



## Distribution of metastases in mesorectum is unpredictable: Metastases do not respect tumor localization even in small non-circumferential rectal cancers

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### Abstract

**Introduction:** Low anterior resection with total mesorectal excision (TME) is the gold standard for surgical treatment of rectal carcinoma. The radicality of this procedure is negatively counterbalanced by morbidity, lethality, and numerous other complications. Local excision would appear to be an attractive alternative, but its radicality is disputable due to risk of undetected metastasis to the mesorectum. The study aimed to determine the location of mesorectal metastases with respect to circumferentially – located tumors in patients with tumors involving less than one-third of the rectal circumference.

**Materials and methods:** Resected specimens from patients with tumors smaller than one-third of the circumference were divided into: Sector A – tumorous, and Sector B – nontumorous. Group A was created by the pathologist cutting part of the rectal wall with the adjacent mesorectum, as though imitating a full-thickness excision.

**Results:** The study comprised 35 patients with a mean age of 66 years, of which 23 were men (65.7%) and 12 were women (34.2%). Tumors were predominantly (y)pT1-T2; a total of 799 lymph nodes and 5 tumor satellites were examined. Six patients (17.1%) were identified as stage (y)pN+. A total of 3 positive findings (lymph node metastasis or satellites) were detected in 3 patients (8.5%) in tumorous Sector A; and 8 positive findings were detected in 4 patients (11.4%) in non-tumorous Sector B.

**Conclusion:** Rectal carcinoma involving one-third of the rectal circumference metastasizes discontinuously, and spreads into parts of the mesorectum beyond the tumor area.

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**Keywords:** Rectal cancer; Total mesorectal excision; Mesorectal metastasis

### Introduction

Low anterior resection with total mesorectal excision (TME) is the gold standard for surgical treatment of rectal carcinoma [1,2]. The clearly demonstrated benefits of the radicality of this procedure are negatively counterbalanced by morbidity, lethality, and numerous other complications. Sexual dysfunction, urine retention, urgency, and fecal

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incontinence occur in a large number of patients [3,4]. For some patients, quality of life deteriorates to such a degree that the issue of their own oncological disease recedes into the background.

For this reason, a local procedure that preserves the rectum as an organ would appear to be an attractive alternative [5–7]. The radicality itself is disputable, as is the selection of the most suitable patients. It seems that local excision can be considered for 2 basic groups of patients. The first group involves patients with early rectal cancer that reaches a maximum depth that is no more than one-third the thickness of the submucosa and shows no other signs of aggressive behavior (i.e. T1, sm1, Grade 1, without angioinvasion or perineural propagation). The second group involves patients that respond well to preoperative chemoradiotherapy (CHRT), i.e. ycT0–T1, ycN0. The problem lies in the risk of overestimating the true pathologic response and the risk of undetected metastasis to the mesorectum.

Our study aimed to determine the location of mesorectal metastases with respect to circumferential tumor location in a group of patients with tumors that did not involve more than one-third of the rectal circumference.

## Materials and methods

This prospective study was conducted between November 2013 and June 2016 and was approved by local IRB. It included patients  $\geq 18$  years who had been diagnosed with rectal carcinoma and who underwent resection procedures that included mesorectal excision (resection, amputation, Hartmann's operation) at the Hradec Králové University Hospital's Department of Surgery. The sample inclusion criterion was the presence of a non-circular tumor involving less than one-third of the rectal circumference. All patients had undergone standard preoperative diagnostic methods; e.g. colonoscopy, endorectal ultrasonography, or pelvic MRI. In the event that patients had undergone CHRT, restaging was carried out within 6 weeks of CHRT completion, and surgery was performed 10 weeks after CHRT completion. Preoperative chemoradiation was indicated in cT3/cT4 or cN positive patients. The standard CHRT regimen involves irradiation with 45 Gy in 25 fractions to the pelvic area, which includes the rectum, pararectal, presacral, and internal iliac lymph nodes. A supplementary boost dose of radiation was applied to the tumor itself (5.4 Gy in 3 fractions) for a total dose of 50.4 Gy. Radiotherapy was potentiated by chemotherapy with continuous 5-fluorouracil infusion at a dose of 200 mg/m<sup>2</sup>/24 h for the entire duration of radiotherapy.

### Histopathological examination

Resected samples were examined using standard histopathology. The unfixed specimens were documented using macro-photography and then fixed for 48 h in a 10% formaldehyde solution. This was followed by the inspection of

mesorectal fat, after which the sample was cut into transverse slices, which were also photodocumented.

If the pathologist identified a tumor smaller than one-third of the rectal circumference, the tumor and adjacent portion of the mesorectum were cut into wedge-shaped slices in order to imitate a local "full-thickness" excision. In this manner, the resection samples were divided into two sectors: Sector A – tumorous (i.e. the entire area of the tumor and adjacent mesorectal fat), and Sector B – nontumorous (i.e. the larger portion of the resection sample beyond the tumor region) (Figs. 2 and 3). In addition to the tumor biopsy samples themselves, both sectors (A and B) of mesorectal fat were also subjected to histopathological analysis. Lymph nodes and potential tumor satellites were identified in adipose tissue via fat clearing techniques using Carney's solution (1 day). Microscopic slides were stained using the conventional hematoxylin-eosin technique. Mesorectal metastasis was defined as a tumor deposit in lymphatic node, while the satellites were considered as a tumor deposit in fat, outside of the lymphatic node.

## Results

During the study period, 226 patients were diagnosed with non-circular rectal cancer. According to the previously mentioned criteria, 35 patients (15.5%) were selected and

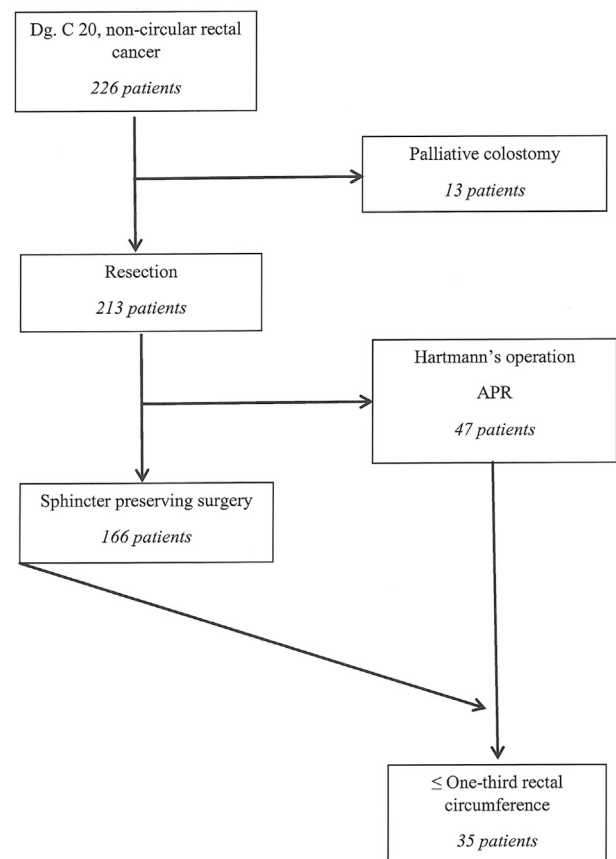


Fig. 1. Schematic representation of patients selected for study enrollment.

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