Brief Reports

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Incidental Left-Sided Gallbladder During Laparoscopic Cholecystectomy for Cholelithiasis

The gallbladder, which forms from the cavitation and coalescing of the epithelial cells from the primitive gut, develops as an outpouching from the hepatic diverticulum and rests normally in the gallbladder fossa between liver segment IV and V. Rarely, ectopic locations can be found including transverse, intrahepatic, retrodisplaced, and left-sided. The presentation of a left-sided gallbladder (LSG) usually occurs in the setting of situs inversus. However, transposition of only the gallbladder is seen in up to 0.3 per cent of the population. Sporadic reports of aberrant gallbladder beneath the left liver have come from all over the world but mostly from Japan, and there are no previous reports from the mainland of China. The detection of an aberrant gallbladder and the complexity that may develop with it have assumed a new dimension as laparoscopic cholecystectomy (LC) has become the standard operative procedure for gallstones. We report on two cases of left-sided gallbladder discovered incidentally during LC.

A 35-year-old male presented to our surgical clinic with a 2-year history of epigastric discomfort and pain. The clinical examination revealed no pathological signs and no elevated temperature. His blood results showed that white blood cell count, bilirubin, alkaline phosphatase, alanine transferase, and gamma-glutamyl transferase were in the normal range. An abdominal ultrasound was performed, which showed gallstones in the gallbladder, whereas the diameter of the common bile duct (CBD) was normal, suggesting the absence of obstruction and the presence of gallstones in the CBD. No other pathology was identified, and cholelithiasis was the presumed diagnosis. The patient was informed of the diagnosis, and an LC was performed. During the procedure, after the insertion of the umbilical port (10 mm), we incidentally discovered an LSG located under the third hepatic segment at the left of the round ligament (Fig. 1 available online). Consequently, the patient was turned in a left-side up position to optimize the view of the gallbladder and Calot's triangle, and the positions of the surgeon and the assistant were still set to the left side of the patient. A trocar (10 mm) was inserted in the left subcostal line, middle of the distance between the left midclavicular line and the xiphoid, and the other lateral subcostal ports (5 mm) were placed on the right anterior axillary lines of the abdomen. The gallbladder was excised by the "fundus-first" method. When the dissecting plane was near Calot's triangle, we dissected it and identified the cystic duct, the common hepatic duct junction, and the cystic artery, which, interestingly, were located as in the case of a right-sided gallbladder. Then we clipped and cut the cystic duct and the cystic artery. The patient recovered uneventfully and was discharged on the second postoperative day.

The other patient was a 56-year-old female who presented to the hospital with a 1-week history of right upper quadrant pain associated with nausea, vomiting, and fever. The abdomen was tender in the right upper quadrant and epigastric region with a positive Murphy's sign and no palpable masses. Ultrasonography of the right upper quadrant showed a thickened-wall gallbladder with a nonmobile 1.8-cm calculus in the gallbladder neck. The liver function test was unremarkable. LC was performed with the patient in the supine position. After placement of the supraumbilical trocar, a 30-degree telescope was used for initial laparoscopic visualization. The gallbladder was inflamed and distended and was to the left of the falciform ligament (Fig. 2 available online). Subsequent port placement and patient position were modified as in the first case. The gallbladder was then excised also by the "fundus-first" method. When the dissecting plane was near Calot's triangle, we found that it was difficult for us to identify and isolate the cystic duct–Hartmann's pouch junction to achieve the adequate exposure of the cholecystohepatic triangle due to the acute inflammation. So we incised Hartmann's pouch, and divided the infundibulum circumferentially,

Address correspondence and reprint requests to Wu Shuo-Dong, M.D., Ph.D., Shengjing Hospital of China Medical University, 36 Sanhao Street, Shenyang, Liaoning, People's Republic of China. E-mail: wushuodong@gmail.com.

as close to the junction of the gallbladder and cystic duct, and as safely as possible. The mucosa around the rim of the remnant infundibulum/Hartmann's pouch was stripped off and destroyed. The flap was secured with a continuous suture of polyglactin 3-0. The gallbladder was dissected off the liver and placed in an endobag and extracted through the 10-mm port. A subhepatic drainage was placed. The patient also recovered uneventfully, and was discharged home on the third postoperative day.

Anatomical descriptions of LSG have shown that the cystic artery crosses in front of the CBD from right to left. The cystic duct may enter the common hepatic duct on the right or the left side in a curving manner. LSG embryologically can arise in three different manners. First, the gallbladder develops from a hepatic diverticulum at its normal place then migrates to the left of falciform ligament and becomes attached to the undersurface of the left liver. This migration explains the entry of the cystic duct on the right side of the hepatic duct, as described in this and most other studies. Second, an accessory gallbladder may develop directly from the left hepatic duct, and the main gallbladder either fails to develop or regresses. Here the cystic duct enters the common duct directly on the left side. Third, some LSGs have been explained by Nagai et al.[1] who found the anomaly associated with a right-sided falciform ligament at operation. In such patients the gallbladder is situated at the normal site but to the left of a right-sided falciform ligament, so it appears aberrant beneath the left lobe of the liver. This anomaly should not be confused with a true LSG situated medial to a normal falciform ligament.

There are several therapeutic implications of LSG. Knowledge of the location of the gallbladder is of great importance for the surgeon, particularly when cholecystectomy or other biliary surgery is to be performed. Because the gallbladder transposition may be associated with the anomalies of the intrahepatic portal vein or the cystic duct or with an accessory liver, understanding the individual's anatomy is crucial to avoid injuries to the bile ducts in these patients. Therefore, if an LSG is encountered, the surgeon should be aware of the possibility of the anomalies of the cystic artery and ductal system, and meticulous dissection should be used. The anomaly does not preclude a safe LC but demands exercising surgical prudence, limiting the use of diathermy, and avoiding the division of structures until a clear picture of the bile duct and blood vessels is obtained. If anatomy remains unclear, conversion to open cholecystectomy is advised.

