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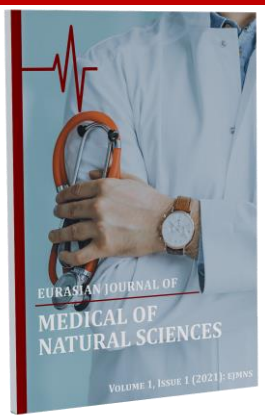

SOME VARIANTS OF ANATOMICAL STRUCTURE OF EXTRAHEPATIC BILE DUCTS

Rakhmonova Habiba Nurullaevna
Assistant of the Department of Histology, Cytology and Embryology, Samarkand State Medical University; e-mail: asilarahmonova9@gmail.com.
Shadieva Shokhida Khaknazarovna
Lecturer, Department of Nursing in Society, Abu Ali ibn Sina Technical School of Public Health; e-mail: shoxida.shadiyeva72@gmail.com.
Yakhyaeva Khursheda Yaheevna
Lecturer, Department of Nursing in Society, Abu Ali ibn Sina Technical College of Public Health; e-mail: xurshida.1975@gmail.com.
Rakhmonov Fariz Zafarjonovich
Student of the Faculty of Pediatrics, Samarkand State Medical University; e-mail: asilarақmonova@gmail.com.
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ABSTRACT

Knowledge of anatomical variations and anomalies of biliary tree development is one of the most important factors of efficiency of surgical treatment of cholelithiasis. At the same time, systematised and unsystematised descriptions of the anatomy of separate sections of extrahepatic bile ducts in the literature are rather diverse and scattered. The aim of the study is to generalise the experience of foreign and domestic authors in the question of estimation of variants of mutual location of extrahepatic bile ducts. Results and discussion. Acquaintance with literature sources allows to state that there is no unified approach to classification of variants of anatomy of the whole extrahepatic biliary tree. Different authors emphasise on separate structures. In addition, the literature widely presents the analysis of clinical cases within a certain classification of anatomical variations or outside of it. In this article a unified classification of variations and anomalies of the extrahepatic bile ducts structure is proposed, the internal structure of which is determined by the allocation of anatomically important regions. In the literature there is no unity of approaches concerning variations and anomalies of extrahepatic bile ducts development and their occurrence. On the basis of systematisation of variations and anomalies of development isolated by different authors, their classification including six groups was constructed: anomalies of hepatic ducts, variations and anomalies of the connection of the vesicular duct with the common

hepatic duct, anomalies of development of the vesicular duct, presence of aberrant ducts, anomalies and variations of development of the common bile duct and anomalies of the pancreatobiliary junction.

An extremely important and often determining condition of successful surgical manipulations on extrahepatic ducts, balloon dilatation of ducts for concrements removal is prevention of the risk of damage to the walls of the ducts themselves and sphincters at their confluence. The possibility of preventing surgical damage in this case is based on the knowledge of variations in the anatomy of the biliary tree, which determines the relevance and practical significance of the study. The problem is complicated by the fragmentation of scientific attention to individual elements of the biliary tree and, as a result, the lack of a unified system of classification of anomalies and variations in its development.

The aim of the present study is to summarise the experience of foreign and domestic authors in the issue of evaluation of variants of mutual location of extrahepatic bile ducts.

Results and discussion

According to the statement of P. Garelick et al. (2011), the frequency of atypical anatomical structure of extrahepatic bile ducts reaches 35-74 %, but the practical significance of different variants is the cause of damage during surgical interventions in a small number of cases [1]. According to M. Lamah and G.H. Dicson (1999), developmental anomalies of extrahepatic bile ducts occur in 0.58 % of cases, but the authors note that a small percentage of findings does not deny the presence of abberant ducts, which may not be visible if the surgeon's manipulations are predominantly performed at the bladder neck [2]. According to L.H. Blumgart, L.E. Hann, Y. Fong (2000), the similar rate is 1/3 of cases [3]. C. Gordeev (2007) in his study notes variants of bile duct anatomy in 17.4 % of cases [4].

In addition to the variety of frequency estimates, there is no consensus in the literature regarding the classification of the variant occurrence of individual anomalies. A. Samokhina (2011) found various types of extrahepatic bile duct anomalies, but the author did not attempt to classify the findings: double left hepatic duct (LHD) was found in 9 cases (8.04 %); double right hepatic duct (RHD) was found on 3 preparations (2.68 %), which forms an anterior and posterior branch in the sagittal plane; absence of the vesicular duct (VD) was observed in 1 case (0.89 %), and short VD was found on 2 preparations, which was 1.79 %; in 5 cases (4.46 %) there was a low connection of the vesicular and common hepatic duct (CHD); in 6 cases (5.36 %) there was a high connection of the CHD and CHD; in 7 preparations (6.25 %) there was a fusion of the CHD with spiral envelope of the CHD; in 2 objects (1.79 %) the CHD and CHD were in one connective tissue sleeve; in 9 preparations (8.04 %) abnormally located additional hepatic ducts were detected [5].

