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Mustafa GİRGIN¹
Burhan Hakan KANAT²
Ziya ÇETİNKAYA¹
Mürşit DİNÇER³

¹ Fırat Üniversitesi,
Tıp Fakültesi,
Genel Cerrahi Anabilim Dalı,
Elazığ, TÜRKİYE

² Elazığ Eğitim ve Araştırma
Hastanesi,
Genel Cerrahi Kliniği,
Elazığ, TÜRKİYE

³ İstanbul Haseki Eğitim ve
Araştırma Hastanesi,
Genel Cerrahi Kliniği,
İstanbul, TÜRKİYE

Can Bile Leaks be Prevented By Recognizing and Ligating Subvesical Ducts During Laparoscopic Cholecystectomy?

Objective: Overlooking small bile ducts between the gall bladder and liver opening directly to gall bladder may cause bile leakage after laparoscopic-cholecystectomy.

Materials and Methods: A retrospective evaluation of 230 laparoscopic cholecystectomies including 8 cases of recognized and ligated subvesical bile ducts was conducted.

Results: In all of 8 patients with subvesical ducts in the gall bladder fossa, the ducts were ligated by clip or ligasure, no bile leakage was seen after operation.

Conclusions: The anatomic variation of subvesical bile ducts poses a risk during laparoscopic cholecystectomies. A careful and gentle dissection of gall bladder from the liver is elemental in recognizing and ligating small bile ducts which can be the cause of bile leakages during cholecystectomies.

Key Words: *Bile leaks after cholecystectomy, subvesical duct, bile leakage, Luschka duct*

Laparoskopik Kolesistektomi Sırasında Subvezikal Kanalları Tanımak ve Ligat Etmek Safra Kaçaklarını Engeller mi?

Amaç: Safra kesesi ile karaciğer arasında doğrudan safra kesesine açılan safra kanallarının gözden kaçması laparoskopik kolesistektomi sonrası safra kaçaklarına yol açabilir.

Gereç ve Yöntem: 230 laparoskopik kolesistektomi olgusu retrospektif olarak değerlendirildi ve 8 subvezikal safra kanalı tanınarak bağlandı.

Bulgular: Sekiz olgu da klip ya da Ligasure yardımı ile ligate edildi. Hiçbirinde safra kaçağı izlenmedi.

Sonuç: Subvezikal kanalların anatomik varyasyonları laparoskopik kolesistektomi sırasında risk oluşturmaktadır. Dikkatli ve titiz bir diseksiyon ile görerek tanıyıp ligate etmek safra kaçaklarını engelleyebilir.

Anahtar Kelimeler: *Kolesistektomi sonrası safra kaçağı, subvesikalkanallar, safra kaçakları, Luschka kanalı*

Introduction

The subvesical ducts are small biliary ducts 1–2 mm in diameter, which usually originate in the right hepatic lobe. They may occur as a single duct or as a meshwork of ductules. Their course continues along the center or periphery of the gallbladder fossa and have variable drainage into the biliary tree (1). Most commonly, the ducts of Luschka, or subvesical ducts, are encountered in clinical practice as a result of their injury during laparoscopic or open cholecystectomy. Injuries are manifested as a bile leak. Subvesical duct leaks follow those of the cystic duct as the most common cause of postcholecystectomy bile leaks (2-8).

In this study our aim is to give the ratio of bile subvesical ducts during laparoscopic cholecystectomy and to emphasize that bile leaks from small ducts can be prevented.

Materials and Methods

Two hundred thirty cholecystectomy cases operated by a single surgeon between 2001–2010 were examined. The cases with bile ducts starting from right liver ending in gall bladder were detected, the methods used for the closure of the ducts and the postoperative follow up were reported. The small bile ducts were recognized by encountering an unexpectant perforation of the gall bladder and observing the leak in the fossa by dissection or after completing the dissection of the gall bladder and seeing the leak from the fossa. The subvesical ducts were ligated by clips and ligasure. Subhepatic drains were placed in all cases. Patients were observed 2 days postoperatively. One month after surgery abdominal ultrasonography was performed.

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Yazışma Adresi Correspondence

Burhan Hakan KANAT
Elazığ Eğitim ve Araştırma
Hastanesi,
Genel Cerrahi Kliniği,
ELAZIĞ - TÜRKİYE

ku318@mynet.com

Results

Seventy six of 230 patients were diagnosed as acute cholecystitis. Mean age was 37.3 (17–82). Subvesical or aberrant bile ducts were seen in 3.47 % of patients (8 cases). Six patients were women, two were man, and two of these cases had acute cholecystitis. Ducts were ligated by clips in 5 cases and 3 by ligasure. There were no leaks and subhepatic drains were removed in the second day postoperatively. All of the data are summarised in Table 1.

