



Overview

Techniques and Outcome of Surgery for Locally Advanced and Local Recurrent Rectal Cancer

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Abstract

Locally advanced primary rectal cancer is variably defined, but generally refers to T3 and T4 tumours. Radical surgery is the mainstay of treatment for these tumours but there is a high-risk for local recurrence. National Institute for Health and Care Excellence (2011) guidelines recommend that patients with these tumours be considered for preoperative chemoradiotherapy and this is the starting point for any discussion, as it is standard care. However, there are many refinements of this pathway and these are the subject of this overview. In surgical terms, there are two broad settings: (i) patients with tumours contained within the mesorectal envelope, or in the lower rectum, limited to invading the sphincter muscles (namely some T2 and most T3 tumours); and (ii) patients with tumours directly invading or adherent to pelvic organs or structures, mainly T4 tumours – here referred to as primary rectal cancer beyond total mesorectal excision (PRC-bTME). Major surgical resection using the principles of TME is the mainstay of treatment for the former. Where anal sphincter sacrifice is indicated for low rectal cancers, variations of abdominoperineal resection – referred to as tailored excision – including the extralevator abdominoperineal excision (ELAPE), are required. There is debate whether or not plastic reconstruction or mesh repair is required after these surgical procedures. To achieve cure in PRC-bTME tumours, most patients require extended multivisceral exenterative surgery, carried out within specialist multidisciplinary centres. The surgical principles governing the treatment of recurrent rectal cancer (RRC) parallel those for PRC-bTME, but typically only half of these patients are suitable for this type of major surgery. Perioperative morbidity and mortality are considerable after surgery for PRC-bTME and RRC, but unacceptable levels of variation in clinical practice and outcome exist globally. To address this, there are now major efforts to standardise terminology and classifications, to allow appropriate comparisons in future studies.

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Key words: ELAPE; morbidity and mortality; pelvic exenterative surgery; rectal cancer; total mesorectal excision

Statement of Search Strategies Used and Sources of Information

PubMed was searched using the terms ‘rectal cancer’ AND ‘total mesorectal excision’; ‘rectal cancer’ AND ‘ELAPE’; and ‘rectal cancer’ AND ‘pelvic exenteration’ for articles published in English, from 2005 to October 2015. Lists were scanned for relevant papers and references from systematic reviews were cross-checked, but the approach was not systematic.

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Background

Locally advanced primary rectal cancer is variably defined, but generally refers to T3 and T4 tumours. Contemporary population-level data from the Greater Manchester Cancer Network (2011–2012) estimates, using conservative definitions, that locally advanced rectal tumours account for 31% of all rectal cancers (Table 1). With 10,000 new rectal cancers per annum in England (source: Office of National Statistics, ICD10 code: C20), the burden of this problem is about 4000 patients per year for the UK. Radical surgery is the mainstay of treatment for these tumours but there is a high-risk for local recurrence. The 2011 National Institute for Health and Care Excellence (NICE) [1] guidelines recommended that patients with these tumours be considered for preoperative chemoradiotherapy (CRT). This is the starting point for any discussion, as it is standard

Table 1
Greater Manchester Rectal Cancer Audit January 2011 to June 2012

	Subtotals		Totals
Referred to radiotherapy centre			
Preoperative radiotherapy	SCRT (n = 218)	LCCRT (n = 276)	494
T stage*			
T1	4	1	
T2	77	28	
T3	130	176	244/775 (31%)
T4	5	68	
Other radiotherapies†			74
Not referred to radiotherapy centre			
Local surgery, resection			207
Surgery without preoperative radiotherapy			
All rectal cancers for Greater Manchester in audit period			775

SCRT, short-course radiotherapy; LCCRT, long-course chemoradiotherapy.

The insert box are those patients with T3 and T4 tumours requiring LCCRT, i.e. a conservative definition of locally advanced rectal cancer.

* Missing T stage for five patients.

† Palliative and postoperative radiotherapy.

care. However, there are many refinements of this pathway, and these are the subject of this overview. As a prelude to these discussions, it is first necessary to define the term locally advanced rectal cancer – this is variably defined in the literature, making comparisons of results across studies problematic.

Definition of Locally Advanced Rectal Cancer

First is the definition of the rectum. The Beyond TME Collaboration consensus document [2] defined the rectum by anatomical criteria shown on magnetic resonance imaging (MRI) as being the portion of the large bowel below the sacral promontory that is surrounded by a definable mesorectum posteriorly. However, several radiotherapy trials have used various definitions of what constitutes the rectum, ranging from 12 to 16 cm from the anal verge [3–5]. From a surgical perspective, this is less of an issue; the greater issue is the distance of the lower edge of the tumour from the top of the anal canal (i.e. the surgical rectum) rather than the distance from the anal verge.

To understand the nomenclature around definitions of locally advanced rectal cancer, one has to first restate the American Joint Committee on Cancer (AJCC) TNM staging system [6] (Table A1) and the pre-treatment MRI staging classification [7] (Table A2) for primary rectal cancers. It is important to note that although the AJCC 7th edition of the TNM staging is the current version, many UK cancer centres still use the AJCC 5th edition. Specifically, the Beyond TME Collaboration [2] retained this classification system to define subclasses of T4. This is relevant to later discussions for beyond total mesorectal excision (TME) rectal tumours.

In general, the term ‘locally advanced rectal cancer’ has been applied to tumours with an increased risk of local recurrence, namely T3 and T4 lesions, which may benefit from neoadjuvant (long-course CRT) therapy. However,

tumours in patients with a threatened circumferential margin (CRM) are also included and these might be T2 lesions (as illustrated in Table 1). Beyond this, there are several other examples of different uses of the term ‘locally advanced rectal cancer’, including those used by the German Rectal Cancer trial (any T N+ or T3/T4) [8], the MERCURY study (T3c, T3d or T4) [9], the EXPERT study (T1–4 N2; low T3; T4; threatened CRM) [10] and the Berlin Rectal Cancer trial (ultrasound defined (u)T2 N+; any T3, T4 excluded) [11].

At the ‘big’ end of the scale are T4 lesions. Here, the lesion can range from just beyond the CRM to lesions that invade several structures or organs within the pelvis. The Beyond TME Collaboration [2] defined these lesions as primary rectal cancer beyond total mesorectal excision planes (PRC-bTME) predicted by MRI to require an extended surgical resection beyond the TME plane to achieve a pathological R0 resection. The principles underpinning the surgical management of patients with PRC-bTME overlap with those required to surgically treat recurrent rectal cancer (RRC); and are dealt with in the second half of this overview.

General Principles

The mainstay of curative treatment for locally advanced rectal cancer is surgical resection. There are two broad settings: (i) patients with tumours contained within the mesorectal envelope, or in the lower rectum, limited to invading the sphincter muscles (namely some T2 and most T3 tumours); and (ii) patients with tumours directly invading or adherent to pelvic organs or structures, mainly T4 tumours – here referred to as PRC-bTME.

Preoperative Chemoradiotherapy

The 2011 NICE [1] guidelines recommended that patients with locally advanced rectal cancer be considered for CRT

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