Original article

Should 'doughnut' histology be routinely performed following anterior resection for rectal cancer?

WJ Speake, JF Abercrombie

Department of Surgery, University Hospital, Nottingham, UK

Stapled low anterior resection is widely employed in the treatment of rectal adenocarcinoma. The technique yields two tissue 'doughnuts' which are often submitted for histological examination. This process is labour intensive and not part of the minimum data set for colorectal cancer histopathology reports. A consecutive series of anterior resection doughnuts from 125 patients was reviewed retrospectively to assess the impact of doughnut pathology on the management of patients. Four doughnuts had a histological abnormality reported but none of these altered treatment. Routine histological examination of 'doughnuts' is not beneficial to the management of patients undergoing surgery for rectal adenocarcinoma.

Key words: Rectal cancer – Anterior resection – Histopathology – Doughnuts

The double-stapled technique of anterior resection of the rectum for adenocarcinoma has enabled low anastomoses to be fashioned with proven safety and efficiency.^{1,2} The staple gun cuts 2 circular 'doughnuts' of tissue from inside the anastomosis, one proximal and one distal. It is customary for the doughnuts to be examined for completeness by the operating surgeon since macroscopic defects in a doughnut increase the risk of a peri-operative anastomotic leak.³ The guidelines published by The Royal College of Surgeons of England and the Association of Coloproctology of Great Britain and Ireland recommended that doughnuts should be examined histologically. This suggestion was not backed by evidence of the usefulness of the information gained from doughnut pathology.⁴ The minimum dataset for colorectal cancer histopathology reports states that it is not necessary to examine doughnuts histologically if the tumour is greater than 30 mm from the cut end, and that

the decision to examine doughnuts in other circumstances should be made locally.⁵

Preparation and histological examination of two doughnuts costs approximately £40.00, and up to 40 min of a pathologist's time.

The aim of this study was to assess the impact of doughnut histology on the management of patients with rectal cancer.

Patients and Methods

Patients who had undergone surgery for rectal adenocarcinoma between 1992 and 1999 were identified from a gastrointestinal cancer database held in the department of histopathology. The histopathological report was then examined and those that commented on doughnuts were retained for analysis. The clinical records of any patient in whom doughnut histology was anything other than

Correspondence to: WJ Speake, Department of Surgery, University Hospital Nottingham, Nottingham NG7 2UH, UK. Tel: +44 115 924 9924 ext 44201; Fax: +44 115 970 9428; E-mail: bill.speake@nottingham.ac.uk

normal were reviewed and the influence of this result assessed.

Results

From a series of 308 anterior resections, 125 (41%) patients with doughnut histology were identified and, of these, 121 sets of doughnuts were normal. Two doughnuts showed non-specific inflammation consistent with diverticular disease, one had a metaplastic polyp with no evidence of malignancy, and one contained adenocarcinoma. This distal doughnut, which was involved by carcinoma, came from a patient with a poorly differentiated Dukes' stage C tumour. The circumferential and distal excision margins of the main operative specimen were also positive for carcinoma. The operating surgeon described the 'high likelihood of locally residual tumour at the end of the procedure'. The fact that the distal doughnut was involved did not influence the management since the pathology of the main specimen dictated that it was already a pathologically non-curative procedure.

Discussion

Direct spread of rectal cancer is usually in the lateral plane and it is rare to find microscopic spread of cancer cells further than 1 cm distal to the limit of the macroscopic tumour.⁶ Lateral resection margin involvement has become increasingly important as a predictor of local recurrence and as a surrogate marker for the quality of surgery.^{7,8} Cross *et al.* suggested that histological examination of proximal and distal bowel resection margins is unnecessary unless the tumour extends to within 2 cm of the resection margin.⁹ The logical extension of this concept is that doughnut histology is irrelevant.

Doughnut histology might prove useful if the distal margin of the specimen is involved by tumour and the relevant doughnut is free of disease, but it is our practice to regard involvement of the distal resection margin as evidence of an incomplete cancer resection. A case might be

made for examining the distal doughnut when there is concern that the distal excision margin is very narrow. However, the distal doughnut does not usually include the entire staple line across the rectal stump and normal doughnut histology is not proof of absence of residual disease. The number of instances where such concern might exist should be minimal since clearance at surgery of at least 1 cm is recommended for the very lowest tumours.⁴

Conclusion

This study does not support routine submission of doughnuts for histological examination.

References

1. Baran JJ, Goldstein SD, Resnik AM. The double-staple technique in colorectal anastomoses: a critical review. *Am Surg* 1992; **58**: 270–2.
2. Redmond HP, Austin OM, Clery AP, Deasy JM. Safety of double-stapled anastomosis in low anterior resection. *Br J Surg* 1993; **80**: 924–7.
3. Griffith CD, Hardcastle JD. Intraoperative testing of anastomotic integrity after stapled anterior resection for cancer. *J R Coll Surg Edinb* 1990; **35**: 106–8.
4. Expert Advisory Group to The Royal College of Surgeons of England and the Association of Coloproctology. *Guidelines for the Management of Colorectal Cancer*. London: The Royal College of Surgeons of England, 1996.
5. The Royal College of Pathologists. *Minimum Dataset for Colorectal Cancer Histopathology Reports*. London: The Royal College of Pathologists, 1998.
6. Williams NS, Dixon MF, Johnston D. Re-appraisal of the 5 centimetre rule of distal excision for carcinoma of the rectum: a study of distal intramural spread and of patients' survival. *Br J Surg* 1983; **70**: 150–4.
7. Quirke P, Durdey P, Dixon MF, Williams NS. Local recurrence of rectal adenocarcinoma due to inadequate surgical resection. Histopathological study of lateral tumour spread and surgical excision. *Lancet* 1986; **2**: 996–9.
8. Adam JJ, Mohamdee MO, Martin IG, Scott N, Finan PJ, Johnston D *et al.* Role of circumferential margin involvement in the local recurrence of rectal cancer. *Lancet* 1994; **344**: 707–11.
9. Cross SS, Bull AD, Smith JH. Is there any justification for the routine examination of bowel resection margins in colorectal adenocarcinoma? *J Clin Pathol* 1989; **42**: 1040–2.