

Cancer Care Ontario

Action Cancer Ontario

Rectal Cancer Grossing Guideline

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David Driman MBChB FRCPC

Department of Pathology

London Health Sciences Centre

Background Information

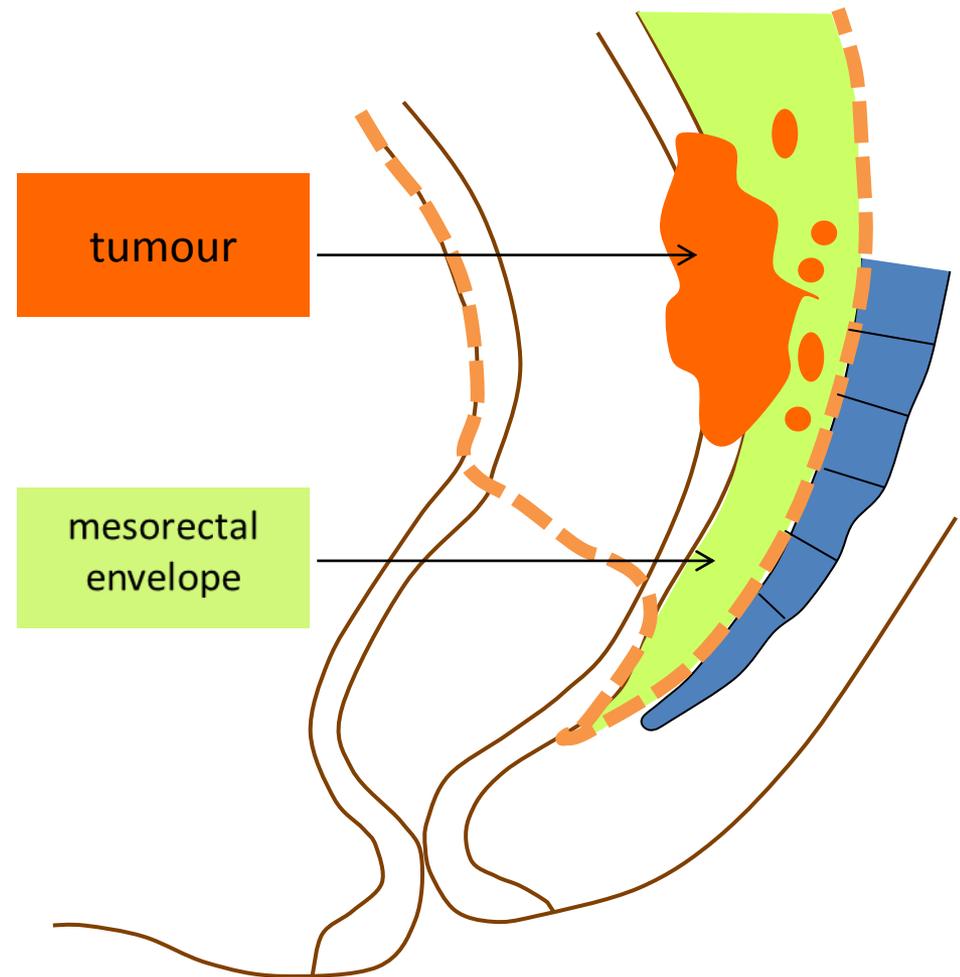
- ❖ This document describes the optimal method for grossing rectal cancer resection specimens. It differs from other methods in that the bowel segment with tumor is not opened prior to sectioning, the rationale being that this optimizes the assessment of the radial resection margin, by not cutting through this margin. Because the specimen is left intact, longer fixation is required, prior to grossing.
- ❖ Radial margin status is the single most important factor for predicting the risk of local recurrence, distant metastases and mortality in patients with rectal cancer.
- ❖ This method also requires the prosector to assess the quality of the surgical mesorectal excision, in either low anterior or abdominoperineal resections. Quality is directly related to patient outcome; the more complete the mesorectal resection procedure, the lower the overall recurrence rate and the lower the incidence of radial margin positivity.

“The macroscopic assessment of a colorectal resection specimen is of the utmost importance - no amount of clever microscopy can redeem a poorly dissected specimen.”