In addition, it is important to emphasize that the diagnosis of the malformation is difficult to obtain preoperatively as the clinical picture usually is one of pain on the right side. Hence, it may provide the surgeons with an unusual surprise during laparoscopy. Some studies suggest that routine preoperative ultrasonography or endoscopic retrograde cholangiopancreatography in patients with gallstone disease often fail to make the diagnosis of LSG disease in the majority of cases,[2] which was also the case in our patients. In another study, the diagnosis was made only at the time of surgery, despite repeated radiological investigations.[3] Thus, when an incidental LSG is encountered, several modifications of the laparoscopic procedure need to be made. Idu et al.[2] reported five cases of LSG and suggested that the right-hand operating port should be placed on the left of the midline, which was almost the same as the way we performed the procedure in our patients. Hunter[4] suggested that the preparation and clipping of the cystic duct should be performed as nearly as possible to the infundibulum, after the surrounding tissue is stripped down.

Tian Yu, M.D., Ph.D.
Wu Shuo-Dong, M.D., Ph.D.
Li Min, M.S.

Biliary and Vascular Unit
Department of General Surgery
Shengjing Hospital
China Medical University
Shenyang, PR China

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The Role of a Complete Blood Count with Differential for the Surgeon

The complete blood count (CBC) with differential involves the addition of a differential leukocyte count to the white blood cell (WBC) portion of a standard CBC, with neutrophilia and bandemia (so-called a left-shift) traditionally believed to be indicators of an acute infectious or inflammatory process. Whether or not an

Address correspondence and reprint requests to Vijay K. Mittal, M.D., Program Director of General Surgery, Department of Surgery, Providence Hospital and Medical Centers, 16001 West Nine Mile Road, Southfield, MI 48075. E-mail: Armin.Kamyab@providence-stjohnhealth.org.

added differential count provides additional clinically relevant information has not been shown, especially because many factors alter the differential count. Some studies suggest that even minor trauma, such as tooth extractions, cause a left-shift.[1] Others suggest there are diurnal physiological changes in the neutrophil count, with elevations at certain times of the day.[1] The question therefore arises as to whether a CBC with differential contributes additional clinically relevant information beyond that obtained from a CBC alone for the evaluation of a surgical patient.

Diverticulitis was chosen as a model for an acute abdominal inflammatory process because the treatment of diverticulitis ranges from nonoperative management to requiring an operation, depending on its severity. Indications for surgery in the acute setting include, but are not limited to, perforation, peritonitis, or obstruction and it is ultimately a clinical decision based on the evaluating surgeon.

A chart review was therefore performed for all patients at Providence Hospital with CT scan findings suggestive of sigmoid diverticulitis between July 2007 and September 2009. Particular attention was paid to the WBC, the neutrophil percent, and the band count at the time of the initial surgical evaluation. Leukocytosis was defined as WBC > 10.5, neutrophilia was defined as a neutrophil percent > 75 per cent, and bandemia was defined as a band count > 0.

There were 95 patients with CT scan findings of sigmoid diverticulitis between the mentioned time period; 33 patients underwent surgical management during the same admission as deemed appropriate by the evaluating surgeon compared with 62 patients who were treated successfully nonoperatively and discharged in a stable condition (Fig. 1). Overall, 66 patients (69%) had a leukocytosis, 33 (34%) had a neutrophilia, eight (8.4%) had a bandemia, and 12 (13%) had a neutrophilia and bandemia.

When comparing patients treated surgically and patients treated nonoperatively, there was no statistically significant difference in the average WBC count (13.15 *vs* 12.44), neutrophil percent (75.48 *vs* 75.35), or band count (1.91 *vs* 1.05). Leukocytosis was observed in 79 per cent of patients who were treated surgically, compared with 65 per cent of patients treated nonoperatively (Fig. 1). Neutrophilia or bandemia was observed in 81 per cent of patients treated surgically, compared with 80 per cent of patients treated nonoperatively (Fig. 1). Conversely, in both treatment groups, when patients did not have a leukocytosis, they were also likely not to have neutrophilia or bandemia (Fig. 1).

Hence, in all cases, when patients had a leukocytosis, neutrophilia or bandemia was likely, and when patients did not have a leukocytosis, neutrophilia or bandemia was unlikely. What additional information did the CBC

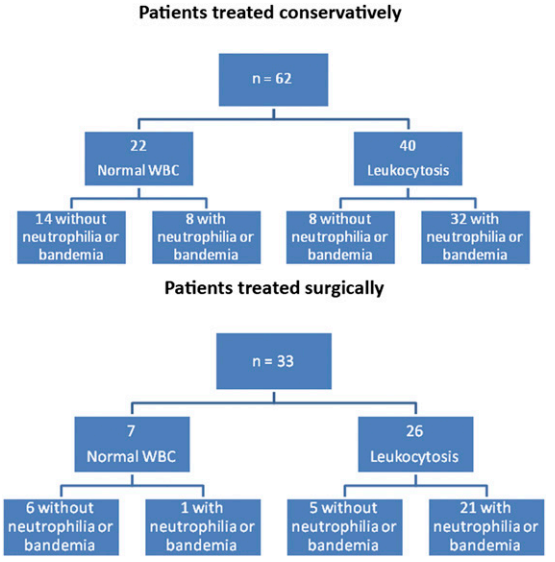

FIG. 1. Patients treated nonoperatively compared with patients treated surgically.

with differential therefore provide? When physicians were asked in one study why they ordered a CBC with differential instead of a standard CBC, to "rule in infection" was a common answer.[2] It is conventionally believed that a leukocytosis accompanied by a left-shift is sensitive and specific for infection. There are however many acute stresses that cause the shift of neutrophils and bands out of the bone marrow and into the peripheral blood.[1] The relationship between a left-shift and an acute inflammatory process is consequently unclear. Yet, ordering a "CBC diff" has become somewhat of a routine test in many institutions.

