Transanal endoscopic microsurgery

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The anatomy of the pelvis makes it difficult to perform local excisions in the rectum when a tumour is some distance from the anal verge. Transanal endoscopic microsurgery, a minimally invasive procedure, has been developed. It provides an alternative to the transsacral or transabdominal approach, with subsequent shorter hospital stay and fewer complications.

Transanal endoscopic microsurgery (TEM) is an endoluminal, minimally invasive technique for local excision of rectal and lower sigmoid tumours. Professor Gerhard Buess developed it in Cologne, Germany in 1983 (Buess, 1993), although its use mainly remained confined to a number of centres in Germany until the explosion of minimal invasive techniques in the 1990s (Saclarides, 1997). The senior author (MJH) performed the first TEM in the UK in 1993 (Mayer and Mortensen, 1995) and there are currently 24 centres in the UK performing this technique.

When comparing TEM with the conventional abdominal approach to rectal lesions there is no abdominal incision and consequently less patient discomfort. Recovery is more rapid and associated with a lower morbidity. The excellent visualization made possible by TEM enables precise excision and may produce a reduced local recurrence rate.

TRADITIONAL APPROACHES

The traditional techniques for excising benign rectal tumours have been by the abdominal approach (anterior resection), the transsacral approach (Kraske, 1885), or via the transsphincteric approach (Yorke-Mason, 1974). Unfortunately these traditional techniques carry a high morbidity (Localio, 1983). It is for this reason that a number of local excision techniques have been developed. Park's transanal technique (1968) allows dissection under direct vision, and remains a valuable and widely practised procedure for low rectal lesions. However, using this technique, even benign lesions have a recurrence rate of approximately 10%, even in the best hands, perhaps as a result of poor access.

Rectal neoplasms have also been removed in a piecemeal fashion with the use of a modified transurethral resectoscope (Gaya et al, 1983). However, adequacy of excision cannot be guaranteed because of difficulty in obtaining representative histology, which means that it is not possible to guarantee complete excision. Colonoscopic excision, laser ablation and photodynamic therapy similarly cannot effectively deal with large rectal lesions, whereas TEM permits precise dissection under direct vision, enabling adequate clearance and excellent histology. TEM is ideally suited for resection of benign sessile adenomas from the rectal cavity, but may also be applicable for local resection of early carcinomas (Steele et al, 1996).

Local resection of T1 rectal carcinomas with good or moderate differentiation is appropriate as they have a relatively low risk of metastatic spread. Conventional rectal resection by the transabdominal approach has significant associated morbidity and mortality, particularly for elderly and frail patients. Studies have shown that when TEM is compared with anterior resection for early carcinoma the operative morbidity is significantly reduced (Winde et al, 1996) and the 5-year survival similar (Heintz et al, 1998). For several years the senior author (MJH) has worked with Dr S Myint (Clatterbridge and Royal Liverpool and Broadgreen University Hospitals Trust) and combined preoperative chemoradiotherapy with TEM for early rectal carcinoma. Currently a prospective randomized trial of preoperative chemoradiotherapy and local excision *vs* anterior resection or abdominoperineal resection is planned (E Lezoche et al, personal communication, 1999).

STAGING

Staging of rectal cancer before TEM may accurately be performed by endorectal ultrasound or intrarectal magnetic resonance imaging (Banerjee

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et al, 1996). Local excision of rectal cancer should be by full thickness technique with a clearance margin of at least 1 cm. In the authors' practice, the same excision technique is used for benign adenomas, as approximately 10% of these will have a focus of carcinoma within them.

TEM is performed with a specially designed resectoscope of 4 cm diameter and either 12 cm or 20 cm in length with a 45° end, which holds a stereoscopic optic. The latter provides a precise three-dimensional view of the operative area with up to six-fold magnification of the operative field. The telescope contains channels for light, viewing, insufflation and irrigation. The working insert also has three ports to allow passage of instruments. An combined electrosurgical instrument (ERBE Medical Instruments Ltd) allows suction, irrigation, monopolar diathermy and bipolar coagulation, and is the authors' instrument of choice. Carbon dioxide insufflation is automatically adjusted to maintain a pressure of 15 mmHg so that the rectal wall does not collapse when suction is used.

PROCEDURE

Informed consent is obtained, emphasizing that if it is not considered technically safe to proceed with TEM then an open procedure may be required. Since the authors' policy is to perform full thickness excision routinely, it is vital to have excellent bowel preparation. The patient is positioned on the operating table such that the lesion lies inferior. This may involve the patient in lithotomy, prone jack-knife or lateral position.

General anaesthesia is usually employed, although it is possible to employ spinal anaesthesia in frail patients with small posterolateral lesions. Four planes of dissection are considered: submucosal, partial thickness, full thickness and wide excision where the plane extends through into the retrorectal space.

The tumour is appropriately localized using the resectoscope. The procedure begins by defining the margin of clearance using coagulation dots. In the case of an adenoma, the distance to the macroscopic tumour edge should be 5 mm, and 10 mm in the case of carcinoma. The lesion is then mobilized in the appropriate plane. The subsequent defect is closed with continuous polydioxanone suture which is secured with silver clips. The lesion, which is removed intact, is orientated, pinned out on a corkboard and sent for histological analysis.

The key advantages of this relatively new technique are: it is a minimally invasive technique without the need for a laparotomy, it affords excellent vision of the gas-filled rectum facilitated by optic magnification, excision is precise, postoperative recovery is usually swift and there is good cosmesis.

The main disadvantages of the technique are limited space in which to operate, the whole apparatus is expensive to purchase and relatively complicated to set up (Buess, 1993; Saclarides, 1997; van Dalen and Hershman, 1997).

CONCLUSIONS

The advantages of TEM are the precise excision facilitated by a magnified, three-dimensional image and constant gas dilatation of the rectum, as translated in low complication and recurrence rates. In addition, there is minimal postoperative pain, shorter hospitalization and rehabilitation, and no external scar. The major disadvantages of the technique are that it is technically very demanding, it is complex to set up, in addition the apparatus is not cheap. There are relatively small numbers of patients whose tumours are suitable for this technique, and so it probably should be practised in certain regional centres. HM

Conflict of interest: none.

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KEY POINTS

- Transanal endoscopic microsurgery (TEM) provides a minimally invasive technique without the need for laparotomy.
- The technique affords excellent visualization of the gas-filled rectum.
- TEM allows precise excision of benign and early malignant (T1) lesions.
- The technique leads to low recurrence rates.
- Following surgery recovery is usually swift, allowing early discharge.
- TEM is associated with a low morbidity and mortality.