ANAL AND RECTAL TUMOUR

The Role of Endorectal Ultrasound in Therapeutic Decision-Making for Local *vs.* Transabdominal Resection of Rectal Tumors

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Abstract
Introduction In rectal tumors, preoperative biopsies frequently fail to diagnose an invasive carcinoma. Endorectal ultrasound is considered a useful adjunct in preoperative staging of rectal tumors. However, feasibility of endorectal ultrasound and its role in therapeutic decision-making in presumed rectal adenomas is sparsely studied.
Methods Endorectal ultrasound was performed in 268 tumors referred for local excision because biopsies showed tubulovillous adenoma. Feasibility of endorectal ultrasound was studied and ultrasound staging was compared with definite histopathologic findings.
Results In 231 tumors, endorectal ultrasound was technically feasible (86 percent). Median distance from the dentate line was 11 cm in nonassessable tumors and 7 cm in assessable tumors ($P<0.001$). In 21 tumors, endorectal ultrasound was not conclusive, mainly in tumors being recurrent or after recent endoscopic manipulation ($P<0.001$). With endorectal ultrasound the rate of preoperative missed carcinomas could be reduced from 21 to 3 percent ($P<0.01$). In diagnosing tubulovillous adenomas, sensitivity and specificity of endorectal ultrasound was 89 and 86 percent, respectively.
Conclusions Endorectal ultrasound is technically feasible in almost all presumed rectal adenomas, referred for local excision. Proper endorectal ultrasound interpretation is possible in 78 percent of all presumed rectal adenomas. Endorectal ultrasound is very reliable in diagnosing tubulovillous adenomas, and therapeutic decision-making regarding local excision *vs.* radical surgery based on endorectal ultrasound is valid.

Key words Endorectal ultrasound - Preoperative staging - Feasibility - Transanal endoscopic microsurgery - Adenomas - Rectal cancer

Predictive clinicopathologic factors for limited response of T3 rectal cancer to combined modality therapy.

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PURPOSE: The response of T3 rectal cancer to combined modality therapy (CMT) is highly predictive of long-term outcome following surgery. The aim of this study was to identify pretreatment factors associated with poor tumor response to neoadjuvant chemoradiation. METHODS: A prospective institutional database at Memorial Sloan-Kettering Cancer Center was queried for endorectal ultrasound (ERUS) stage T3N0-2 rectal cancer patients, treated with CMT followed by surgical resection, between 1998 and 2003. Preoperative clinicopathologic factors determined by biopsy, ERUS, proctoscopy, and digital rectal examination were correlated with the degree of downstaging of the primary mural lesion (tumor downstaging) in response to neoadjuvant therapy. Associations were analyzed by chi-square, Kaplan-Meier, and logistic regression. RESULTS: Of 274 patients, 51% obtained tumor downstaging in response to preoperative treatment, i.e., lower pathologic T-stage compared with pretreatment ERUS. Five-year recurrence-free survival was 89% in the cohort that obtained tumor downstaging compared with only 45% in the cohort that obtained no tumor downstaging. Factors significantly associated with limited or lack of tumor downstaging after CMT included: fixed tumor on digital rectal examination ($p < 0.021$), near-circumferential tumor ($p < 0.011$), tumor stenosis ($p < 0.025$), metastatic disease ($p < 0.012$), biopsy-proven poorly differentiated pathology ($p < 0.002$), and radial extension >2.5 mm on ERUS ($p < 0.031$). On multivariate analysis, deep radial extension on ERUS, metastatic disease, and poorly differentiated pathology were in each, independently associated with limited or lack of tumor downstaging. CONCLUSIONS: Pretreatment evaluation with biopsy, proctoscopy, and ERUS can identify T3 rectal cancer patients unlikely to respond well to CMT. These patients may be considered for alternative protocols and their tumors studied to ascertain the molecular events responsible for resistance to chemoradiation.

Imaging and management of rectal cancer.