In our study, although many patients treated surgically presented with neutrophilia and bandemia, just as many patients treated nonoperatively also presented with neutrophilia or bandemia. Moreover, most patients treated surgically had either leukocytosis in association with neutrophilia/bandemia, or neither leukocytosis nor neutrophilia/bandemia. The CBC with differential therefore did not seem to have an additional association with the management outcome of the patient compared with the WBC count alone. When the diagnosis is clear from other data such as physical examination or imaging studies, documentation of differential count abnormalities is unlikely to affect management, as it will not exclude an infectious process when the suspicion is high, nor confirm it when the suspicion is low.[3]

There are many clinical situations in which abnormalities in the differential count correlate with clinically important disease.[4] This is perhaps best illustrated by Shapiro and Greenfield[3]: "[The differential count] is most useful in the diagnostic workup of. . . primary hematological disorder, assessing the neutrophil count in a leukopenic patient, or any other indication to examine

the smear. The differential count is generally not necessary to confirm the presence of bacterial infection when leukocytosis has been documented."

The cost-effectiveness of ordering unnecessary laboratory tests must also be ascertained. The cost of a CBC at our institution is $23, whereas the cost of a CBC with differential is $34, or approximately 50 per cent more. This seems like a modest figure, but with approximately 300 beds, if half the patients at our institution get a daily CBC with differential as opposed to a standard CBC, the result is an additional $1,650/day, or over $500,000/year. Realistically, closer to 75 per cent of patients at any given hospital get daily "routine" labs (including a CBC with differential), with figures therefore reaching just under a million dollars per year for unnecessary testing. Costs do vary per institution, but the CBC with differential is consistently more expensive than a standard CBC.

Limitations of this study include the fact that it is a retrospective review, as well as the limited sample size. Furthermore, we focused on a single disease process (sigmoid diverticulitis), and therefore it is not possible to rule out the use of a CBC with differential in the workup of other infectious or inflammatory processes. Perhaps there is a validated role for the CBC with differential in other surgical diseases that has yet to be studied. Lastly, the use of certain medications (especially corticosteroids) alters the hematological physiology and may have altered our results. Being a retrospective chart review, it was not always possible to ascertain whether the patients were taking steroids or not. A prospective study and more research needs to be undertaken to evaluate the usefulness of a differential count in the evaluation of surgical patients, and more concrete evidence is required to support the use of a CBC with differential for "routine" laboratory evaluation of the surgical patient.

A standard CBC in conjunction with a history and physical examination and appropriate imaging studies in most cases may suffice in the evaluation of the surgical patient. The CBC with differential should be reserved for the workup of suspected hematological disorders, or to evaluate the leukopenic patient. This simple change in routine ordering habits can save hospitals as much as $500,000 or more annually.

Armin Kamyab, M.D.
Jonathan Cook, B.S.
Sameer Sawhney, B.S.
Michael Milshteyn, B.S.
Vijay Mittal, M.D.

Department of Surgery
Providence Hospital and Medical Centers
Southfield, Michigan

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A Prospective, Randomized, Single-Blind Comparison of Laparoscopic *Versus* Open Colectomy for Slow-Transit Constipation

In China, 3.19 per cent of the population has been reported to suffer from chronic constipation. Patients with abnormal colon motility who are refractory to conservative treatment are regarded as candidates for surgery.[1] Despite the reduction in morbidity and improved convalescence after laparoscopic operations for benign disorders (*i.e.,* gallbladder stones and reflux oesophagitis), surgeons remain skeptical about whether such advances would pertain to laparoscopic colectomy for constipation. Therefore, a single-center, randomized trial was established to compare laparoscopic *versus* conventional open colectomy for patients with slow-transit constipation (STC), and to determine which procedure optimizes patient outcome.

Reported symptoms included infrequent bowel movements (<3/week), excessive straining at defecation for more than 25 per cent of events, or a frequent feeling of incomplete defecation for at least 6 weeks. Constipation due to other causes was excluded by taking a thorough medical history and physical examination, thyroid function tests, and a complete colonoscopy. In cases that did not involve a previous dependency on laxatives or enemas, a 6-week trial of $\geq$ 30 g of dietary fiber and 1.5 L of oral fluids/day was prescribed. This regimen failed to resolve STC in all cases. Patients consumed 40 radiopaque markers and were examined by abdominal radiographs daily for $\geq$ 3 days. If more than 20 per cent of the markers were not eliminated after 3 days, then they were considered to have an extended colonic transfer time and STC was diagnosed. Overall, 64 patients were diagnosed with STC and randomly assigned to one of two resection groups: a laparoscopic group or an open group. Patients and hospital staff were blinded to the group assignments for 4 days postoperatively.

Address correspondence and reprint requests to Dr. Li-Shan Xu, M.D., Ph.D., Department of General Surgery, The Affiliated Forth Hospital of Harbin Medical University, 37 Yi-Yuan Road, Harbin, Heilongjiang Province, China. E-mail: xulishan001@hotmail.com.

Both colectomy procedures involved similar protocols. The colon was mobilized and supplying mesenteric vessels were stapled using an Endo CIA (laparoscopic linear cutting stapler; Johnson & Johnson Corp, New Brunswick, NJ). The upper rectum was transected intracorporeally using an Endo CIA, and the colon was delivered through a small transverse suprapubic incision. The anvil of a Premium Plus CEEA stapler (Autosuture, Melbourne, Victoria, Australia) was then inserted into the transected terminal ileum, and intracorporeal double-cross stapling reanastomosis was performed after closure of the incision and reestablishment of the pneumoperitoneum.

All patients were free to drink on postoperative day 1 and were started on a solid diet by postoperative day 2. Patients were also encouraged to walk as soon as possible. Postoperative dressings were removed on Day 4 and, at that time, patients were informed that they could go home as soon as they felt confident to do so.