Table 1. Results and data of patients

	N
Laparoscopic cholecystectomy	230
Mean age	37.3 (17–82)
Subvesical duct	8 (%3.47)
M/F	2/6
Acute cholecystitis	2/8
Ligated by Ligasure	3/8
Ligated by clip	5/8

Discussion

In 1863, Luschka reported a thin bile duct passing through the shallow gallbladder fossa to join the right hepatic or common hepatic duct. This duct is now known as the duct of Luschka or a subvesical bile duct. The ducts of Luschka occur in 20–50% of the population (1, 2, 9). Most commonly, the ducts of Luschka, or subvesical ducts, are encountered in clinical practice as a result of their injury during laparoscopic or open cholecystectomy. Injuries are manifested as a bile leak. Bile leaks occur in 0.2–2% of cases of laparoscopic cholecystectomy (10). Injury to the ducts of Luschka are a relatively frequent cause of such leaks.

The ducts of Luschka, preoperative detection, preoperative imaging of the subvesical ducts of Luschka has been reported. Kitami et al (11) performed drip-infusion cholangiography with computed tomography (DIC-CT) in 277 patients with cholelithiasis. Subvesical ducts were detected in 28 patients. Intraoperative detection and direct visualization of injured subvesical ducts were reported during the era of open cholecystectomy. We have not been able to find reports of subvesical ducts visualized during initial laparoscopic cholecystectomy in the literature. Postoperative detection in most cases is due to the leaks from injured subvesical ducts, which are diagnosed during the investigation of a postoperative bile leak after laparoscopic cholecystectomy. In general, a patient with symptoms and signs which does not convey a normal postoperative course will undergo investigation with an abdominal ultrasound or CT scan. If a fluid collection is observed, this should be drained under radiologic guidance. If the collection contains bile, an external drainage catheter should be placed. A number of bile leaks will resolve spontaneously (12). The next step is to establish whether there is continuing leakage of bile. This can be accomplished with a variety of modalities, and each one of these can depict a leak from an injured subvesical duct. Fistulography is one of

the simplest methods of diagnosing a biliary leak. Retrograde instillation contrast is performed through a surgically or percutaneously placed drain under fluoroscopy. This is performed to demonstrate a communication with the biliary tree. A subvesical duct leak may be detected by this method. Several authors share the opinion that this should be the initial study to be performed in suspected cases (2, 13). HIDA scintigraphy is a dynamic study in which an ongoing bile leak may be detected. However, it provides suboptimal anatomic detail. A subvesical duct injury will be shown as extravasation of radionuclide from the gallbladder fossa (14). This is the most common initial study being used to detect a bile leak. Most often, it will lead to further investigation. Endoscopic retrograde cholangiopancreatography (ERCP) is the most commonly used modality in which subvesical duct leaks are diagnosed (3). ERCP also provides a therapeutic solution by reducing intrabiliary pressure with sphincterotomy and endobiliary stent placement. Recently, magnetic resonance (MR) imaging has been introduced into clinical practice for biliary leak detection (15). Reoperation and, specifically, relaparoscopy, can be performed in certain cases of postoperative biliary leaks. Injured subvesical ducts have been visualized during reoperation (16, 17). In most cases, ligation of the injured duct and external drainage of bile was considered as sufficient treatment (10, 16, 17). Reoperation is usually performed when other less invasive modalities fail to either detect or resolve the leak, when they are unavailable, or when symptoms are severe enough to warrant reexploration.

Known as Luschka, bile ducts were described for the first time in 1863 by the German anatomist Hubert von Luschka; draining right liver lobe to right hepatic duct or to the common bile ducts and a number of articles have been reported (18-21). For this reason, we encountered small bile ducts in a single surgeon series, we have identified 8 patients which does not fit the definition of Luschka ducts.

In our study, we notified 8 bile ducts which are not associated with the injury of large bile ducts. The name of these ducts are subvesical bile ducts, hepatocholecystic ducts, or aberrant bile ducts. These ducts are opening to the lumen of the gall bladder and can be involved in bile duct injuries. Treatment modalities for bile duct injuries, may vary and can be different from our described approach.

As a conclusion we may say that subvesical ducts or aberrant bile ducts can be detected during laparoscopic cholecystectomy and the ligation of these ducts may prevent bile leaks.

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