Ludeman L, Shepherd NA. Curr Diagn Pathol 06;12:220

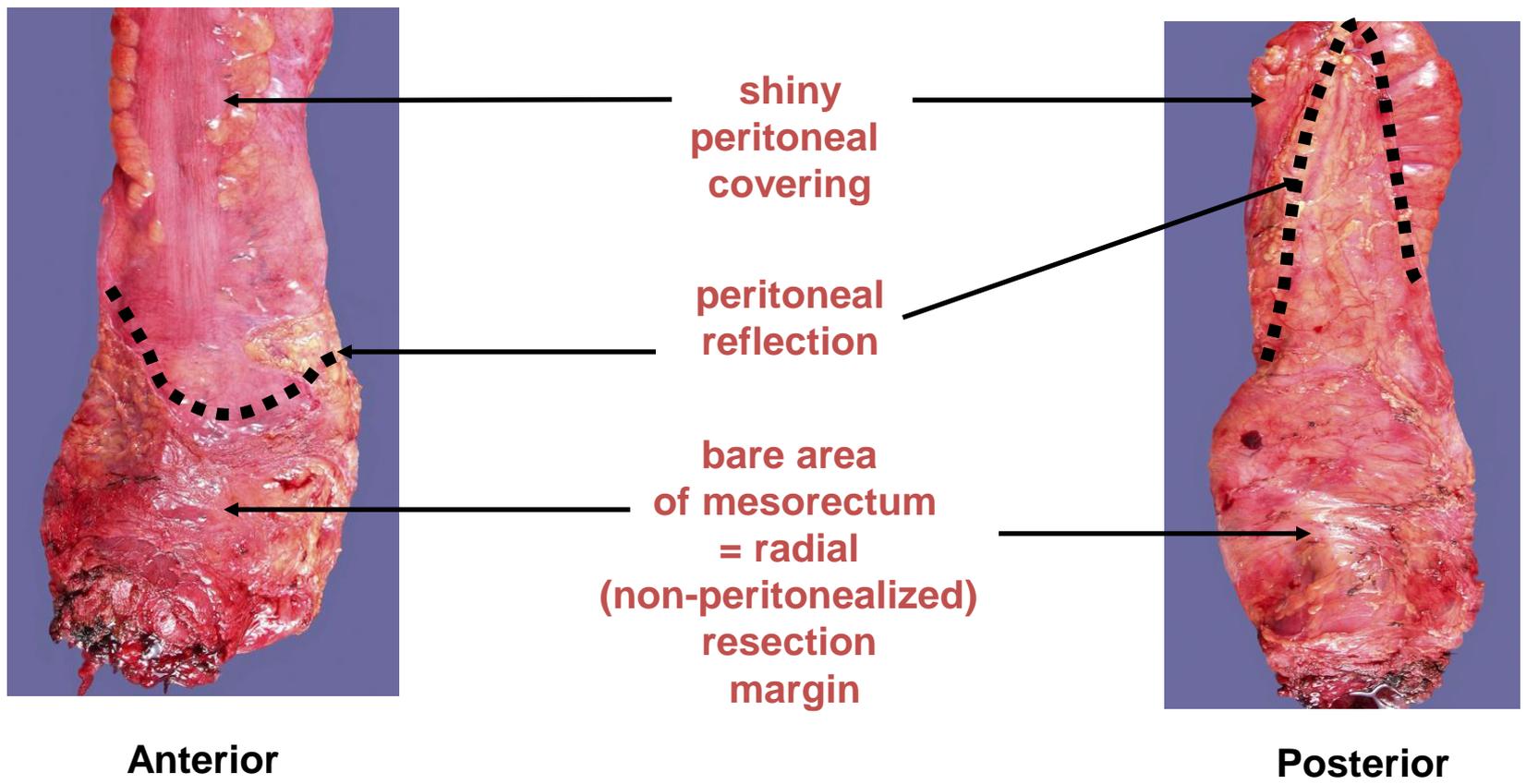
What is a Mesorectal Excision?

- ❖ **Mesorectum** = fatty connective tissue layer, measuring 2-3 cm in thickness, with associated vessels, lymphatics and lymph nodes, which surrounds the rectum and is enveloped by fascia
- ❖ **Mesorectal excision** = surgical removal of this soft tissue envelope using sharp instruments under direct vision, dissecting the potential space (“holy plane”) between the visceral and parietal pelvic fascia
- ❖ **Total mesorectal excision (TME)** = complete excision of the mesorectum down to the pelvic floor (tumor: middle and lower third rectum)
- ❖ **Partial mesorectal excision (PME)** = circumferentially the same as TME, but mesorectum transected at a right angle to the rectal wall at a distance of 5 cm beyond the gross distal edge of tumor (tumor: upper third rectum)