The primary outcome of the trial was how successful each treatment was at improving evacuation and relieving constipation. Secondary outcomes included operative duration, amount of blood loss, delay to first passing of flatus and bowel movement, duration of hospitalization (number of nights in-hospital postoperatively), incidence of postoperative complications, morbidity, and the need for a second procedure. If a patient was readmitted for a complication, the second hospital stay was included in the total postoperative stay. Comparisons of continuous data were performed using the Mann-Whitney test and time-to-event methods (*i.e.,* Kaplan-Meyer curves and log-rank tests). Percentage differences were compared with using the χ^2 test or Fisher's exact test.

The mean follow-up period was 32 months (range, 6–70). A distinct improvement in symptoms was observed in all 64 patients. The open colectomy procedure was associated with a longer operation time (median, 145 minutes; range, 70–315) than the laparoscopic procedure (median, 122 minutes; range, 75–281) ($P < 0.0001$). In contrast, Gervaz et al.[2] reported a significantly longer operation time for laparoscopic procedures. Their longer laparoscopic procedures may be related to the operations being performed at a teaching hospital, whereas their use of an ultrasound knife in the open procedure would be expected to reduce ligation and hemostasis. Greater experience with laparoscopic colectomy should positively affect operating time.[3]

We observed significantly less blood loss with laparoscopic colectomies (median 55 mL; range, 15–700) than with open colectomies (median, 127 mL; range, 50–1200). And, consistent with the report by Kiran et al.,[4] fewer laparoscopic group cases required blood transfusions during or after surgery than in the open group. Relative to patients in the open group, patients in the laparoscopic group were able to drink $\geq$ 1 L/day of fluids 1 day earlier and experienced a reduced median delay until their first bowel movement (by ~2 days, $P < 0.001$). This reduction in the duration of postoperative ileus translated into a reduction in the median length of hospital stay for the laparoscopic group (8.5 ± 4.1 days) *versus* that of the open group (9.7 ± 5.5 days; $P < 0.001$).

The two groups exhibited similar rates of overall morbidity and complication. Two patients experienced a fever after laparoscopic surgery, whereas none of the patients undergoing an open colectomy experienced a fever. One patient from each group experienced major complications requiring an additional operation; in the case of the laparoscopy group patient, the complication was due to a small bowel perforation and was associated with a prolonged hospital stay. Although it is unclear whether small bowel perforations are more frequent with laparoscopic *versus* open colectomy, there is certainly a greater risk of overlooking a small bowel perforation during a laparoscopic colectomy due to the limited field of vision.

In conclusion, in the present study, patients who underwent a laparoscopic procedure to treat STC experienced a shorter duration of surgery, less perioperatve blood loss, earlier postoperative bowel movements, and a shorter hospital stay than patients who underwent an open colectomy. However, one patient in the laparoscopic procedure group experienced a small bowel perforation, which is a very serious complication. Further studies are needed to evaluate the potential long-term benefits of a laparoscopy colectomy for STC, and also to determine whether this method reduces the incidence of incisional hernias, adhesions, and small bowel obstruction.

Li-Shan Xu, M.D., Ph.D.
Wen-Sheng Liu, M.D.

Department of General Surgery
The Affiliated Forth Hospital of Harbin Medical University
Harbin, China

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Old Age Is a Risk Factor for Recurrence after Laparoscopic Inguinal Hernia Repair with Porcine Small Intestine Submucosa Mesh

Porcine small intestinal submucosa (SIS) is a biodegradable mesh composed of noncross-linked collagen (Types I, III, and V), glycosaminoglycans, proteoglycans, glycoproteins, and multiple growth factors. It provides a scaffold to allow the integration of human tissue, which gradually increases the strength of the growing host tissue and achieves significant wall reinforcement. The SIS mesh is eventually degraded to avoid chronic pain or infection.[1, 2] Though SIS mesh has been applied in inguinal hernia repair for many years, the clinical outcomes are not consistent across studies.

In the past few years, we also accumulated some experiences of SIS mesh in inguinal hernia repair, and we found that the SIS mesh was associated with a higher recurrence rate. Between June 2008 and October 2009, a total of 82 patients with 125 inguinal hernias underwent endoscopic total extraperitoneal (TEP) herniorrhaphy at our department. Of those, 70 patients had a posterior wall repair with polypropylene mesh, and the other 12 patients had SIS mesh (Surgisis Inguinal Hernia Graft; Cook, Bloomington, IN). After a median follow-up of 18 months, five of the 12 patients with SIS mesh had a recurrence of hernia, compared with no recurrence in the polypropylene group.

This unacceptable high recurrence rate prompted us to explore risk factors for recurrence. We compared the characteristics of the 12 patients (five recurrences *vs* 7 nonrecurrences). The median age in the recurrence patients was 68 (31–71 years), compared with a median age of 45 (25–63 years) in the nonrecurrence patients. Old age seemed to be associated with a higher recurrence rate after endoscopic TEP hernia repair with SIS mesh.

It is possible that the remodeling process is impaired in old age, leading to a poor outcome after SIS mesh repair as shown in our series. It has been demonstrated that aging fibroblasts have decreased collagen production.[3] Moreover, disorganized collagens in aging tissue have a lower mechanical tension on fibroblasts; the decreased stimulation on fibroblasts also cause less collagen production.[3] Besides the decreased collagen production, aging can also up-regulate the activity and expression of collagenase,[4] which increases the rate of SIS mesh degradation. Both conditions can lead to an inadequate integration of fibrotic tissue for wall reinforcement, eventually leading to recurrence after SIS mesh hernia repair.

As the unacceptable high recurrence rate was observed in our initial experience of SIS meshes, we had to stop the use of SIS mesh in inguinal hernia repair. Therefore, the present study is inevitably limited by a small case number. Further research is still required to elucidate the relationship between age, the remodeling process, and clinical efficacy of SIS mesh implantation.

