**Colonoscopic preoperative localization using submucosal injection of radiolabelled colloid**

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Malignant colonic polyps can be removed endoscopically but surgical resection is sometimes required. However, the polypectomy site can be difficult to locate. Current methods use various tattooing agents, with varying degrees of success. A new technique using preoperative injection of technetium-99m-labelled antimony colloid, with intraoperative localization using a handheld gamma probe, is described. Although unsuccessful in terms of localizing a previously partially resected polyp, the technique itself proved safe and simple, and has some advantages over other endoscopic approaches.

**Key Words:** Colonic polyps; Lymphoscintigraphy; Sentinel lymph node

CASE PRESENTATION

A 66-year-old man underwent screening colonoscopy. During the procedure, a polyp was found in the ascending colon. A polypectomy was performed. Subsequent histopathology revealed a polyp measuring 12 mm × 10 mm × 5 mm, which contained a focus of moderately differentiated adenocarcinoma. The invasive adenocarcinoma extended into the submucosa and was 0.8 mm from the excision margin. Lymphovascular invasion was also present. A second colonoscopy and definitive surgery occurred nine weeks later. Colonoscopy was performed by the same proceduralist. In the ascending colon, a small, 1 cm polypoid lesion was located at what was thought to be the same site as the original polyp. Using a disposable varices injector (Cook Australia, Australia), 0.5 mL (10 nBq/mL) of technetium-99m-labelled antimony colloid (Dupont Pharmaceuticals Co, USA) was injected submucosally at the site of the polyp. To ensure that the radioactive tracer was placed accurately in the submucosal layer, this injection was 'sandwiched' between two 1 mL injections of isotonic saline, as previously described by Fu et al (9). No complications resulted from the colonoscopy or injections.

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Two lymph nodes were identified, which were benign. 

Surprisingly, histopathology of the resected right hemicolon revealed no evidence of hepatic or peritoneal metastases. A right hemicolectomy was then performed and the specimen was removed from the operative site. The remaining colon and peritoneal cavity were once again checked for areas of radioactive tracer corresponding to the polypectomy site and was contained within a small area approximately 1 cm in diameter, adjacent to the colonic mesentery. No other areas of radioactivity were found within the colon or the abdominal cavity.

A right hemicolectomy was then performed and the specimen was removed from the operative site. The remaining colon and peritoneal cavity were once again checked for radioactivity, and no areas eliciting a count above the background level were identified by the probe. The resected colon was opened, and the small polyp, which had been seen at colonoscopy, was identified. The probe confirmed this area as a site of localized, high radioactivity, and the area was marked with a silk suture. Intraoperative scanning of the specimen mesentery was performed but no ‘sentinel lymph nodes’ were found. Postoperatively, the patient’s recovery was complicated by antibiotics, which have an advantage because they may be injected several days before surgery. However, submucosal tattoos may not be visible at surgery and, conversely, some agents may disperse widely and not remain localized at the injection site (11,12). Tattooing agents can also lead to local complications. Injection of India ink, the most commonly used tattooing agent, can lead not only to submucosal reactions but also mucosal ulceration, necrosis and edema (11,12), and even fat necrosis and phlegmon formation (13). It is not known whether radiolabelled colloid has the potential to cause complications, such as allergic reactions, within the short interval between colonoscopy and surgery. However, this seems unlikely because it has not been seen in other applications of this technology. Other tattooing agents, such as indocyanine green and methylene blue, are not commonly used because they disperse within seven days, and are associated with mucosal ulceration, necrosis and severe inflammatory reactions (11,12). Admittedly, the technique described in the present paper is more logistically demanding than the use of a tattooing agent, because marking must occur within a few hours of surgery. Nonetheless, the technique does have a role, particularly in cases where there is concern regarding potential allergic reactions to tattoo agents. In addition, with the growth of nuclear medicine, suitably labelled anergic fluid is now available at most general hospitals on relatively short notice.

DISCUSSION

To our knowledge, the present paper is the first to report the use of submucosally injected, radiolabelled fluid in an attempt to locate a colonic polypectomy site. The absence of adenomatosus tissue in the resected specimen suggests that the site injected was not that of the previous polypectomy. The polypectomy site may have healed in the nine weeks between the polypectomy and the hemicolecetomy. It may therefore be better to perform localizing procedures sooner following polypectomies in these types of cases. Nonetheless, the technique described was successful in localizing endoscopically identified tissue and is logistically simple; other than the requirement to minimize the time between colonoscopic labelling and surgery, to reduce both the risk of potential diffusion of radioactive tracer away from the polypectomy site and the decay in the radioactivity of the tracer, the half-life of which is 6 h (10). The ‘sandwich’ technique, in which the tracer injection is made between two injections of isotonic saline, has two advantages: it reduces the risk of colonic perforation by the needle, with consequent injection and spillage of tracer into the peritoneal cavity; and it increases the accuracy of injection into the submucosa rather than into other layers of the colonic wall (9).

Alternatives to the technique described above include tattooing agents, which have an advantage because they may be injected several days before surgery. However, submucosal

REFERENCES