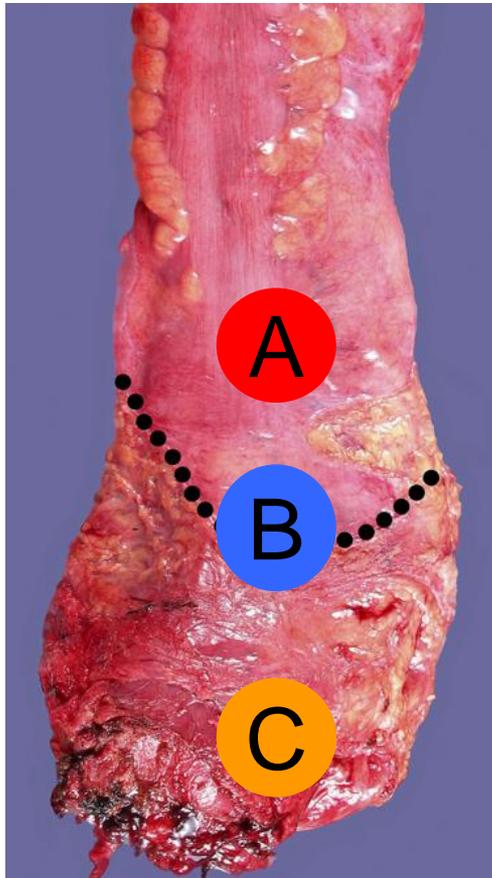
Step 1 = Define Anatomical Landmarks

This is best done in the fresh state. These images show the anterior and posterior surfaces of a mesorectal excision (anterior resection) specimen. The peritoneal reflection is low anteriorly, and high posteriorly, imparting a triangular appearance to the bare area of the mesorectum. The bare area is the resection margin; above the anterior peritoneal reflection, it is non-circumferential while below it, it is circumferential (the CRM).

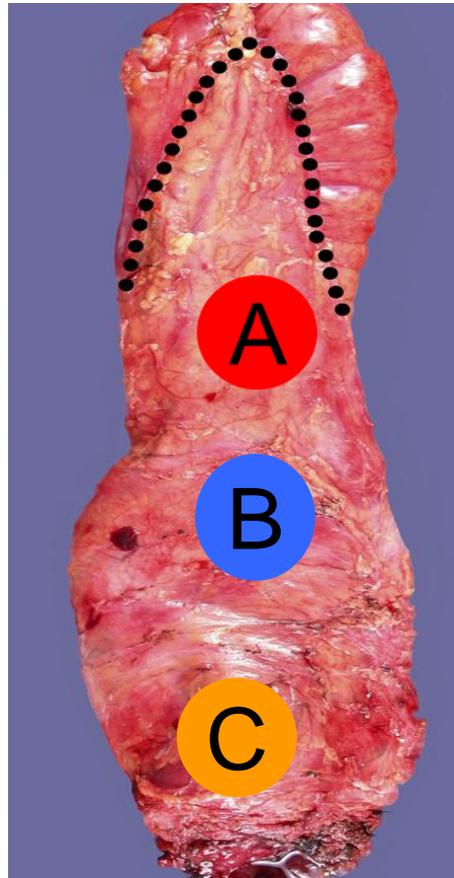


Identify Serosa and Radial Margins

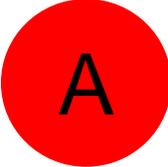
Whether or not a rectal cancer has a circumferential resection margin (CRM) or a non-circumferential resection margin, depends on its location relative to the peritoneal reflections. Those cancers beneath the anterior peritoneal reflection have a CRM while those that are not entirely beneath the anterior peritoneal reflection have a non-circumferential radial margin in addition to a serosal surface that needs to be evaluated.



