normal small bowel series before capsule ingestion. When the procedure is performed in patients with presumed small bowel obstruction, retention rates up to 21% per cent have been reported. Wireless capsule endoscopy has demonstrated effectiveness in the diagnosis of Crohn’s disease in the range of 33% to 100% per cent. Patients with diagnosed Crohn’s disease have a higher incidence of capsule retention than suspected disease. The causes of obstruction include jejunal mass, structuring Crohn’s enteritis, and extensive postoperative adhesions. With the increased use of capsule endoscopy, surgeons must be familiar with its pros and cons. Retention during capsule endoscopy has been defined as the presence of the capsule in the body for at least 2 weeks. Prolonged retention up to 21 months has been reported in the literature. The retention is usually considered permanent and will require medical, endoscopic, or surgical intervention to remove the capsule. In the majority of cases, retention of the capsule itself indicates the presence of at least one sticture. Many previous series have reported capsule retention proximal to strictures that had remained undetected with standard imaging techniques. A small bowel followthrough has been suggested in the literature before patients undergo capsule endoscopy. However, retention rates as high as 4 to 6.7 per cent have been reported despite normal small bowel series and CT enteroclysis.

Double-balloon endoscopy, laparoscopic exploration, and surgical exploration have been reported for capsule extraction. In the present case, there was a known history of Crohn’s disease and the patient had multiple previous laparotomies for subtotal colectomy, bowel obstruction, and abdominal wall hernias.

A pediatric colonoscope was used for attempted capsule retrieval. This was unsuccessful. We used fluoroscopy intraoperatively to quickly and accurately localize the capsule and retrieve it from the small bowel without causing additional morbidity. Although there has been no absolute contraindication to the use of capsule endoscopy, it should be used cautiously in a patient with known Crohn’s disease. Use of a small bowel follow-through study is highly recommended before using capsule endoscopy but does not absolutely rule out obstruction. Another important surgical consideration in patients with Crohn’s disease is to anticipate other associated problems like bleeding, multiple strictures, fistula, tumor, and perforation. All the videos obtained from the capsule should be studied before performing any elective procedures and also all these patients must have preoperative abdominal films immediately before surgery in the holding area to confirm the presence of the capsule. Laparoscopic exploration can be attempted in a person with no known surgical history but is not always successful. Fluoroscopy should always be used intraoperatively at the time of open exploration because it significantly reduces the morbidity associated with surgery.

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Laparoscopic Management of Gallstone Ileus

To the Editor:
We report a patient with gallstone ileus that was diagnosed on CT scan and managed with laparoscopic-assisted enterolithotomy.

An 81-year-old woman presented with a 5-day history of progressive nausea, vomiting, and intolerance of oral intake. She denied fatty food intolerance, biliary colic, or cholecystitis episodes. She reported mild abdominal discomfort. Physical examination revealed an afibrile, morbibly obese woman with stable vital signs with generalized mild abdominal tenderness and no peritoneal signs. Liver function tests, amylase, and complete blood count were normal and blood urea nitrogen was elevated. Intravenous fluid resuscitation was initiated, but the patient developed bilious vomiting. Plain abdominal radiographs demonstrated a distended loop of small bowel with a calcified mass in the

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pelvis and presence of pneumobilia. Abdominal CT scan with oral contrast revealed small bowel obstruction secondary to gallstone impaction in the small bowel and presence of pneumobilia consistent with a diagnosis of gallstone ileus (Fig. 1). After fluid resuscitation and correction of electrolytes, the patient underwent emergent laparoscopic exploration. A 10-mm periumbilical trochar was placed. 12 mm Hg CO₂ pneumoperitoneum established, and a 10-mm 30° scope was then introduced. Two further 5-mm ports were placed on the right side of the abdomen. Laparoscopic exploration revealed a dilated, hyperemic, and edematous proximal segment of jejunum. There appeared to be a large oval mass within this particular segment of jejunum approximately 2 feet from the ligament of Treitz and the distal small bowel appeared to be collapsed. The umbilical port site incision was extended to approximately 4 cm and the loop of jejunum containing the impacted gallstone was delivered through the wound. A transverse enterotomy was made in the jejunum and a large gallstone was extracted extracorporeally. The enterotomy was closed in two layers and the jejunum returned into the abdomen. There were severe inflammatory omental adhesions noted in the right upper quadrant and the gallbladder and the fistula were not visualized. In view of the patient’s age and significant medical comorbidities, further extensive dissection required to address the gallbladder and the duodenal fistula was felt not to be warranted. The patient did well. At follow up, the patient remained asymptomatic with no further biliary symptoms and therefore the cholecystenteric fistula was left alone.

