Stapled hemorrhoidectomy (mucosectomy) is a new technique that has been developed for the treatment of third-degree and fourth-degree hemorrhoids and rectal mucosal prolapse. Three randomized, controlled trials have shown stapled hemorrhoidectomy to be associated with reduced postoperative pain and earlier return to normal activities, compared with excisional diathermy hemorrhoidectomy. No major adverse effects because of stapling were reported in these studies, and the rates of minor complications, such as secondary hemorrhage and rectal stricturing, were similar for both methods. As a result, stapled hemorrhoidectomy is being performed more frequently.

Despite the results in favor of stapled hemorrhoidectomy, cases of persistent pain and fecal urgency in other studies and a few reports of more serious complications have led some authors to caution against the more widespread adoption of the stapled technique until a thorough review of the results and complications from centers practicing the technique have been conducted. We describe a case of retroperitoneal sepsis caused by stapled hemorrhoidectomy and review the literature on the more serious complications associated with the procedure.

CASE REPORT

A 36-year-old male underwent day case stapled hemorrhoidectomy for persistently bleeding prolapsing hemorrhoids that failed to respond to more conservative treatment. A 33-mm Proximate HCS (PPH 01) hemorrhoidal circular stapling gun (Ethicon Endo-Surgery, Inc, Cincinnati, OH) was used. Rigid sigmoidoscopy was not performed, because a recent colonoscopy had shown no other pathology. There was minor staple line bleeding that was controlled by electrocautery. Perioperative antibiotics were not given, and the patient was discharged after three hours. He presented to the emergency department 36 hours later complaining of rectal discomfort, lower abdominal pain, and fever. There was no rectal bleeding or diarrhea. He was febrile (temperature, 38°C), his abdomen was slightly distended, and there was guarding to palpation in the suprapubic area. On rectal examination there was an offensive serous discharge, but the staple line seemed intact. The white blood cell count was $15 \times 10^9/l$. Extensive retroperitoneal gas was present on a supine abdominal radiograph (Fig. 1), but no pneumoperitoneum was visible on an erect chest x-ray. A diagnosis of retroperitoneal sepsis was made, and the patient was admitted and treated with intravenous cefuroxime and metronida-
zole. His temperature and white blood cell count progressively settled to normal, and his symptoms resolved. Seventy-two hours after admission, a repeat abdominal film showed a substantial reduction of the retroperitoneal gas, and the patient was discharged on antibiotics. When reviewed in the follow-up clinic one week later, he had fully recovered. At three months postoperatively he had no residual problems.

In 18 other stapled hemorrhoidectomy patients who have had a transient postoperative pyrexia and mild abdominal pain or pelvic pain, we have performed abdominal radiographs. Retroperitoneal gas has not been seen in any other case, and no one else has developed clinical symptoms of retroperitoneal or pelvic sepsis.

**DISCUSSION**

Serious complications caused by stapled hemorrhoidectomy and published in the literature include two case reports of severe pelvic sepsis. In addition, Herold and Kirsch recently alluded to the results of an anonymous survey of 224 departments of surgery performing stapled hemorrhoidectomy in Germany. In 4,635 stapled hemorrhoidectomies three cases of rectal perforation (two requiring temporary and one permanent stoma formation), one of complete rectal obstruction, one with a large retrorectal hematoma, and one case of lethal Fournier’s gangrene were reported.

In the case described by Molloy and Kingsmore, the patient was initially treated with intravenous antibiotics on the night of surgery but failed to respond. Both that patient and the one reported by Roos, one with a rectovaginal fistula, were subjected to laparotomy, debridement, and colostomy formation, at which time the staple lines were found to be intact. In one case there was extensive retroperitoneal gas, and the pararectal tissues were highly inflamed, although there was no tissue necrosis. Polymicrobial infection was demonstrated in both these cases (Escherichia coli, group A Streptococcus, and Enterococci in one case, Coliforms, Bacteroides, and Clostridial species in the other).

Fatal and nonfatal sepsis has also been reported after rubber-band ligation and injection sclerotherapy of hemorrhoids. The cause of severe pelvic and retroperitoneal sepsis associated with both surgical and nonsurgical treatment of hemorrhoids remains uncertain. Usually the infection is polymicrobial, frequently with gas-forming organisms. With stapled hemorrhoidectomy it has been postulated that stapling itself might allow bacterial ingress into the perirectal tissues, synergistic infection then spreading rapidly through the pelvic and retroperitoneal fascia. Too deep a placement of the pursestring suture or the drawing in of too much tissue into the stapler housing may incorporate the muscularis propria in the staple line. Full-thickness rectal wall stapling would almost certainly allow bowel-derived organisms to enter the pararectal tissues. The incorporation of rectal wall muscle in the excised tissue is not uncommon after stapled hemorrhoidectomy. In the Leicester study of 11 patients in the stapled group and in Cheetham and colleagues’ report of 5 patients with long-term complications after stapled hemorrhoidectomy had muscularis propria in the excised tissue. In Singapore, where all stapled hemorrhoidectomy doughnuts were sent for histology examination as part of a study, 100 percent of patients had rectal wall smooth muscle in the excised specimen. Electrocautery around the staple line, in an effort to effect hemostasis, may cause