Anterior

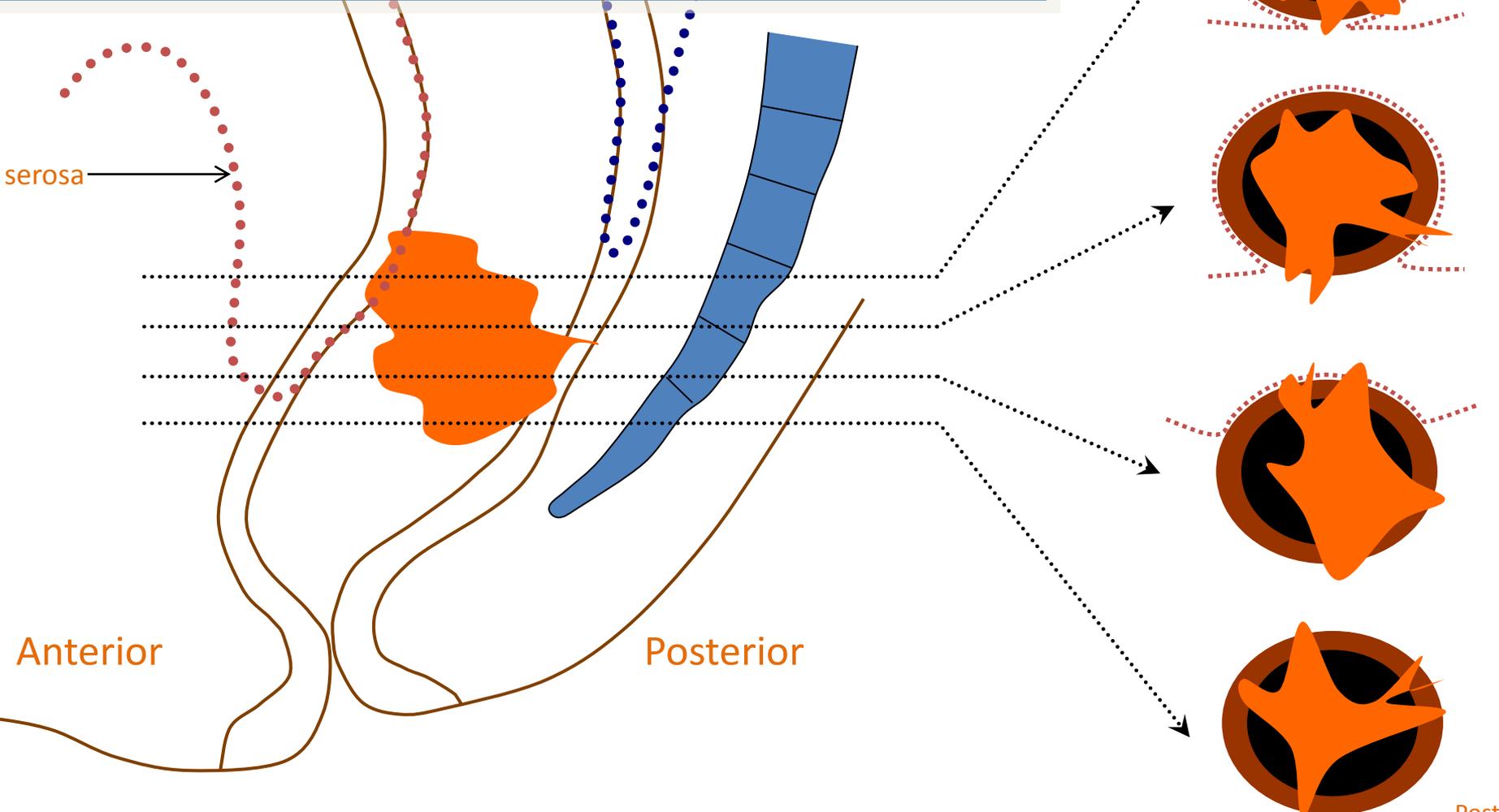


Posterior

-  non-circumferential radial margin (posterior) + serosal surface (anterior)
-  CRM + serosal surface (anterior)
-  circumferential radial margin

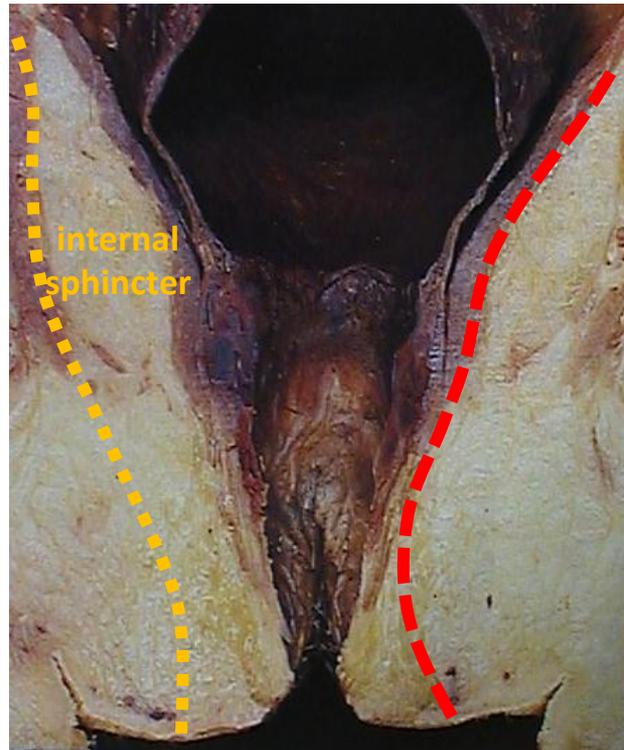
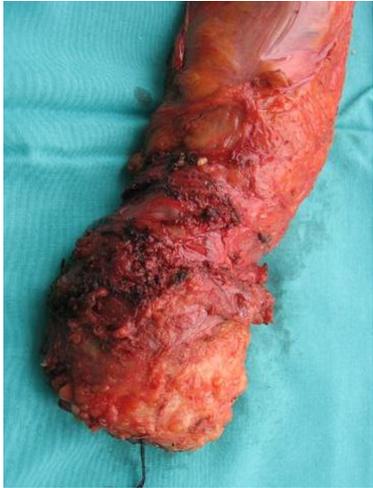
Serosa and Radial Margins