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Division of Gastroenterology and Hepatology, Indiana University Medical Center, Indianapolis, IN 46202, USA. Nat Clin Pract Gastroenterol Hepatol. 2007 Dec;4(12):665-76. Erratum in: Nat Clin Pract Gastroenterol Hepatol. 2008 Feb;5(2):117.

Local staging and management of rectal cancer has evolved during the past decade. Imaging modalities used for staging rectal cancer include CT, endoscopic ultrasound, pelvic phased-array coil MRI, endorectal MRI, and PET. Each modality has its strengths and limitations. Evidence supports the use of both endoscopic ultrasound and CT in staging rectal cancer. MRI is the only reliable tool for determining the status of the circumferential resection margin, which is important for the assessment of the risk of local recurrence

Endorectal sonography in rectal cancer staging and indication for local surgery.

Hepatogastroenterology. 2007 Jun;54(76):1102-6.
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BACKGROUND/AIMS: Radical surgery still plays a decisive role in the therapy of rectal cancer. Besides classical abdominal operations, an alternative is transanal endoscopic resection of rectal tumor at T1 and T2 stages. Indication for local resection of malignant rectal tumor requires an accurate preoperative staging. METHODOLOGY: The paper evaluates the accuracy of 3D endorectal sonography in rectal cancer staging. In the group of 78 patients the staging of preoperative 3D endorectal sonography was compared with a final histopathologic of the operative sample. RESULTS: The results obtained indicate that the preoperative staging of malignant rectal tumor using 3D endorectal sonography represents 100% only in the pT1 stage. In the pT2 stage, the accuracy of 3D endorectal sonography is 72%, in pT3 and pT4 represents 92%. CONCLUSIONS: On the basis of our experience, complicated interpretation of findings obtained by 3D endorectal sonography occurs at limits of T2-T3 and T3-T4. In these localizations the peripheral reactive fibrous and inflammatory sections in the vicinity of tumor tissue often involve even the next layer of rectal wall and leads to overevaluation of invasion depth at endorectal sonography of rectal cancer.

Three-dimensional endoluminal ultrasound-guided interstitial brachytherapy in patients with anal cancer.

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Acta Radiol. 2008 Mar;49(2):132-7.
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BACKGROUND: New techniques using image guidance other than computed tomography (CT) and traditional two-dimensional (2D) endosonography might improve interstitial brachytherapy in patients with anal cancer. Purpose: To investigate a new technique guided by three-dimensional (3D) endosonography used in our institution. MATERIAL AND METHODS: Seventeen patients with anal carcinoma were referred to interstitial brachytherapy under 3D endosonographic guidance after external radiotherapy. The procedure was initiated by anal endosonography performed with a 10-MHz rotating endoprobe. Cross-sectional images of the anal sphincters were stored on a 3D system during retraction of the endoprobe through the anal canal. Afterward, any projection could be reconstructed. From this scanning, the optimal positioning of the needles was determined. The needles were inserted through holes in an externally fixated anal template. A repeated endosonography assured that optimal tumor coverage could be obtained by adjusting the number, dwell positions, and/or position of the needles. RESULTS: In all patients, endosonography was able to visualize the extension of the tumors and the position of each needle in 3D. CONCLUSION: 3D endosonography guidance of interstitial brachytherapy in anal carcinoma seems to optimize the implant procedure and offer better information for dose planning.

cT3N0 rectal cancer: potential overtreatment with preoperative chemoradiotherapy is warranted.

