
Article:
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Tables

Table 1. Summary of key recommendations from this article.

1	Pre-operative planning	• Pathology attendance at the planning meeting is recommended. In most centres this will not be possible due to resource constraints, therefore, as a minimum, comprehensive notes from the meeting should be available to the pathologist.
2	Surgical specimen orientation	• The pathology request form should be completed by the responsible surgeon and should contain all key information. • Orientation sutures or numbered beads can be used to mark specific structures and margins of concern. • The reporting pathologist should review the pre-operative planning notes, operation note and the request form prior to dissection. • If there is any uncertainty, the surgeon and pathologist should orientate the specimen together.
3	Specimen receipt and opening	• After orientation, the specimen should be opened to facilitate fixation. • Any bowel should be opened along the peritoneal surface, avoiding the tumour. • Opening the uterus and bladder is optional and should be done through the serosal surface where possible. • If opening/slicing through a surgical margin to aid fixation, the margin should be first inked.
4	Specimen photography	• The whole specimen should be photographed from the anterior, posterior, left and right lateral aspects. • Close-ups should be taken of areas of concern/interest. • A metric scale, orientation labels and surgical orientation markers should be visible.
5	Macroscopic description	• Measure the whole specimen in three dimensions. • Describe and measure all structures/organs identified. • Assess the plane(s) of excision (if colon/rectum included). • Describe the location of visible tumour, perforations and other focal lesions.
6	Specimen inking and removal of bony structures	• Ink all surgical margins according to a locally agreed standard scheme. • Ink the edges of any defects in a different colour. • Bony structures may be dissected from the main specimen for decalcification, and the opposing

		surfaces should be inked. Alternatively, a bone-saw may be used to keep the specimen intact.
7	Sampling prior to cross sectional slicing	• Take margin shaves of all identifiable tubular/ vascular structures and bowel. • Longitudinal bowel margins less than 30mm from tumour should be sampled in full. In cases of squamous cell carcinoma with perineal skin excision, the entire skin margin may need embedding.
8	Cross sectional slicing	• Slice the specimen ideally at 4-5 mm intervals and lay slices out in a standardised format (ideally in the CT plane) with orientation labels and marker beads/sutures visible. • Where 4-5 mm slice thickness is not achievable, document the variation in slice thickness. • Photograph all the slices together, with close ups of tumour slices and areas of interest. • Document which slices contain key organs/structures, marker sutures/beads, defects and additional pathology. • Describe the tumour/tumour bed and tumour deposits, including location (slice and position), size, involvement of en bloc structures, distance to all key margins and relationship to areas of concern.
9	Specimen sampling	• Tumour should be extensively sampled, ideally in large blocks, to include the deepest level of invasion (if primary cancer) and involvement of all en bloc organs/structures. • Additional sampling may be indicated particularly in the context of neoadjuvant treatment and potential complete tumour regression. • Sample all CRMs within 10 mm of the tumour. • Sample all lymph nodes in the specimen with attached CRM where close. The apical node should be embedded separately. Document the location of the lymph nodes according to drainage bed and if a non-regional site. • Sample all tumour deposits. • Take at least one representative block from all other organs. • After sampling, consider wrapping slices sequentially.
10	Bony structures after decalcification	• Slice decalcified bone. • If the bone appears uninvolved, one representative section may be taken. • If the bone appears involved by tumour, describe, photograph, measure distance to margin, and

		sample thoroughly (or completely), with a clear description of the slices. • After sampling, consider wrapping slices sequentially.
11	Microscopic reporting	• Report the tumour type, grade and stage (if primary tumour) along with the site, extent of invasion and presence of venous, lymphatic and perineural invasion. • Describe whether tumour (or fibrosis/acellular mucin) involves organs and structures resected en bloc, and whether en bloc organs or structures show any additional pathology. • Record the distance to any detached bony structures and confirm that the final report is to follow decalcification. • Number and describe multiple tumours separately. • The number of all sampled nodes and involved nodes should be recorded for each location separately (e.g. left/right pelvic sidewall, non-regional sites). • If involved nodes lie close to the CRM, the presence of extracapsular spread or capsule disruption should be recorded. • Report the number and location of tumour deposits. • Report the pM stage if distant metastases are present. • Report the status of all margin shaves, margins of concern and all aspects of the CRM to the closest mm. • For any sites of pR1, record whether this is due to primary tumour, tumour deposit, perineural invasion, venous invasion, lymphatic invasion, or an involved lymph node, in addition to the location of pR1 and whether diathermy artefact is present. • For primary rectal cancer, tumour within an encapsulated lymph node ≤1 mm from the CRM is considered pR0, whereas tumour within a transected lymph node that directly involves the margin or with extracapsular extension ≤1 mm from the CRM, is considered pR1. • The definition of pR1 resection in locally recurrent rectal cancer is not internationally defined and individual MDTs will need to decide how they define pR1 in this context. • Tumour regression grading should be performed after neoadjuvant therapy. It is not validated in locally recurrent cancers, although an equivalent score may be given if helpful.