With all rectal cancers that are above the anterior peritoneal reflection, the serosa must be assessed, as well as the radial margin. As one proceeds from superior to inferior, the extent of serosal covering decreases, and the bare area (radial margin) increases in extent, extending from posterior, to posterior and lateral, eventually becoming circumferential.



Types of Abdominoperineal Resection

There are 2 principal types of AP resection: the traditional type does not include the internal sphincter muscle and produces a waisted specimen; the extra-sphincteric type produces a more cylindrical specimen and has a lower rate of margin positivity.



Note: The presence of a waist should not be misinterpreted as a defect in the specimen. It is a normal finding that indicates the site of insertion of the levator muscles.



Step 2 = Grade Quality of Surgery

- grade the quality of the mesorectal excision procedure
- initial assessment is best done prior to fixation and inking, but can be done after fixation if necessary

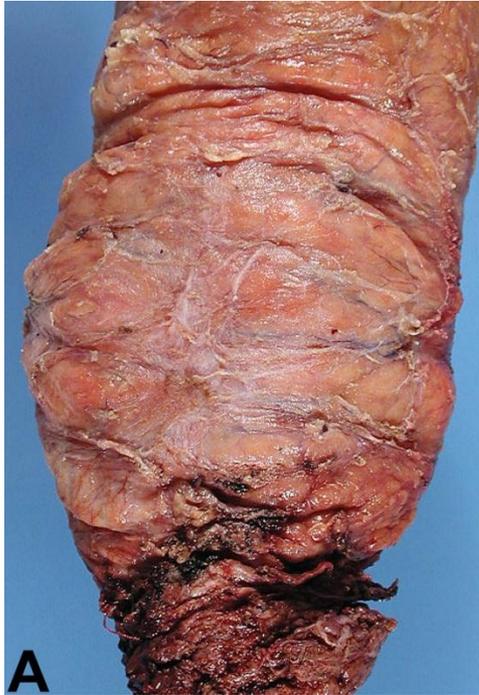
	Mesorectal Bulk and Surface	Defects	Coning	Radial Margin
Complete	bulky, smooth	no deeper than 5 mm	none	smooth, regular
Nearly complete	moderate bulk, irregular	deeper than 5 mm, no visible muscularis propria (except where levator muscles insert)	moderate	moderately irregular
Incomplete	little bulk, irregular	down to muscularis propria	moderate-marked	very irregular

