



ORIGINAL RESEARCH PAPER

Radiology

TO STUDY THE ANATOMICAL VARIATIONS OF CYSTIC DUCT USING 3T MRCP IN TERTIARY CARE TEACHING HOSPITAL

KEY WORDS:

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ABSTRACT

Introduction: Variations in anatomy of cystic duct are common. Failure to recognize some of variants may lead to complication during surgical, endoscopic, or percutaneous interventions. Therefore, it is necessary for the practitioner to be familiar with it's variations.

Aims: To demonstrate the imaging features of cystic duct (CD) and its variants using magnetic resonance cholangiopancreatography (MRCP) and document their prevalence in our population.

Materials and methods: This study included 126 patients who underwent MRCP due to different indications and variations of cystic duct were documented.

Results: Normal lateral insertion of CD at middle third of common hepatic duct was seen in 22.22% of cases. Medial insertion was seen in 17.46 % of cases, of which 3.17 % were low medial insertions. Low insertion of CD was noted in 15.07 % of cases. Parallel course of CD was present in 4.76 % of cases. High insertion was noted in 3.17 % and short CD in 2.38% of cases. No cases of cystic duct draining into right hepatic duct and right posterior sectoral hepatic duct draining into cystic duct were found.

Conclusion: Cystic duct variations are common and MRCP is an optimal imaging modality for demonstration of cystic duct anatomy.

1. INTRODUCTION

Variations in anatomy of cystic duct are common and are frequently encountered during imaging. Failure to recognize some of clinically important variants may lead to complication during surgical, endoscopic, or percutaneous intervention procedures^[1]

The cystic duct, measuring about 2–4 cm in length and 1–5 mm in caliber connects neck of gall bladder to common hepatic duct (CHD) to form the common bile duct (CBD). The point of insertion of cystic duct into the CHD is variable. Most frequently it enters the CHD from right lateral aspect^[1]. It joins CHD approximately halfway between hepatic confluence and ampulla of Vater.

Different cystic duct variations are described in literature based on its length, course, and site of insertion with CHD. Some variations which are clinically important are the following: (i) low insertion of cystic duct, (ii) parallel course of cystic duct with CHD, (iii) anterior or posterior spiral course with medial insertion, (iv) absent or short cystic duct (length < 5 mm), (v) aberrant drainage of cystic duct to right hepatic or left hepatic duct, (vi) aberrant or accessory intrahepatic ducts draining into cystic duct, and (vii) double cystic duct^[2-4].

2. MATERIALS AND METHOD

In this observational retrospective study conducted from July 2019 to October 2019, a total of 126 cases were evaluated among which cystic duct insertion was seen.

Imaging was performed in 3-Tesla MRI units (Signa pioneer, GE) using a torso phased-array coil. 3D MRCP RTr sequence was used. The first was single-shot radial MRCP (TR/TE, 700/120 ms; echo-train length, 120; flip angle, 90°; FOV, 300 mm²; section thickness, 40 mm; sections passing through the porta hepatis and rotating around a point anterior to the portal vein). First coronal oblique image was through the tail of the pancreas, the second image was a straight coronal image, and subsequent sections were 15° apart.

Maximum-intensity-projection sets of MRCP high-resolution sequence images were generated in the coronal plane.

2.1. Image Analysis

The MRCP images were assessed in PACS. Length, course, and insertion of cystic duct were documented. When cystic duct joins CHD at its upper third it was defined as high insertion and when it joins CHD at lower third it was defined as low insertion. Point of insertion was documented as lateral (to the right of CHD), anterior, posterior, and medial (to the left of CHD). Short cystic duct was defined as cystic duct length of less than 5 mm. Long parallel insertion was defined as parallel course of cystic duct with CHD for at least 2 cm.

3. Results

Among 126 patients, 66 (52%) cases were male patients and 60 (48%) were female patients (mean age, 47 years; range, 21–68 years). Anatomical variations of cystic duct are summarized in Table 1

Table 1: Distribution Of Anatomical Variants Of Cystic Duct

	Type Of Cystic Duct Variations	Frequency In Our Study	Frequency In Our Study As Percentage Of Total	Frequency Noted In Literature In Percentage [5-13]
1.	Spiral course with medial insertion	22	17.46	16.1%
2.	Low insertion	19	15.07	9%
3.	Low medial insertion	4	3.17	4%
4.	High insertion	4	3.17	5.5%
5.	Anterior insertion	6	4.76	2%
6.	Posterior insertion	34	27.01	20.2%
7.	Parallel course of cystic duct	6	4.76	7.5%
8.	Short cystic duct	3	2.38	1%
9.	Cystic duct draining to right hepatic duct	0	0	0.5%

In 28 (22.22%) cases, normal lateral insertion of cystic duct at middle third of CHD was seen. Spiral course with medial insertion of cystic duct is seen in 22(17.46 %). Low insertion of cystic duct was noted in 19 (15.07%) cases, out of which 4(3.17 %) cases had low medial insertion. Parallel course of cystic duct was present in 6(4.76 %) cases. High insertion of cystic duct was noted in 4(3.17 %). Short cystic duct was seen in 3(2.38%). None of the cases had cystic duct draining into the RHD. None of our cases showed any aberrant right posterior sectoral bile duct draining into cystic duct.

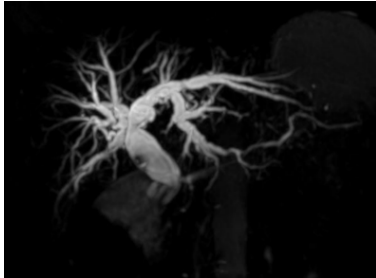


Figure 1 Coronal oblique 3D MR cholangiogram shows medial insertion of cystic duct.

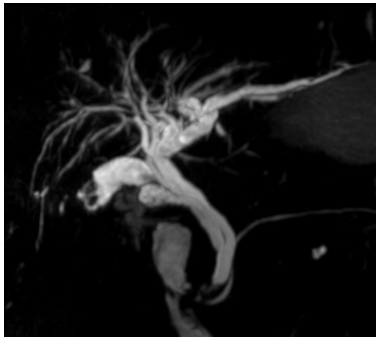


Figure 2 Coronal oblique 3D MR cholangiogram shows parallel insertion of cystic duct.

4. DISCUSSION

MRCP is a noninvasive imaging modality which can optimally image the bile ducts and cystic duct. Cystic duct anatomy and its variants helps in proper interpretation of disease process. Preoperative documentation of bile duct anatomy may also help in medicolegal purposes. [14- 17].

There is extreme variability in the course of cystic duct and its junction with extrahepatic bile duct. [14].

The limitation of our study is that we could not compare our results ERCP or intraoperative cholangiography.

5. CONCLUSION

Cystic duct variations are not uncommon and it is imperative to recognize its anatomical variations, for which MRCP is an excellent imaging modality for demonstration of cystic duct anatomy and its variations thereby helping not only in proper interpretation of disease process but also in providing a road map before any percutaneous, endoscopic, and surgical interventions.

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