12	Post-operative correlation meetings	• All primary cancers should be discussed in the relevant MDT meeting. • Cases with unexpectedly involved margins should ideally be discussed in an exenteration specific clinicopathological correlation meeting including radiology, pathology and surgery. Resource constraints may preclude this, at present, in many centres.

Supplementary Tables

Table S1. Illustrative examples highlighting scenarios in which the standardised recommended approach has proven valuable.

1	Pre-operative planning (worked examples)	• An additional polyp that was radiologically concerning for malignancy was referenced in planning but not subsequently documented. Pathology attendance at the pre-operative planning meeting ensured appropriate sampling of this polyp as per the RCPath Dataset. • A tiny deposit, rather than the primary tumour, dictated the extent of surgery. Knowledge of this from the pre-operative planning meeting tailored the pathological approach. • An inconspicuous node of concern at the angle of the coccyx would have been difficult to identify without knowledge of the pre-operative planning. • Background active IBD noted at pre-operative planning was sampled as per RCPath GI Tissue Pathways. • Accurate dissection of the coccyx, located at the level of the adherent small bowel (described in pre-operative planning) avoided margin disruption, facilitating accurate R1 location. • Pre-operative planning identified an area of concern, but as this was not communicated in the planning minutes or on the request form it was minimally sampled as it appeared macroscopically unremarkable. The specimen subsequently had to be revisited, with associated delays and costs.
2	Surgical specimen orientation	• Detailing that specific structures are not included in the specimen (e.g. if the patient has had a previous appendicectomy or

		oophorectomy), saves time searching for these structures unnecessarily. • Pathologists may misinterpret a wider area of concern for a pinpoint focus, leading to inaccurate sampling. Surgical clarification negates this. • Identifying structures with numbered beads allows more specific orientation, reduces errors and facilitates precise R1 location. • Clarifying a defect as artefactual/surgical avoids misinterpretation as a true margin.
3	Specimen receipt and opening	• Early specimen orientation can highlight the need for timely review together with the operating surgeon.
4	Specimen photography	• Whole specimen photography facilitates radiological correlation and accurate location of an involved margin, providing important feedback and learning opportunities. • Anterior, posterior, left lateral, and right lateral whole specimen photography facilitates accurate surgical correlation, interpretation of surgical defects and location of additional soft tissue margin excisions.
5	Macroscopic description	• Detailed macroscopic description of the sites of specific structures (e.g. specific ligaments or nerve roots) within numbered cross-sectional slices improves localisation of R1 and correlation with radiology images. These structures may otherwise be difficult to identify from photographs or histology alone. • Detailing whether and where specific structures of concern are or are not involved offers important feedback to facilitate learning.
6	Specimen inking and removal of bony structures	• Standardised inking significantly reduces the time taken to review cases for pathology-radiology-surgery correlation meetings. • Standardised inking allows accurate identification of where and from which slices blocks were taken if the block key dictation is lost. • Inking bony structures upon removal prior to decalcification enables accurate assessment of tumour involvement of the bony structures and localisation of R1.
7	Sampling prior to slicing (worked example)	• Margin shaves of L5/S1 nerve roots were critical in determining the completeness of excision in recurrent anal SCC.
8	Cross sectional slicing	• Some pathologists find it helpful to arrange slices from proximal to distal, in the CT plane

		(i.e., inferior face up with the right side of the specimen present on the left-hand side of each slice) to allow for efficient and accurate radiological correlation.
9	Specimen sampling	• A detailed block description and sequential labelled wrapping of the slices facilitates returning to the specimen to perform targeted additional sampling for example in cases of a provisional complete pathological response.
10	Bony structures after decalcification	• Correlation with pre-operative planning can inform sampling of bony structures.
11	Microscopic reporting	• Detailed descriptions of R1 location are key, for example: *'The tumour lies 0.1 mm from the left anterolateral margin at the level of the seminal vesicles, slice 5'.* *'A focus of lymphovascular invasion lies 0.2 mm from the posteromedial margin immediately superior to the attached sacrum, slice 6'.*
12	Post-operative correlation meetings (worked examples)	• Discussion of several cases with involved CRM around the sacrum has changed radiological and surgical planning to provide more robust measurements and allow for a wider margin of error. • Discussion of R1 status in SCC has highlighted the need for a more aggressive approach in cases with nerve root involvement.