According to D. Wind (1999), the PP runs parallel to the common bile duct (CBD) and can drain the latter in different areas up to the duodenum (in 1/4 of cases) [6]. Parallelism of RPD and PP in 10.6 % of cases is also noted by M. Turner, A. Fulcher (2001) [7]. M.J. Shaw et al. reported that low connection of PP and RPV and spiral coiling of PP around the latter was found in 7 % of cases [8].

A more serious danger for the surgeon is a short PP, which was found by S. Gordeev in 6.7% of patients. The cause of this anomaly can be chronic scar-inflammatory changes of the gallbladder, in 5-10 % of cases leading to shortening of the PP [4]. The same type of congenital absence of PP occurs much less frequently - in 0.14-0.67 % of cases (Lamah M., 1999) [2].

The presence of double PP, according to some authors, is extremely rare (Hirono Y. et al., 1997 [9]). M. Lamah and G.H. Dicson found it in one of 2125 patients (0.05%) during cholecystectomy. In another case, the authors described the doubling of the PP, which merged into one before flowing into the OJP [2].

The drainage of the PP into the PPS, detected by S.A. Gordeev in 0.15% of cases, is one of the most insidious anatomical variants leading to iatrogenic complications [4]. The frequency of this anomaly, according to different authors, varies from 0.1 to 2.3 % (Known A.H. et al., 1997 [10]).

It is much rarer for PP to fall into LPP. In the same study M. Lamah and G.H. Dicson noted it in one patient (0.05 %) [2].

According to the results of J.E. Losanoff et al. (1996), different variations of the anatomical structure of hepatic-fascicular ducts can be reduced to three types: I - LPT is absent; II - LPT and LPT merge before flowing into the gallbladder; III - LPT flows into the gallbladder [11]. It should be noted that the results obtained by J.E. Losanoff results or, possibly, their author's description do not quite agree with the generally accepted ideas about the structure of the biliary tree in the part of bile ducts flowing directly into the gallbladder. However, S. Aristotle et al. (2011) analysed a clinical case falling within the above classification [12].

A large number of studies are devoted to duplication of extrahepatic ducts. In particular, N. Saito et al. (1988-1989) proposed a classification, in which the following variants of duplication of extrahepatic ducts were singled out: I - EPC with a septum in the lumen; II - EPC, which bubble splits into two ducts; IIIa - double biliary drainage without communicating LPP and SPT; IIIb - double biliary drainage with communicating LPP and SPT; IV - double biliary drainage with one or more extrahepatic communicating ducts [13].

E. Choi et al. (2007) supplement the above classification with two more types of anomalous duplication: Va - single biliary drainage without extrahepatic communication; Vb - single drainage with the presence of communication between the ducts [14]. In addition, the Va variant is confirmed by the studies of R. Jha at al. (2013), which identified a single long ODD formed by distal convergence of long LPP and PPP without formation of an ODD [15].

Among the rare congenital anomalies of the LLL, different authors highlight the opening of the LLL into the small curvature of the stomach (Sezgin O. et al., 2010 [16]), the absence of the gallbladder and PP (Gupta N. et al. 2010 [17]). Special attention in the literature is paid to the description of aberrant extrahepatic ducts of Luschka (Kitami M. et al. (2005), Jamshidi M. et al., 1999 [18, 19], Ko K. et al., 2006 [20], Tsigikalo O., 2010 [21]).

As for variations in the anatomy of the fusion of the OJP and pancreatic duct, a number of scientists describe different types of pancreatobiliary fusion anomalies, the so-called pancreaticobiliary maljunction (PBM), a rare genetically determined anomaly, which is defined as a fusion of the OJP and pancreatic duct located outside the duodenal wall, with the formation of a long common duct and without sphincter of Oddi (Komi N. et al, 1992 [22]).

Familiarisation with literature sources allows us to state that there is no unified approach to the classification of variants of the anatomy of the whole extrahepatic biliary tree. Different authors emphasise on separate structures (structure of the OBP, structure of the PP, anomalies of the pancreatobiliary junction, etc.). In addition, analysis of clinical cases within a certain classification of anatomical variations or outside of it is widely presented in the literature. The systematisation and generalisation of these variations based on the literature review allows us to attempt to bring the cases of extrahepatic biliary tree anatomy identified by individual authors into a unified classification.

Its internal structure is determined by separation of anatomically important areas of extrahepatic bile ducts. As the most common normal variant of the biliary tree development, we consider the case when the LPP and LPP merge to form the common hepatic duct, then the latter, merging with the LP, forms the OHP, which, in turn, merging with the pancreatic duct, forms the hepatic-pancreatic ampulla in the duodenal wall.

Conclusions

Thus, the following conclusions can be drawn:

- there is no unity of approaches in the literature regarding variations and developmental anomalies of extrahepatic bile ducts and their occurrence;
- on the basis of systematisation of variations and anomalies of development isolated by different authors, their classification including six groups was constructed: anomalies of hepatic ducts, variations and anomalies of connection of the vesicular duct with the common hepatic duct, anomalies of development of the vesicular duct, presence of aberrant ducts, anomalies and variations of development of the common bile duct and anomalies of pancreatobiliary fusion.

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