In conclusion, our study suggests a higher recurrence rate after endoscopic TEP herniorrhaphy with SIS mesh. Our analyses identified old age as a risk factor for recurrence, though the exact mechanism still requires further investigations. The risk of recurrence should be considered when the SIS mesh is considered in the elderly.

Chen-Hsun Ho, M.D.
Yao-Chou Tsai, M.D.

Division of Urology
Department of Surgery
Buddhist Tzu Chi General Hospital
Taipei Branch, Taiwan and
Department of Urology
College of Medicine
Tzu Chi University
Hualien, Taiwan

REFERENCE

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Address correspondence and reprint requests to Yao-Chou Tsai, M.D., Division of Urology, Department of Surgery, Buddhist Tzu Chi General Hospital, No. 289, Jianguo Road, Xindian District, New Taipei City 23142, Taiwan. E-mail: yc.tsai358@gmail.com.

Sacral Osteomyelitis: An Unusual Complication from Foreign Body Ingestion

Foreign body (FB) ingestion is a common occurrence, and most pass spontaneously through the gastrointestinal tract without complication.[1] Approximately 10 to 20 per cent of ingested FB require endoscopic retrieval, whereas 1 per cent require surgical intervention.[1] Complications documented from foreign body ingestion include intestinal obstruction and perforation,

Address correspondence and reprint requests to Tracy Timmons, M.D., R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, 22 South Greene Street, Baltimore, MD 21201. E-mail: ttimmons1@umm.edu.

hemorrhage, fistula formation, and intra-abdominal abscess.[1, 2] We present the complication of sacral osteomyelitis from erosion of a chronically retained rectal foreign body.

A 49-year-old male with a past medical history of diverticulosis and hepatitis C presented to another hospital 3 years ago with the complaint of a 1-month history of left lower quadrant pain. The patient could not recall a history of FB ingestion. Computed tomography and subsequent colonoscopy revealed a stricture in the distal sigmoid colon, sigmoid diverticulosis, and a foreign body consistent with a toothpick embedded in the rectum. An attempt was made to remove the object, but the foreign body could not be adequately visualized. The patient was discharged on antibiotics and a delayed attempt to remove the foreign object was performed after several weeks. However, repeat colonoscopy did not reveal a foreign body at that time, and it was presumed that the patient spontaneously passed the object. Three years later he presented to our service with progressive dyschezia and point tenderness at the apex of the intergluteal cleft. He stated that he had ongoing intermittent rectal pain since his original presentation. Physical exam findings demonstrated tenderness to palpation posteriorly on rectal exam. A CT scan demonstrated a linear FB in an anterior-posterior lie adjacent to the rectum with erosion of the sacrum and associated phlegmon and gas (Fig. 1). Consultation with gastroenterology deemed that the patient's anatomy would not be amenable to endoscopic extraction, and we therefore proceeded to the operating room to perform rigid sigmoidoscopy and low anterior resection.

On rigid sigmoidoscopy no foreign object was noted intraluminally. A midline laparotomy was then performed with the intention of performing a low anterior resection. Given the location of the FB, this had to be carried to the level of the levators. Dense fibrous adhesions were found posteriorly above the levators. Once the specimen was removed, the erosion in the sacrum was clearly visualized and debrided. A coloanal anastomosis was performed using an end to end anastomotic stapler with an omental interposition flap placed between the sacrum and the anastomosis. A diverting ileostomy was created to protect the anastomosis given the distance of the anastomosis from the anal verge and the surrounding phlegmon. The patient's postoperative course was complicated by the need for ileostomy revision due to acute prolapse on the sixth postoperative day. He subsequently was discharged on a regular diet with 6 weeks of intravenous antibiotics for sacral osteomyelitis. At his postoperative clinic visits he reported complete resolution of dyschezia and pelvic pain. His ileostomy was taken down 6 months postoperatively without complication.

FIG. 1. Erosion of sacrum due to prolonged retention of toothpick.

Foreign body ingestion is a common occurrence and the majority of ingestions will not require invasive management.[1] Endoscopy has an estimated sensitivity of 70 per cent in detecting foreign bodies,[3] and remains the initial modality for managing foreign body ingestion given its diagnostic and therapeutic benefits.[4] Sharp or oddly shaped FB are more likely to cause complications than smooth objects such as coins. Intestinal perforation by a FB occurs 1 per cent of the time and normally affects the sigmoid colon, rectum, or distal ileum.[2] In complicated FB ingestions, endoscopic therapy may be unsafe or unfeasible. The surgical approach to addressing a complicated FB ingestion depends on the location of the object, the presence of fecal contamination, and the patient's age and comorbidities. Fecal diversion, segmental resection with anastomosis, and segmental resection with proximal diverting stoma are the most common approaches.[2] This case demonstrates our surgical approach to prolonged FB retention complicated by sacral osteomyelitis, a rare complication. A low coloanal anastomosis with diverting ileostomy was required to resect the FB and allow healing of the sacral erosion. When evaluating a patient with abdominal pain after a history of a "passed" symptomatic FB, the clinician should maintain a high level of suspicion for retained FB.

Maggie Lin
Hussan Mohammed
Garjae Lavien, M.D.
Philip Brazio, M.D.
Kimberly Lumpkins, M.D.
Tracy Timmons, M.D.

R Adams Cowley Shock Trauma Center
University of Maryland Medical Center
Baltimore, MD

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When is Vagus Nerve-Preserving Gastrectomy for Gastric Cancer Safe?

The hepatic branch and the celiac branch of the vagus nerve are generally resected in gastrectomy with dissection 2 (D2) lymph node dissection. However, gastrectomy with truncal vagotomy could increase the incidence of cholelithiasis and diarrhea.[1] The preservation of the hepatic branch and the celiac branch of the vagus nerve has been performed to solve the problem by Japanese scholars since the 1990s.[2] The indication of vagus nerve-preserving operation is early gastric cancer and selected T2 cancer. However, the security of the indication hasn't been evaluated. In which stage would gastric cancer invade the anterior trunk and posterior trunk of the vagus nerve so that the preservation would cause residual cancer cells? The purpose of this study is to figure out in which stage of gastric cancer the cancer cells will invade the trunks of the vagus nerve.

