测中的应用

单独手术后进展期直肠癌复发率接近 25%,放化疗后复发率可下降至 10%^[21],术后最初 2 年是最易复发的,因此早期探测局部肿瘤的复发可以更早的给予治疗和提高生存率^[22]。CT、MRI 仅能发现肠壁外的复发病灶,又因手术后组织的解剖结构发现改变,使 CT、MRI 等影像学检查很难做出准确的判断。TRUS 能弥补上述的不足,且是检测直肠癌术后复发较为有效的方法。尽管对于外科手术治疗直肠癌后复查 TRUS 的最佳时间间隔无法确定,但对于低位骶前切除或经肛切除肿瘤的最初 2 年每 6 个月进行一次 TRUS 检查似乎是合理的筛查。

3 TRUS 的影响因素及与不同检测方法的对比

3.1 术前放化疗对 TRUS 的影响

术前的放化疗可以降低直肠癌的局部的复发率,甚至可以降低直肠癌分期,从而提高肛门括约肌的保留率^[23,24],并且有声明倡导对所有 II 期和 III 期的直肠癌患者行辅助化疗可以显著的提高患者的预后,增加长期生存率^[25];许多报道关于联合治疗即术前化疗后行全肠系膜切除术可使局部复发率降至 10% 以下^[26],这些研究强调的都是初始治疗前的正确 TNM 分期。Jacopo^[27]通过对比 37 例直肠癌放化疗前后 TRUS 的准确率发现放化疗后的结果均低于放化疗前,原因是放化疗使肿瘤局部水肿、炎症、细胞坏死和纤维化,切除的离体标本主要为纤维瘢痕组织,构成了超声影像的基础,因此放化疗后 TRUS 所得出的不再是肿瘤的分期,而是肠壁的纤维化范围。残留的肿瘤组织总是处于纤维病变的内部,绝不在纤维化组织的外部^[28],使 TRUS 从纤维化组织中识别肿瘤变得困难,从而导致了分期准确率的下降;同样 CT、MRI 在放化疗后也无法辨别肿瘤和被瘢痕所替代的组织^[27,29,30]。

3.2 普通 2D-TRUS VS 3D-TRUS

3D-TRUS 成像的优点是 3D 的探头可以自由的旋转、倾斜,且允许操作者无受限的改变不同部分的参数,在不同的可视化病变和不同的平面(冠状面、矢状面、轴面)获取最多的信息数据;三维成像后,可以第一时间选取冠状和矢状视图,且数据可以被保存、输出、回顾及操纵获得全面的图像研究区;三维重建可以测量肿瘤的大小和评估肿瘤与肠管层和直肠旁解剖结构层的关系,另外三维数据可以操纵来渲染图像来加强表面特性及深部特性以最好的描述肿瘤及其周围的情况。Kim 等人^[31]对 3D-TRUS 和普通 2D-TRUS 进行了对比,发现 3D-TRUS 在 T 分期和 N 分期中的准确率略高于 2D-TRUS,但统计学无明显差异。

3.3 TRUS VS 肛门指诊

指诊能够直观的触及低位直肠癌灶,方便易行,可确定肿瘤大小、移动性、肠腔狭窄的程度,以及距离肛缘距离和表面特征等,Nicholls et al 等^[32]报道对于有经验的医生指诊对于直肠外侵犯的准确率达 80%,对直肠旁淋巴结达 65%;但指诊主观性强,难以像 TRUS 那样准确的判断肿瘤侵犯肠壁的深度,对评估淋巴结转移远不及 TRUS。

3.4 TRUS VS CT

CT 无法对肠壁层进行区别,因此不能判断肿瘤浸润肠壁的深度,这就导致了 CT 在决定对局部切除的 T1 和 T2 期肿瘤方面无任何帮助;有资料显示对于早期发现直肠癌肠壁浸润和邻近淋巴结转移探查 TRUS 均优于 CT,无论淋巴结的大小^[33],但是 CT 在评估 M 分期时应用较广泛,是 TRUS 无法相比的。

3.5 TRUS VS MRI

Waizer et al, Thaler et al 等人^[34,35]对 MRI 和 TRUS 在直肠癌分期中的准确率进行了比较,MRI 在 T 分期和 N 分期的准确率分别为 82%和 60%,而 TRUS 的准确率分别为 88%和 80%,但没有统计学意义;对于肿瘤较大或缩窄型直肠癌的评估 MRI 要优于 TRUS^[36],直肠内线圈的应用可以明显提高 MRI 的准确率,但其也存在不足:可视范围较小,只允许早期的直肠癌进行评估,进展期直肠癌病人多因肿瘤致肠腔狭窄线圈无法放入或非常痛苦,另一个缺点是线圈成本高,且通常是一次性的^[37],多数病人无法承担高昂的检查费用使直肠内线圈 MRI 无

法普及。MRI 对于某些病人来说是检查的禁忌症,其中包括幽闭恐惧症者、心脏移植、假体、金属心血管电子设备、血管内支架和过滤器、电子耳蜗等;此外病人在行 MRI 检查期间活动也可能降低图像的质量^[38-40]。但是 MRI 和 CT 图片可以更方便及容易被其他放射科医生、临床医生所解读和评估,并且可以被放射科医生用来计划放疗的区域和指导外科医生切除肿瘤。

4 小结与展望

TRUS 是目前直肠癌术前分期当前最好的检查方式,虽然对 M 分期的诊断不尽人意,但可以联合腹部超声、CT、MRI 使用。对于有经验的操作者中,TRUS 能够测量肿瘤的大小、周长和距解剖标志的距离(前列腺、括约肌、阴道、精囊、直肠系膜筋膜等),并可以给出放疗所照射的区域(深度和浸润的长度),能够检查肛周括约肌被肿瘤侵犯的病变,从而使外科医生决定是否保留括约肌切除肿瘤是安全的或可行的^[41]。对于缩窄型直肠癌 TRUS 分期的结果不是很理想,因此超声微探头应迫切被应用于缩窄型病灶中^[42];此外 N 分期的标准应在进一步的研究中进行修正,TRUS 发现的小于 5 mm 的淋巴结是否也应被列为转移的淋巴结有待进一步的探讨,所以未来提高可能包含直肠系膜筋膜的可视化或更好的评估直径小于 5 mm 的淋巴结。TRUS 检查方便、无创、安全、费用低、实时动态,无需麻醉和向肠腔内注入气体,是一种非常有价值的诊断方法。

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