Radiology of Cholecystectomy Complications

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Abstract. Postoperative problems following simple removal of the gallbladder are infrequent. Radiographic studies may be valuable in suggesting or confirming the diagnosis when not clinically evident. Plain films, contrast studies, ultrasound, and computed tomography (CT) all can be useful modalities in this area. Several examples of complications related specifically to the operative field in cholecystectomy are reviewed.

Key words: Cholecystectomy — Surgical complications — Gallbladder.

Surgical removal of the gallbladder is considered to be the most common general surgical procedure performed in this country. Mortality rates of less than 1% to 2% and morbidity rates of 5% to 6% are commonly reported, dependent on factors such as age, underlying illness, and associated common duct exploration [1-5]. The morbidity of cholecystectomy reflects not only those complications common to other abdominal procedures, but, in addition, problems associated with the biliary tract and its related anatomy are considerably increased. Even when the fundamental operative steps are followed, clean removal of the gallbladder obtained, and proper drainage provided, postoperative difficulties can arise. The radiologist may be in a position to alert the surgeon to these possibilities, and a review of these complications is presented. It is also necessary for the radiologist to be aware of obvious problems which the surgeon sees clinically so that he does not overinterpret easily apparent findings.

Wound

Incisional hernia and infection comprise the most important problems relating to the surgical wound. Clinically evident postoperative incisional hernia is caused by a technically inadequate closure; wound infection, dehiscence, or wound separation associated with suture disruption may result. Midline or paramedian approaches have a significantly higher incidence of hernia than subcostal approaches [6]. Also, in the latter approach, the hernial sac contains only liver and omentum, whereas a hernia through a vertical incision extends into the infracolic compartment and commonly contains small bowel [7]. Occasionally, the stomach can be included in the sac, as seen in Fig. 1.

The majority of wound infections are subcutaneous and are caused by enteric microorganisms and Staphylococci, and occur usually from the 6th to 13th postoperative day. Biliary surgery is not necessarily "clean" since reports of as high as 90% bacterial growth are found in the presence of common duct stones [8]. In addition to the more common contaminants cited, Clostridium welchii occurs in 2% to 10% of the cultures, and its growth can be a life-threatening complication [9, 10]. In most cases, however, its mere presence in bile is no problem. Symptoms progress rapidly, and mere inspection of the wound may not reveal the seriousness of the problem. As the process is primarily subcutaneous, the gas formed by this organism may be demonstrated on plain films (Fig. 2).

Common Duct Injury

Damage to the common bile duct is one of the most feared complications in biliary tract surgery, increasing postoperative morbidity. The injury itself com-
Fig. 1. Six months after cholecystectomy a large incisional hernia was noted to right of midline. Upper gastrointestinal series demonstrates stomach contained within hernial sac.

Fig. 2. Plain film reveals irregular, mottled lucencies in right upper quadrant 1 week after surgery for cholecystitis. Clinically apparent sepsis led to further investigation, and Clostridia welchii was found to be gas-forming organism responsible.

monly results from inadequate identification of the junction of the cystic and common hepatic ducts, which in turn can lead to tenting, ligation, or partial excision of the segment of common duct when the gallbladder is removed [11]. This can lead to bile leak, fistula, and partial or total obstruction of bile flow. It has been reported that there is a 30% chance that the patient will eventually die from a common bile duct stricture [12].

If the duct injury is not recognized during the primary operation, one of two manifestations soon develops: jaundice or fistula. The latter may either be external via the drainage tubes or into the peritoneal cavity. The diagnosis and exact location of the obstruction can be established by sinus tract studies, or T-tube or IV cholangiography. Ultrasound and computed tomography (CT) may show dilated intrahepatic radicals as well. Figure 3 shows several