unopened fresh specimen

assessed on sectioned specimen

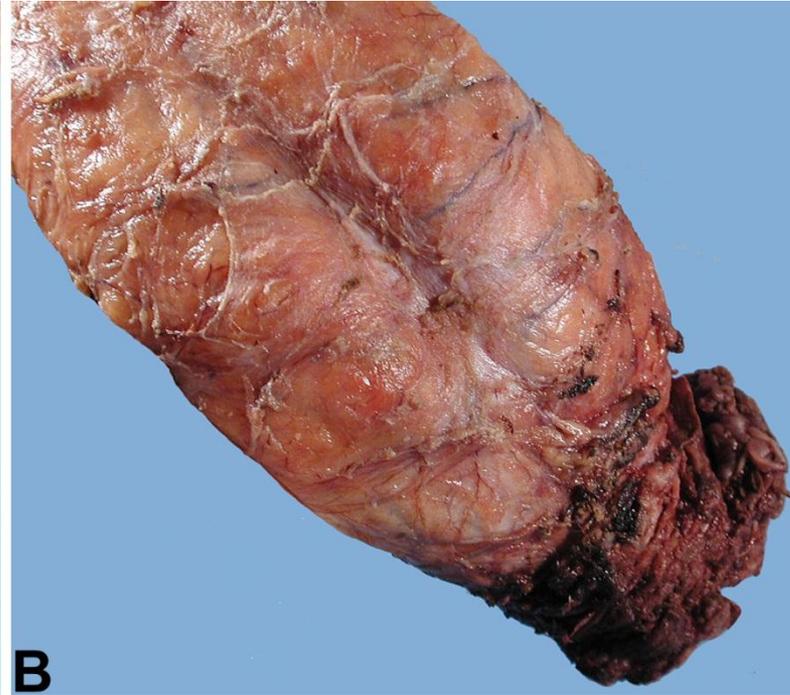
Examples of Mesorectal Excisions

complete



A

complete



B

incomplete



C

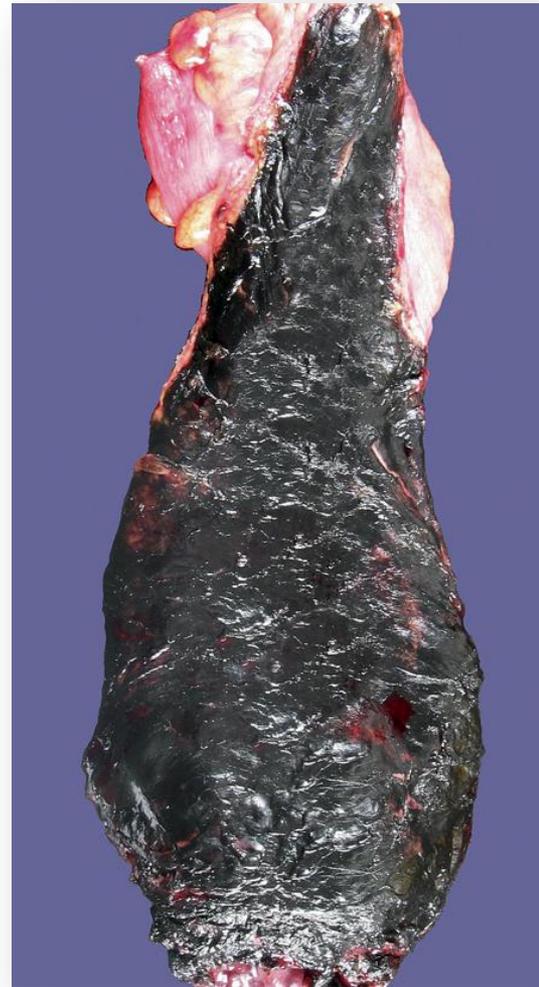
- intact, bulky mesorectum
- B has normal “rectal buttocks”
- no defects deeper than 5 mm
- no coning of the specimen
- wisps of fascia on surface indicate an intact mesorectum
- little bulk to mesorectum
- irregular, ragged mesorectum
- defects down to visible muscularis propria (arrow)

Step 3 = Ink Prior to Fixation

- ink the bare areas (non-peritonealized margins) below the peritoneal reflections



Anterior



Posterior

Step 4 = Partially Open Specimen

- open the specimen along the anterior aspect from the top and the bottom, leaving the bowel intact at a level just above and just below the tumor
- place loose gauze (not paper towel) wicks – soaked in formalin – into the unopened ends of the bowel
- fix specimen for at least 72 hours (96 hours is ideal)

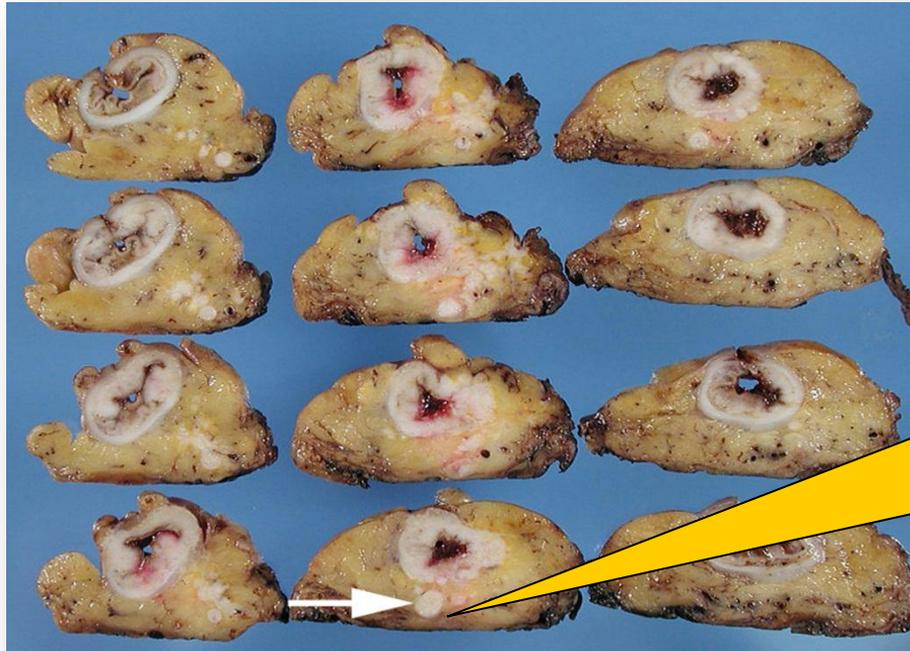


Step 5 = Section

- after at least 72 hours fixation, slice through the unopened bowel at 3-5 mm intervals (section thickness)
- lay slices down on the work surface
- consider photographing the slices, with a scale and labels to designate anterior/posterior and proximal/distal, for subsequent correlation with the pre-operative MRI images



