



Ducts of Luschka: A Review

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Abstract

The ducts of Luschka are small bile ducts that originate in the gallbladder fossa and drain in the majority of cases in ducts located at the right hepatic lobe. Its etiology is still in study but a congenital and acquired hypothesis have been established. Clinical manifestations appear after injury of these ducts during cholecystectomies. The ducts of Luschka are one of the most common causes of bile leakage after this type of surgeries. Signs and symptoms vary from diffuse abdominal pain to signs of sepsis. However, severe manifestations are rare. Diagnosis depends on the moment of this anatomical variation is suspected. Preoperatively, drip-infusion cholangiography with computed tomography is preferred, intraoperatively direct observation or cholangiography are alternative methods and postoperatively fistulography, endoscopic retrograde cholangiopancreatography (ERCP), or HIDA scintigraphy can be chosen. Treatment depends on the amount of bile that leaks. In small amounts, spontaneous closure with a drain is preferred. In case of a procedure, ERCP is preferred over surgical intervention.

Keywords: Ducts of Luschka; Subvesical ducts; Bile leakage; Cholecystectomy

Introduction

The ducts of Luschka also known as accessory or subvesical ducts are an anatomic variation of the biliary ducts. They were first described on 1753 by Ferrein but, Hubert von Luschka in his second Anatomy Book published on 1863, described in detail the course and drainage of them. Luschka described them as “slender bile ducts running along the gallbladder fossa, draining into the right hepatic duct or common duct” [1]. The ducts of Luschka are small bile ducts that in the majority of cases originate from the right hepatic lobe, the majority from the gallbladder fossa [2]. They can appear as a single duct or a meshwork of small ductules. Its drainage is into ducts located at the right hepatic lobe. However, drainage into ducts located at the left lobe of the liver has also been reported [3,4]. The average diameter of these ducts is 2 mm ranging from 1 to 18 mm and its length of approximately 35 mm ranging from 8 mm to 82 mm according to its site of drainage [5]. Subvesical ducts lack of artery and veins along its path [6] like septal and interlobular bile ducts [7]. Its prevalence yet is not well established. A systematic review by Schnellendorfer et al. [6] that included all articles about Ducts of Luschka until July 14, 2009 reported a prevalence of 4%. However, this review explained that the prevalence might be overestimate or underestimate. It could be overestimate because the studies included in the review were only about Luschka ducts, and at the same time it could be underestimate because the lack of diagnostic test with high sensitivity.

Etiology and Clinical Manifestations

It has been hypothesized that Ducts of Luschka have a congenital or acquired origin. During the fourth week of gestation the liver and bile ducts start to develop from the foregut [2,8]. From the 12 weeks of gestation a progressive transformation of the ductal plate begins [9]. From the ductal plate an autonomous growth at atypical locations can occurs leading to the formation of Ducts of Luschka. On the other hand, the acquired origin has two hypotheses. One of them states that the ducts of Luschka are normal peripheral ducts located at an area where liver parenchyma regressed because of hepatic remodeling. The other theory claims that these ducts are liver parenchymal branches that become hypertrophic after local inflammation [10]. Cholecystectomy is one of the most common digestive surgeries [11]. Ducts of Luschka sign and symptoms occur after injuries during cholecystectomies. The most common presumed cause of bile duct injuries is inflammation [12,13]. Theoretically the gallbladder is dissected in the subserosal plane. When inflammation occurs, this plane is lost leading the dissection into a deeper plane. These leads to serious injury of the Luschka duct while dissecting the gallbladder or ligating cystic artery or biliary duct. In the majority

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of cases ducts of Luschka goes unnoticed preoperatively leading to symptoms after the surgery [14,15]. Sign and symptoms are due to biliary leakage. It has been confirmed that bile leakage probability increases in emergency surgeries [16]. They vary according to the presence or absence of drain, amount, distribution in peritoneal cavity, and type (sterile or infectious) of bile. It has been described that one of the most common causes of biliary leakage is because of these ducts [17]. Clinical manifestations include abdominal pain, nausea, anorexia, mild leukocytosis, and vomiting [18]. They can also present fever and sepsis [19]. However, subvesical ducts tend to have mild symptoms [20].

Diagnosis and Treatment

The diagnosis of ducts of Luschka is a challenge. Surgeons must be aware of this anatomic variation in order to suspect it and require correct diagnostic methods. Preoperatively, drip-infusion cholangiography with computed tomography (DIC-CT) is an accepted method to detect these ducts and its course. However, it is not indicated in patients with obstructive jaundice, serum bilirubin levels above 3 mg/dl or iodine allergy. It has been reported a case of a duct of Luschka diagnose during ultrasound [21]. Nevertheless, more studies have to been made in order to evaluate the utility of this method. Intraoperatively, cholangiography is suggested after cholecystectomy in laparoscopic cholecystectomies [22]. As an alternative method, direct visualization during open cholecystectomy is also suggested [23,24]. Postoperatively diagnosis includes a variety of methods. Some authors claimed that the initial study should be fistulography, which consists of administration of contrast through a drain in order to visualize if communication with the biliary tree exists [25,26]. HIDA scintigraphy has also been described as a postoperative method. The problem is that it has suboptimal anatomic details [27]. Nowadays, endoscopic retrograde cholangiopancreatography (ERCP) is the most common method use to diagnose ducts of Luschka complications. Treatment depends on the amount of bile that leaks. In small amounts, a drain is sufficient to control the injury, but usually this spontaneous closure takes 6 to 8 weeks. In case of an intervention surgical and endoscopic procedures have been described. Surgical interventions are being less used because of its high morbidity and mortality [28], ERCP is currently the treatment of choice in case of bile leaks.

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