Fifty cases of gastric cancer patients (34 male, 16 female) who underwent gastrectomy with D2 lymph node dissection in the general surgery department of Huashan Hospital from March 2011 to May 2011 were reviewed in the study. The anterior and posterior trunks of vagus nerves (from cut ends to stomach wall) were separated from the pathological specimens for pathological section and hematoxylin and eosin stain. The TNM stage (according to American Joint Committee on Cancer Cancer Staging Manual, sixth Edition) of each patient was recorded at the same time.

The cancer cells were found in the vagus nerves of five patients. All of them had stage IV cancer. The TNM stages of all patients and nerves-invaded patients are shown in Table 1 below. The nerves-invaded patients account for 10 per cent of the total (5/50), and 55.6 per cent of patients who were stage IV (5/9). The cancer cells were only found in connective tissue. No cancer cells were found inside the perineurium.

TABLE 1. *The TNM Stages of All Patients (Nerves-Invaded Patients)*

	M0				M1			
	N0	N1	N2	N3	N0	N1	N2	N3
T1	6	2						
T2	3	3						
T3	8	13	3	4 (1)			1 (1)	
T4	3	2 (1)	2 (2)					

Pancreatic cancer and cholangiocarcinoma can invade the perineural space (the space between endoneurium and perineurium) and spread along peripheral nerves.[3] The perineural invasion also has been observed in gastric cancer,[4] but whether the gastric cancer can spread along peripheral nerves has not been reported. When we designed this experiment, we assumed that the gastric cancer could spread along the vagus nerve so that a vagus nerve-preserving operation wouldn't be safe even for gastric cancer of early stage. However, we found that there were no cancer cells inside the perineurium of the vagus nerve. The cancer cells were only found in connective tissue (the epineurium). We see that all patients whose nerves were invaded by cancer cells were stage IV. It is possible that once the original cancer breaks through the membrane of the stomach or the metastatic cancer cells break through the integument of the lymph node, these cells would diffuse among the connective tissue and invade the epineurium of the vagus nerve. We believe that this is the source of cancer cells around the vagus nerve.

We can conclude that the vagus nerve-preserving operation is not safe for gastric cancer patients who have stage IV cancer, but is safe for T3N1M0 and earlier stages. Whether this operation is safe for patients who have T3N2M0 and T4N0M0 cancer was not determined because of a lack of cases.

Zhongwen Zhou, M.D.

Department of Pathology
Huashan Hospital
Shanghai, China

Xiang Mao, M.A.

Fen Luo, M.D.

Department of General Surgery
Huashan Hospital
Shanghai, China

Jun Wang, M.D.

Department of General Surgery
Huashan Hospital
Shanghai, China

Address correspondence and reprint requests to Fen Luo, M.D., Department of General Surgery, Huashan Hospital, No 12, Middle Urumqi Road, Shanghai, China, 200040. E-mail: xmyz1983@yahoo.com.cn.

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Hepatocellular Adenoma: A Rare Benign Tumor of the Liver

Hepatocellular Adenoma (HCA) is a very rare benign tumor of the liver and accounts for approximately 19 per cent of benign tumors of the liver.[1] The cause of the disease is not clear. In women, it may be relevant to oral administration of contraceptives. Occasionally, it is related to glucocorticoid or other steroid hormones in men. HCA is mainly seen in three situations. The first is spontaneous HCA; most patients of this type are children and adult males. The female patients of this type usually have not had oral administration of contraceptives. The majority of the patients reported in China belong to this type. The second is related to female hormones; most patients of this type are foreigners. Mainly seen in women during reproductive years, HCA has a clear association with the use of oral contraceptives[2] with 85 to 90 per cent of patients having a history of oral administration of contraceptives for more than 5 years. In addition, it has been found that some of the tumors of the patients could diminish after halting the oral administration of contraceptives. Therefore, we deem that this type of HCA is related to oral administration of contraceptives over a long time period. The third HCA is related to metabolic diseases; this kind of patient mostly suffers from glycogen storage disease Type I.

A 64-year-old patient was admitted into the Department of Hepatobiliary in our hospital. There were no obvious symptoms such as stomach discomfort, nausea, and dull pain in the epigastric region. The tumor was found in medical examination and he had no history of taking male sex hormones or other steroids. The liver function grade of the patient was A. The HBS-Ag and HCV-Ab of the patient were all negative. The levels of AFP, CA-125, CA19-9, and CEA were all in the normal range. Plain CT scans showed a node of 3×2.5 cm, low density in the right hepatic lobe, and the border of the node was clear. On dynamic CT, the lesion enhances nearly homogeneously on arterial phase and on the contrast the enhancement decreases on portal venous phase. MRI scans showed that on T1W1 and T2W1 image there is a node of 3×2.5 cm, which is slightly high density in the right hepatic lobe and the border of the node is clear. The lesion enhances obviously on arterial phase; on the contrast the enhancement decreases on portal venous phase (Fig. 1). The patient was diagnosed as hepatocellular carcinoma (HCC) in our hospital before the surgery. After the partial hepatectomy of the right lobe of liver and the pathological examination, the patient was diagnosed as HCA. On pathological examination, the tumor cells were arranged in cords. These cells are larger than the normal hepatic cells, and the heteromorphism of them is not obvious. Mitoses could not be seen (Fig. 2).