Bartholin in 1654 first described a rare entity known as gallstone ileus, which is a misnomer and represents mechanical intestinal obstruction caused by intraluminal impaction of gallstones rather than a true adynamic ileus. The gallstone enters the gastrointestinal tract through a cholecystenteric fistula resulting from recurrent cholecystitis. Gallstone ileus is a rare surgical emergency that occurs predominantly in the elderly and female population over the age of 65 years. Although its incidence is reported to be only 1 to 4 per cent of all cases of small bowel obstruction in the elderly, it accounts for 25 per cent of the cases of small bowel obstruction. Reisner and Cohen reviewed 1001 cases of gallstone ileus reported in the literature and found terminal ileum and ileocecal valve as the most common site of gallstone impaction (60.5%) as a result of the small-caliber and less active peristalsis. Other less common sites reported include the jejunum (16%), stomach (14.2%), colon (4.1%), and duodenum (3.5%). Preoperative diagnosis is made in only 43 to 73 per cent of cases and therefore most cases are diagnosed at laparotomy. Rigler et al. in 1941 described a tetrad of radiologic findings consisting of 1) pneumobilia; 2) aberrant site of gallstones; 3) change of the position of a previously observed gallstone; and 4) small bowel dilatation suggesting partial or complete obstruction. Abdominal CT scan with contrast is therefore the preferred definitive study shown to be accurate in diagnosing gallstone ileus and often shows pneumobilia, small bowel obstruction, and intestinal intraluminal gallstones. This report and others confirm that laparoscopy is also effective in both diagnosis and treatment of gallstone ileus. Although laparoscopy allows the entire small bowel to be examined using the two-handed technique, caution is required in handling the obstructed bowel, which is often edematous and friable and therefore prone to inadvertent enterotomy. The ultimate goal of treatment is to relieve intestinal obstruction by performing enterolithotomy. Open laparotomy for stone removal has been the standard of care; however, the high reported morbidity and mortality associated with conventional open surgery has led to the search for minimally invasive approaches for enterolithotomy: (1) laparoscopic or laparoscopic-assisted; (2) endoscopic removal; (3) shockwave lithotripsy; and (4) Nd:YAG laser lithotripsy. At the present time, there are very few cases reported in the literature with these alternative procedures as a result of the rarity of this entity; however, the mortality reported has decreased from 40 per cent in 1960 to 15 to 18 per cent in the 1990s. Reisner and Cohen reported in 1994 a mortality rate as low as 11.7 per cent for patients having enterolithotomy alone versus 16.9 per cent for patients undergoing enterolithotomy plus definitive cholecystectomy and closure.

Fig. 1. Abdominal and pelvic CT scan showing a large oval calcified gallstone impacted in the proximal jejunum with proximal dilatation and a collapsed distal small bowel suggesting obstruction.
of fistula in one stage. Currently, there is ongoing controversy regarding the optimal management of the cholecystenteric fistula with proponents of a single-stage procedure arguing cholecystectomy and fistula closure would potentially prevent attacks of cholecystitis, cholangitis, and recurrent gallstone ileus. The counterarguments posed by supporters of enterolithotomy alone cite the higher mortality associated with the one-stage procedure. Biliary surgery for recurrent symptoms is needed in only approximately 10 per cent of the patients. There is at present no consensus on the optimal management of the fistula. Clinical judgment is therefore crucial and treatment should be individualized based on careful clinical evaluation of the patient's comorbidities and clinical status. With early diagnosis based on a high index of suspicion, aggressive preoperative resuscitation and selective use of laparoscopic or laparoscopic-assisted enterolithotomy can be safely performed in the elderly patient with an excellent outcome and possibly shorten the hospital length of stay and help reduce the significant morbidity and mortality associated with open laparotomy.

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Cystic Adenovital Disease of the Popliteal Artery: A Potential Cause of Lower Extremity Claudication

To the Editor:

Popliteal artery occlusion and the disease processes leading up to it cause morbidity and mortality by decreasing or completely blocking supply through the popliteal artery and into the lower leg and foot. Tissue ischemia results. Claudication usually is the first manifestation followed by rest pain and tissue loss (gangrene). Once a portion of a lower extremity becomes gangrenous, infection becomes a constant mortal threat.

Several etiologies have been identified resulting in popliteal artery occlusion. Atherosclerosis is by far the most common cause of popliteal artery occlusion. Popliteal artery aneurysms are the most common peripheral aneurysms. They occur in 0.01 per cent of all hospitalized patients. From 50 to 70 per cent of all aneurysms are bilateral. These aneurysms are most often caused by either atherosclerosis or trauma. Fifteen per cent of lower extremity emboli affect the popliteal artery. Popliteal entrapment is a rare cause of popliteal artery occlusion. This syndrome occurs most commonly in young athletes such as cyclists. Cystic adventitial disease (CAD) is another rare cause of popliteal artery occlusion, accounting for approximately 300 cases since 1947.

CAD is a rare condition found in approximately one in 1000 angiogram studies for claudication. It typically appears in healthy male patients in their fourth or fifth decade of life. The disease is never found in the contralateral vessels and there has never been an association with development of systemic connective tissue disorders. This disease commonly causes a single-segment occlusive disease and is described on angiography as having an “hourglass” appearance. An eccentrically located cyst, which tapers smoothly both proximally and distally, is described as producing a “scimitar sign.”

Histologically, the cysts are very similar to ganglion cyst and proteohyaluronic acid is noted to be the major fluid component.

Treatment of these cysts varies, although surgical intervention appears to be the optimal treatment for long-term results. Aspiration is usually successful in eradication of the lesion, although it predisposes to early recurrence. Incision into the cyst and evacuation of its contents usually restores the patency of the artery and is currently the treatment of choice if the artery has not become occluded. Historically, many of these masses were treated with cyst excision and graft placement with good results. CT-guided drainage has also been described, although it alleviates the problem only temporarily.

A 48-year-old white man presented to the office with a 4-month history of progressive left lower extremity pain with exercise. The patient also stated that he had recently begun to notice his leg “fell asleep” if he sat in a chair for more than a few minutes. At the time of presentation, his initial claudication distance was 50 meters and absolute claudication distance was 150 meters. The patient’s medical history was significant only for hypertension, and he had never smoked tobacco.