Guillem JG, Díaz-González JA, Minsky BD, Valentini V, Jeong SY, Rodriguez-Bigas MA, Coco C, Leon R, Hernandez-Lizoain JL, Aristu JJ, Riedel ER, Nitti D, Wong WD, Pucciarelli S.
J Clin Oncol. 2008 Jan 20;26(3):368-73.
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PURPOSE: Although combined-modality therapy (CMT) is the preferred treatment for T3 and/or lymph node (LN)-positive rectal cancer, the German rectal cancer study published in 2004 demonstrated that 18% of patients deemed suitable for preoperative CMT by endorectal ultrasound (ERUS) may be overstaged. Because data also suggest that LN-negative rectal cancer after total mesorectal excision may not require radiotherapy, it is reasonable to consider omitting radiotherapy for the cT3N0 subset. We therefore determined the accuracy of pre-CMT ERUS or magnetic resonance imaging (MRI) staging, to explore the validity of a nonpreoperative CMT approach for cT3N0 disease. PATIENTS AND METHODS: One hundred eighty-eight ERUS-/MRI-staged T3N0 rectal cancer patients received preoperative CMT (fluorouracil based and 45-50.4 Gy) followed by radical resection. Rates of pathologic complete response (pCR) and mesorectal LN involvement were determined. RESULTS: Tumors were located a median of 5 cm from the anal verge. Sphincter-preserving surgery was performed in 143 patients (76%). Overall pCR was 20%, and 41 patients (22%) had pathologically positive mesorectal LNs. The incidence of positive LNs significantly increased with T stage: ypT0, 3%; ypT1, 7%; ypT2, 20%; ypT3-4, 36% (P = .001). CONCLUSION: The accuracy of preoperative ERUS/MRI for staging mid to distal cT3N0 rectal cancer is limited because 22% of patients have undetected mesorectal LN involvement despite CMT. Therefore, ERUS-/MRI-staged T3N0 rectal cancer patients should continue to receive preoperative CMT. Although 18% may be overstaged and therefore overtreated, our data suggest that an even larger number would be understaged and require postoperative CMT, which is associated with significantly inferior local control, higher toxicity, and worse functional outcome.

FECAL INCONTINENCE

Endoanal ultrasonography in establishing the diagnosis of fecal incontinence.

Acta Chir Iugosl. 2007;54(3):159-62.
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Visualisation of the rectum, rectoanal junction and adjacent structures is very demanding and challenging both with technical and medical side. Local staging of rectal and anal tumor and perianal neoplasm by conventional and sibgle slice CT or by barium enema study is not so valuable. These methods can not visualise fistulous communication in inflamatory bowel diseases and have not any role in evaluation of fecal incontinence. During last decade, endoscopic ultrasound and magnetic resonance imaging have been recognised as methods of choice in establishing diagnosis of rectal, perirectal, anal and perianal diseases. The aim of this article is to review the possibilities of endoanal ultrasound in evaluation of fecal incontinence.

Correlation between anal manometry and endosonography in females with faecal incontinence.

Colorectal Dis. 2008 Feb;10(2):131-7. Epub 2007 Oct 23.
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OBJECTIVE: Female faecal incontinence (FI) is largely because of sphincter injury at childbirth. Sphincter assessment aims to identify surgically correctable defects. We aimed to identify endoanal ultrasonography (EAUS) parameters that correlate with sphincter function. METHOD: One hundred females with FI and 28 healthy asymptomatic females were prospectively assessed. Wexner FI score was recorded and all subjects underwent anorectal manometry and EAUS. Multiple EAUS parameters were assessed and correlated with external (EAS) and internal (IAS) anal sphincter function, determined by maximum squeeze pressure (MSP) and maximum resting pressure (MRP) respectively. Parameters included sphincter quality (echogenicity), thickness, perineal body thickness (PBT) and defect characteristics (angle, length). Results are expressed as medians and interquartile range (IQR). RESULTS: Median Wexner score was 14 (12-17). Maximum EAS thickness significantly correlated with MSP (P = 0.019). EAS defects were detected in 84 patients and seven controls (P < 0.0001). Full-length EAS defects were only detected in FI group and had significantly lower MSP [MSP mmHg: full length 85 (65-103) vs partial length 119 (75-155), P = 0.006]. FI patients were more likely to have a mixed echogenicity of EAS compared with controls. EAS ring quality, PBT and defect angle were not significant. IAS quality was significantly associated with MRP [MRP mmHg: uniform 62 (43-82) vs mixed 47 (30.5-57.5), P = 0.002]. CONCLUSION: Certain EAUS parameters can be predictive of anal sphincter function. These include the presence of an EAS defect and its length, EAS maximum thickness, IAS ring quality. Integration of these parameters can give better EAUS correlation with manometry for FI evaluation.