Step 6 = Inspect



distance of +ve node to radial margin may represent the closest distance of tumor to margin \therefore submit the node with the margin and record distance

Assess:

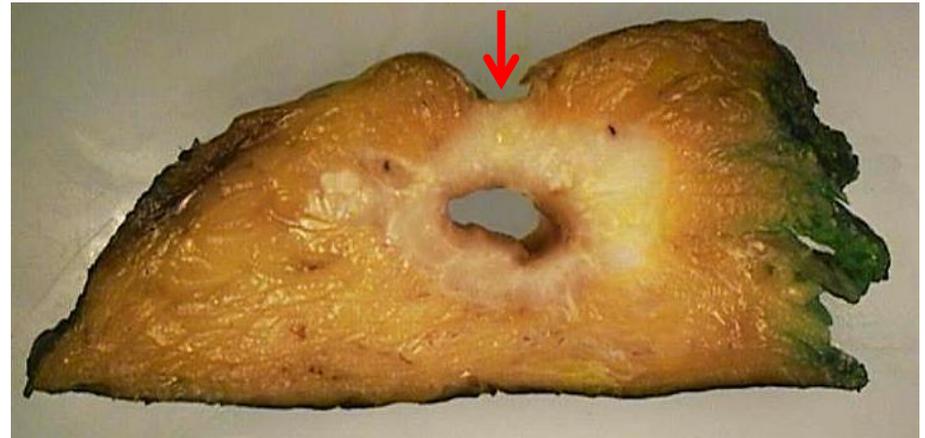
- radial margin: smooth, regular vs moderately irregular vs very irregular
- extent of tumor and the closest distance of tumor to the radial margin
- *obviously* positive nodes (see arrow) and distance of any positive node to margin
- record whether the closest tumor to radial margin is anterior, posterior or lateral
- examine fat away from tumor for lymph nodes
- inspect bowel away from tumor for polyps, other lesions

Serosal vs Radial Margin Involvement

When examining the slices, differentiate between tumor extending to the serosal surface and tumor extending to the radial margin. This relies on correlation of the location of the slice relative to the peritoneal reflection. Note that involvement of the serosa does NOT represent a positive margin.



+ radial margin due to surgical impingement



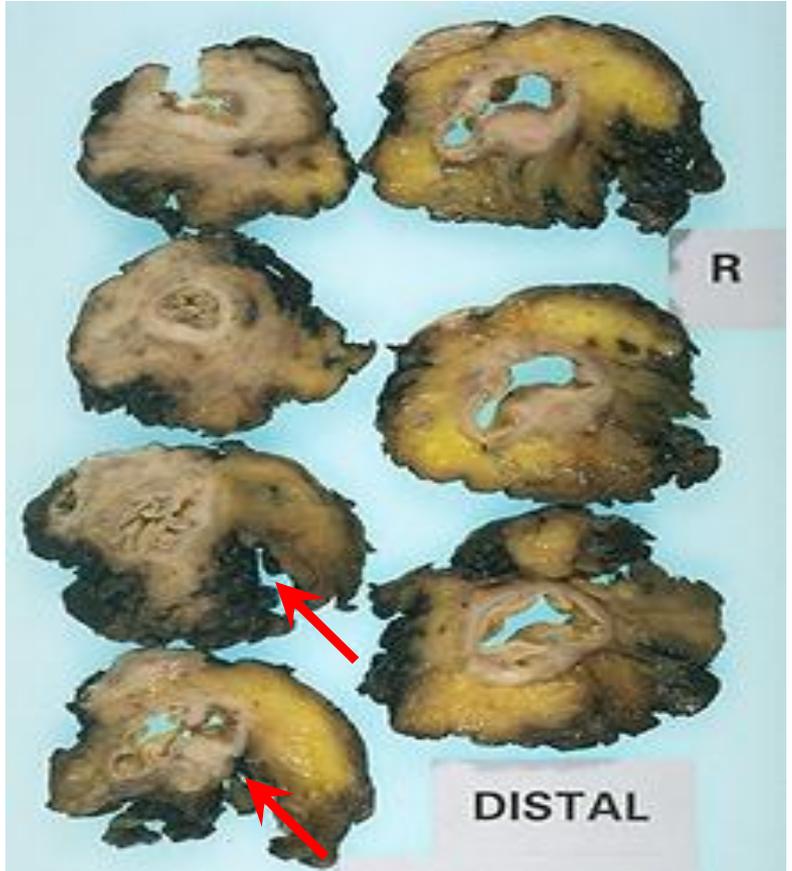
tumor extending to serosa
(not a positive margin)

