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LETTER TO EDITOR

Extrahepatic biliary tract angle is a risk factor for biliary tract injury in laparoscopic cholecystectomy: A surgeon's experience

KEYWORDS
The angle of extrahepatic biliary tract;
Biliary tract injury;
Laparoscopic cholecystectomy;
Magnetic resonance cholangiopancreatography

Dear Editor,

We have recently read the article "Rouviere's sulcus-Aspects of incorporating this valuable sign for laparoscopic cholecystectomy" published in your journal by Stuart Lockhart et al. from Medical School, Trinity College, Ireland,[1] in which reported bile duct injury(BDI) in laparoscopic cholecystectomy (LC) can be avoid by paying attention to the Rouviere's sulcus.

As we all know, BDI is one of the most serious complications of LC,[2] a way to avoid BDI is mentioned in the above article, we also found a possible cause of BDI: the angle of extrahepatic biliary tract system. Relevant literature points out that the most classical mechanism of BDI in LC is misrecognition of cystic duct.[3] However, there are no quantitative indicators to assess the probability of misrecognition in the relevant literature. Our experience is that the angle of extrahepatic biliary tract system is related to the probability of cystic duct misrecognition.

Recently, we met a patient with BDI during LC and analyzed the preoperative Magnetic Resonance Cholangiopancreatography (MRCP). Unlike the classical Anatomical Atlas, actually there is a certain angle in the extrahepatic biliary system, that is to say, there is an angle between the extension line of the lower common bile duct and the upper duodenal segment of bile duct system. After measurement, the angles in coronal and sagittal of MRCP were 62 and 61°, respectively (Fig. 1AB). At the same time, the angles in coronal and sagittal of MRCP for another LC patient without BDI were 15 and 17° (Fig. 1CD), the angle was significantly smaller than that of BDI patients. We suspect that BDI is more likely to occur in patients with bigger angle of extrahepatic biliary tract system, its mechanism may be as follows: 1.When the angle of coronal position increases, the common hepatic duct is closer to the cystic duct, that will make the two structures difficult to distinguish and separate. It is easy to mistake common hepatic duct for cystic duct and cause injury during operation. 2.When the angle of sagittal position increases, the common hepatic duct approaches is closer to ventrally. Therefore, the common hepatic duct which has close relationship with the cystic duct will be more easily exposed. Ultimately, it is will lead to misidentification the common hepatic duct for the cystic duct and cause injury during the operation. Therefore, we named the angle between the lower extension line of common bile duct and the upper duodenal bile duct system in the coronal and sagittal positions as "proximity angle" and "exposure angle" respectively.

Therefore, we suspect that the bigger angle of proximity and exposure angle are correlated with BDI, and

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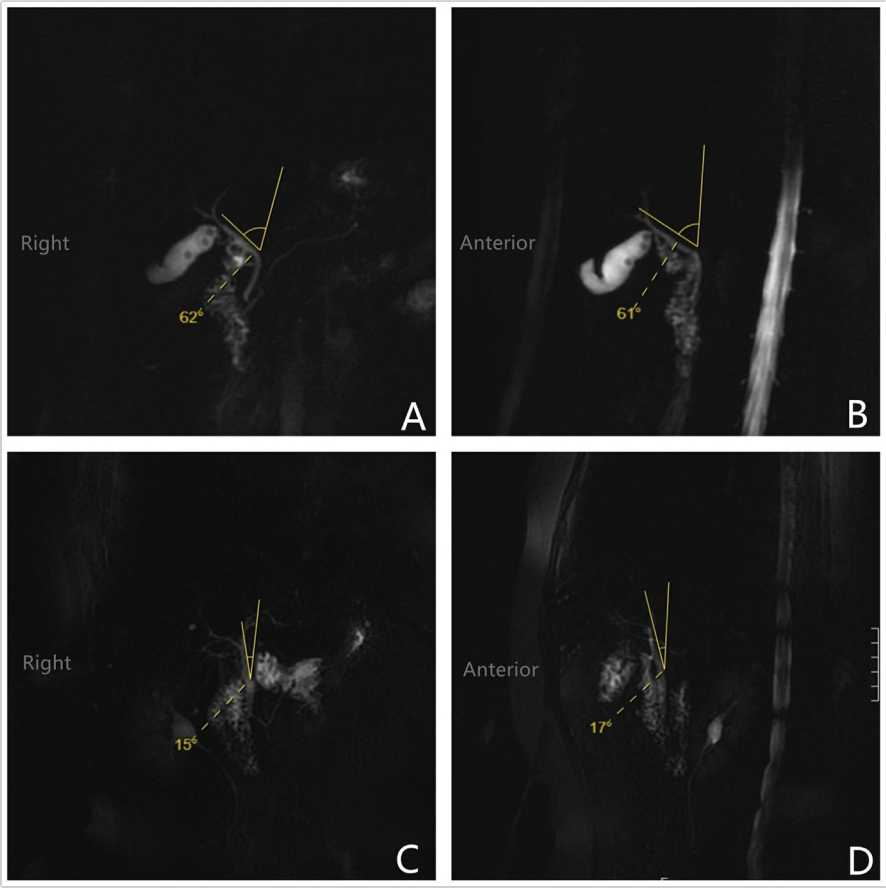

Figure 1 A: proximity angle of BDI patients. B: exposure angle of BDI patients. C: proximity angle of non-BDI patients. D: exposure angle of non-BDI patients.

preoperative assessment of relevant angles may be helpful to avoid the occurrence of BDI. The specific mechanism of the correlation between extrahepatic biliary tract system angle and BDI needs further study to confirm.

Conflicts of interests

All the authors have no potential conflicts of interest to disclose.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.asjsur.2019.03.010.

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