According to the clinical manifestations of the patients with HCA, the disease could be divided into two types: the type of abdominal mass and the type of acute abdomen. The majority of the patients with HCA belong to the abdominal mass type. With the exception of the epigastrium mass, there are no obvious symptoms. In the medical examination, the tumor can be palpated;

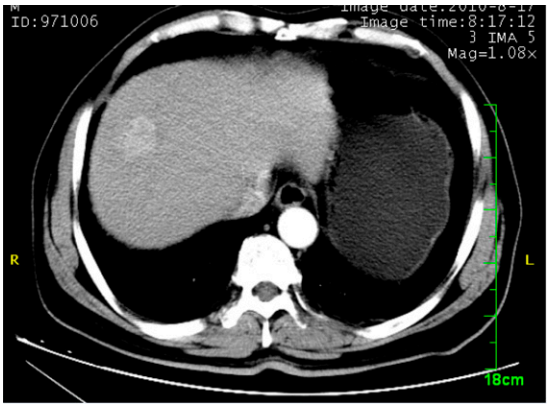

FIG. 1. The lesion enhances obviously on arterial phase.

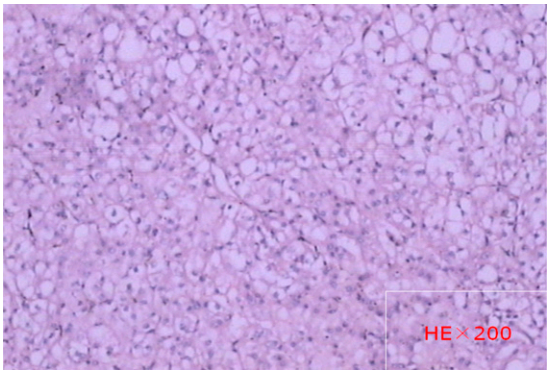

FIG. 2. The tumor cells were arranged in cords. These cells are larger than the normal hepatic cells, and the heteromorphism of them is not obvious. (HE×200).

Address correspondence and reprint requests to Guo-hua Dai, Department of Hepatobiliary, Jiangjin Central Hospital, Chongqing, 400010, China. E-mail: killer8375@126.com.

the surface of the tumor is smooth, which is strong but pliable in texture. Pressing pain is not common, and the tumor moves up and down with every breath. The development of the tumor will accompany some symptoms such as stomach discomfort, nausea, and dull pain in the epigastric region. The minority of the patients with HCA belong to the acute abdomen type. The blood supply of the HCA is from a single arterial, and the arterial is not supported by connective tissue. Consequently the intratumoral bleeding is very common. Sometimes the peplos of the tumor may rupture. A study manifests that 50 per cent of the patients with this disease underwent acute intratumoral bleeding, and the death rate was 6 per cent. The risk of intratumoral bleeding rises in the larger tumor. When intratumoral bleeding happens, it will accompany with some symptoms such as sudden pain in epigastric region, nausea, sich erbrechen, and fever, etc. On examination, there is marked tenderness over the right upper quadrant, where muscular spasm and rebound tenderness are present. In some severe cases of tumor rupturing, the patient may suffer from shock because of excessive bleeding.

The HCA usually occurs in the right hepatic lobe where there is no cirrhosis. Tumors of a single node account for about 70 per cent of the tumors, and the diameter of the tumor is usually more than 10 cm. Sometimes the diameter of the tumor could be up to 20 to 30 cm. There are occasionally many nodules in one tumor. The boundary of the tumor is usually clear, with incomplete fibrous peplos. There are some uplifts in the cut surface of the tumor. The texture of the tumor is closed to the hepatic tissue around the tumor, but the color of the tumor is lighter than the hepatic tissue around it. Hemorrhage and infarction can be seen in the tumor. Microscopically, tumor cells may be arranged in cords, which are constituted by one to two rows of hepatic cells. These cells are larger than the normal hepatic cells, but the heteromorphism of the cells is not obvious. Mitoses are unusual. Occasionally, the heteromorphism of the cells can be seen in the patients of oral administration of steroid hormones or contraceptives.

There is nonspecific clinical manifestation and serum index in the patients with HCA, and the symptom of the patients in early stage is not obvious. Consequently, imaging examination becomes the main means of diagnosing the HCA. Plain CT manifestation of the tumor usually appears low density, and the boundary of the tumor is clear, inside of which old hemorrhage and necrotic areas of lower density can be seen. On the contrast, high density shadow appears when there is new hemorrhage inside the tumor. Enhanced CT manifestation of the tumor usually appears isodensity or low density. The tumor is rich in blood vessels, therefore, it is easier to find the tumor in the arterial phase. The cell differentiation of the tumor is closed to the normal hepatic cells; consequently, the tumor is equal-low signal or equal-high signal on MRI T1W1 and T2W1, which is similar to liver parenchyma. On dynamic MRI, the tumor enhances obviously on arterial phase, and then the tumor fades away rapidly, which appears similar to liver parenchyma. Few cases remain enhanced on portal venous phase, but almost all of the contrast medium disappears on the delayed phase. The pseudo capsules or the peplos of the tumor are enhanced clearly in this period. We should mainly distinguish the HCA from the hepatocellular carcinoma. The HCA is easily misdiagnosed as HCC, especially the less malignant HCC. In addition, the HCA should also be distinguished from focal nodular hyperplasia (FNH). In the clinical manifestation, FNH is nearly the same as HCA. It is not difficult to distinguish the HCA from FNH by means of imaging examination. Recently, it has been reported that positron emission tomography/CT with ^{18}F-fluorocholine can differentiate FNH from HCA.[3]

To sum up, in clinical treatment, clinical, serum data, and imaging findings should be comprehensively analyzed for a more precise diagnose. In our country, we believe that surgical resection is the optimal treatment for tumors suspected of HCA, and the surgery should be done as soon as possible. The reasons are as follows. Most of the patients around the world are the women in reproductive years, and 85 to 90 per cent of them have a history of oral administration of contraceptives for more than 5 years. In addition, it is found that some of the tumors of the patients could diminish after halting the oral administration of contraceptives. However, most patients in our country belong to the spontaneous HCA, which is not related to the oral administration of contraceptives. Rupture and bleeding could be encountered in HCA. In some cases, there is possibility of cancerization. Tumors more than 10 cm in size indicate an increased risk of rupture and malignant transformation.[4] It is difficult to distinguish HCA from well-differentiated HCC through clinical, serum data, and imaging findings. The general condition of the patients with HCA is usually well and the liver function is normal. Hence, the majority of the patients could stand the strain of liver surgery.