Examples of Incomplete Specimens

This example: surgical impingement into the intramesorectal plane

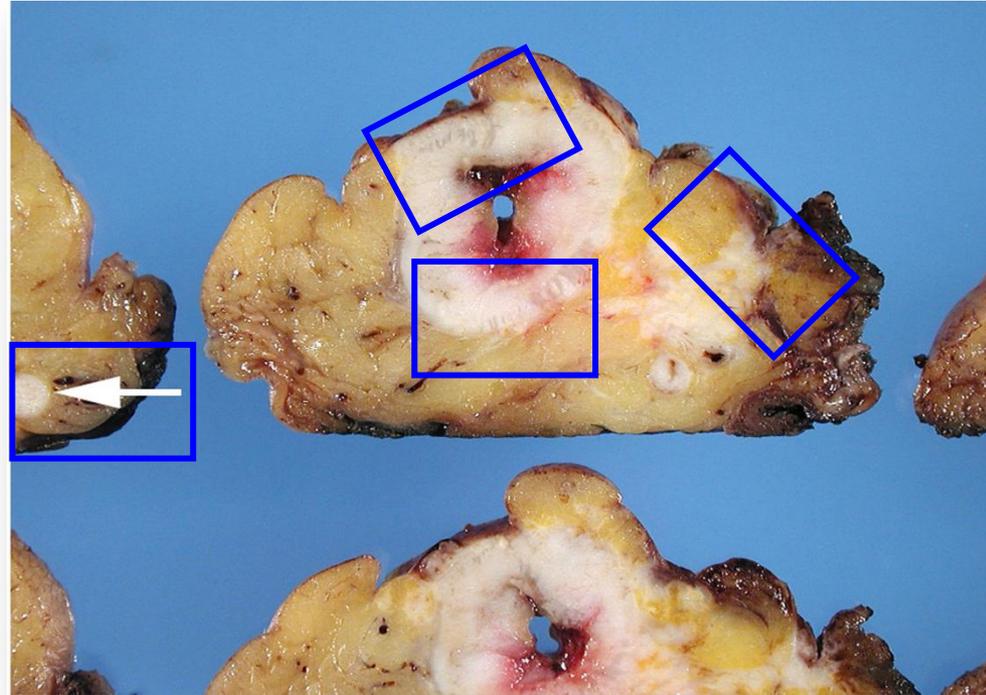


This example: surgical impingement into the muscularis propria plane



Step 7 = Block

- tumor
 - 3 blocks - closest radial margin
 - 2 blocks - luminal aspect
- lymph nodes
 - be careful not to double-count nodes present in more than one slice
 - fat away from the tumor must also be examined to detect lymph nodes
- any polyps
- proximal and distal resection margins (NB: include both mucosa and mesorectum in the distal margin)
- if tumor is present above the peritoneal reflection, the serosa overlying the tumor must be sampled



- example of blocks taken
- note: - tumor extension close to anterior radial margin
- positive lymph node (arrow)

Potential Issues with the Quirke Method

1. *“Fixing the specimen for 4 days is too long and will negatively affect turnaround time.”*
Given the required post-op recovery, and time required prior to starting adjuvant therapy, if required, this should have no negative impact on patient care.
2. *“If I can’t open the specimen, I can’t assess whether the tumor is polypoid, fungating or ulcerating.”*
It is more difficult to assess this, but this descriptor has little if any significance, especially when compared with the benefits of a properly grossed specimen.
3. *“If I can’t open the specimen, I can’t properly assess the size of the tumor.”*
The response is similar to #2. Exact measurements are more difficult to make, but the extent of tumor will be visualized on the cut bowel rings and allow for proper sectioning to be done.
4. *“It’s more difficult to find and count lymph nodes.”*
Finding nodes should not be more difficult; in fact, nodes often stand out better after prolonged fixation and are easier to palpate. But counting nodes is more difficult and the prosector does have to be careful not to double or triple count nodes that are present in more than one bowel ring.