Pilot study of two new injectable bulking agents for the treatment of faecal incontinence.

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OBJECTIVE: The use of injectable bulking agents for passive faecal incontinence appears to provide reasonable short-term results. However experience with different agents is limited. We report on the outcome of injections with new bulking agents. METHOD: Each patient received injections of either Bulkamid (hydrogel cross-linked with polyacrylamide) or Permacol (porcine dermal collagen). Assessment included clinical evaluation, anorectal physiological testing, endoanal ultrasonography and questionnaires including the St Mark's Incontinence Score, one week bowel diary card, the Faecal Incontinence Quality of Life Scale and the Short Form-36 (SF-36) health survey. Follow up was at 6 weeks and 6 months, with a further telephone review at a median of 19 months (range 14-22). RESULTS: Ten patients (nine female), median age 68 years (range 45-79), were enrolled. St Mark's incontinence score (0 = best, 24 = worst) was 15 (range 11-24) at baseline, 12.5 (range 3-18) at 6 weeks and 14 (range 6-22) at 6 months. A 1-week bowel diary and SF-36 forms also showed temporary improvement but this was not sustained beyond 6 weeks. CONCLUSION: Bulkamid and Permacol injections did not have a major effect on faecal incontinence.

Cross-sectional imaging of the anal sphincter in fecal incontinence.

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AJR Am J Roentgenol. 2008 Mar;190(3):671-82.
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OBJECTIVE: Fecal incontinence is a disabling disorder. Cross-sectional imaging techniques can be used to confirm the diagnosis and to clarify the anatomy and function of the anorectal region. CONCLUSION: Cross-sectional imaging has increased the understanding of the sphincter complex, resulting in a more adequate evaluation of fecal incontinence.

Correlation between anal manometry and endosonography in females with faecal incontinence.

Titi MA, Jenkins JT, Urie A, Molloy RG.
Colorectal Dis. 2008 Feb;10(2):131-7. Epub 2007 Oct 23.
Department of Surgical Gastroenterology, Gartnavel General Hospital, Glasgow, UK. mohtiti@yahoo.com

OBJECTIVE: Female faecal incontinence (FI) is largely because of sphincter injury at childbirth. Sphincter assessment aims to identify surgically correctable defects. We aimed to identify endoanal ultrasonography (EAUS) parameters that correlate with sphincter function. METHOD: One hundred females with FI and 28 healthy asymptomatic females were prospectively assessed. Wexner FI score was recorded and all subjects underwent anorectal manometry and EAUS. Multiple EAUS parameters were assessed and correlated with external (EAS) and internal (IAS) anal sphincter function, determined by maximum squeeze pressure (MSP) and maximum resting pressure (MRP) respectively. Parameters included sphincter quality (echogenicity), thickness, perineal body thickness (PBT) and defect characteristics (angle, length). Results are expressed as medians and interquartile range (IQR). RESULTS: Median Wexner score was 14 (12-17). Maximum EAS thickness significantly correlated with MSP ($P = 0.019$). EAS defects were detected in 84 patients and seven controls ($P < 0.0001$). Full-length EAS defects were only detected in FI group and had significantly lower MSP [MSP mmHg: full length 85 (65-103) vs partial length 119 (75-155), $P = 0.006$]. FI patients were more likely to have a mixed echogenicity of EAS compared with controls. EAS ring quality, PBT and defect angle were not significant. IAS quality was significantly associated with MRP [MRP mmHg: uniform 62 (43-82) vs mixed 47 (30.5-57.5), $P = 0.002$]. CONCLUSION: Certain EAUS parameters can be predictive of anal sphincter function. These include the presence of an EAS defect and its length, EAS maximum thickness, IAS ring quality. Integration of these parameters can give better EAUS correlation with manometry for FI evaluation.