Yi Feng, M.M.
Yao-Hong Zhu, M.B.
Hua-Guo Feng, M.M.
Guo-Hua Dai, M.B.

Department of Hepatobiliary
Jiangjin Central Hospital
Chongqing, China

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Creating Illicit Laparoscopic Appendectomy ORs Using Online Sourcing

Appendicitis is the most common cause of acute abdominal pain requiring surgery.[1] Appendectomy is the treatment of choice, and is increasingly done laparoscopically.[1] Analysis of National Surgical Quality Improvement Project data shows laparoscopic appendectomy has surpassed open appendectomy.[1] Laparoscopic appendectomy is also well-known to consumers. Using Web 2.0 interactive technology, Internet access now includes YouTube videos illustrating laparoscopic appendectomies and links to a "How to Do Laparoscopic Surgery" website.[2]

However, the Internet continues to raise important patient safety challenges. For example, unfettered access to drugs through illegal online pharmacies has created tremendous and growing public health concerns.[3] Online access now allows everyone with a computer to both diagnose and treat themselves or anyone else without professional oversight.

This Internet challenge is growing and evolving. One key area that has not been assessed is the availability of surgical resources. Because of the tremendous concerns with regard to fraud globally regarding providers and patient care, including recent cases of physician impersonation practice,[4] there is now concern laypersons without medical training, physicians with invalid licenses, as well as criminals, may begin to treat themselves and others using Internet-accessible resources. This could lead to adverse patient outcomes and even death.[4]

This deep patient safety and professional concern has now entered into the realm of surgery. From a consumer protection perspective, because of the detailed availability of video and social media online detailing laparoscopic appendectomy, one would expect barriers in obtaining the relevant surgical equipment needed for this complex treatment. To assess this, we first searched "what equipment is needed for a laparoscopic appendectomy". The top hit was an eHow.com website. This website provides directions and lists surgical equipment necessary for a laparoscopic appendectomy: trocar, insufflator, veress needle, laparoscope, 5 mm claw grasper, 5 mm dolphin nose grasper, Endo GIA™ 30 with cartridges (Covidien, Mansfield, MA), and Endo Catch™ 10 mm (Covidien, Mansfield, MA). We then searched a common online auction site for this equipment. *All* were available without prescriptions or proof of medical professional licensure or entity status, such as hospital or licensed health provider. Furthermore, used equipment was also available to anyone without proof, which also may raise patient safety concerns if sterilization and repair are not performed correctly—areas not understood by laypersons.

Supporting this unfettered surgical equipment access is similar availability of general anesthetic compounds as well as ventilators and other anesthesiology equipment online from business-to-business websites such as Alibaba.com. Add this to easy access to fake credentials online[4] and social media demonstrations of surgical procedures, illicit operating rooms and fraudulent medical practices can be created. Indeed, these access points may be exported to other countries and patients over the Internet, allowing for international trade of equipment and methods supporting global unauthorized practice of medicine.

Exacerbating this precarious situation is complex and inconsistent state licensure requirements for medical product and device distributors. Indeed, some states do not engage in medical product and device distribution regulation and few if any specifically address unique online challenges.[3] This complete and unregulated access indicates the exceedingly negative potential downsides from continuing to ignore the patient safety threat from lagging Internet regulation.

Internet facilitation of unfettered drug access has raised patient safety concerns. In this context, it was noted that if "operating room paraphernalia were easily accessible through Internet search engines and sold and used by unlicensed sellers and consumers on themselves and their families, policymakers would quickly act."[3] This reality is upon us. The Internet must be addressed to focus upon this clear patient safety concern, and indeed, Congress must act. At a minimum, Congress should prohibit any sales of any medical equipment online, unless verifications systems ensure: 1) that the person/entity is licensed to use/receive them; 2) that there are periodic government online audits of potentially prohibited sales (including business-to-business sellers and auction sellers); and 3) that prohibited transactions between sellers and unlicensed buyers are blocked as

Address correspondence and reprint requests to Bryan A. Liang, M.D., Ph.D., J.D., San Diego Center for Patient Safety, University of California, San Diego School of Medicine, 350 Cedar Street, San Diego, CA 92101. E-mail: baliang@alum.mit.edu.

they are presently for online gambling transactions and some Internet drug sales.[3]

In addition, the National Association of Boards of Pharmacy could provide separate accreditation and verification (similar to their Verified Internet Pharmacy Practice Sites accreditation program for pharmaceuticals) for online medical products and supply providers that ensure all potential customers provide proof of applicable provider or distribution licensure at point of sale. International law enforcement partners and private sector actors must be engaged as well. Key international sources (*e.g.,* China and India) dominate the population of sellers providing unregulated access to operating room equipment. Hence, harmonization of law enforcement efforts and cooperative approaches to identify and prosecute inappropriate sellers will also be a component in addressing this multifactorial problem. The private sector can assist by providing information and support for these efforts through identifying illegal sellers and operators.

Finally, it is of paramount importance that leadership from surgical and medical academia and public health authorities, including the Centers for Disease Control and Prevention and World Health Organization, join together for a sustained public health educational effort on patient safety dangers represented by illicit Internet medical resources. The nimble nature of Internet presence and disappearance, criminal locations and transactions worldwide, and the increasingly global nature of health means that no country can address this issue alone.

Bryan A. Liang, M.D., Ph.D., J.D.

Institute of Health Law Studies
California Western School of Law
San Diego, California and
San Diego Center for Patient Safety
University of California San Diego School of Medicine
San Diego, California

Tim K. Mackey, MAS

Institute of Health Law Studies
California Western School of Law
San Diego, California and
Joint Doctoral Program in Global Health
San Diego State University–
University of California, San Diego
San Diego, California

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