

# Phrygian Cap - An Incidental Finding in Laparoscopic Cholecystectomy

Dr. Ramendranath Talukdar<sup>1</sup>, Dr. Megha Grover<sup>2</sup>, Dr. Kartavya Patel<sup>3</sup>, Dr. Amandeep Singh<sup>4</sup>

<sup>1</sup>Professor, Department of General Surgery, SGT Hospital, Gurugram, Haryana

<sup>2</sup>Junior Resident, Department of General Surgery, SGT Hospital, Gurugram, Haryana

<sup>3</sup>Junior Resident, Department of General Surgery, SGT Hospital, Gurugram, Haryana

<sup>4</sup>Senior Resident, Department of General Surgery, SGT Hospital, Gurugram, Haryana

**Abstract:** A Phrygian cap is a congenital anomaly of the gallbladder with an incidence of 4%. A Phrygian cap, however, has no pathological significance and normally causes no symptoms. A case will be presented where a Phrygian cap was found by coincidence during surgery. The patient was operated for symptomatic cholelithiasis. During perioperative inspection, a gallbladder with a folded fundus was seen. Radiographic imaging can be helpful in narrowing the differential diagnosis. To our knowledge, there is no recent literature about the Phrygian cap and its imaging aspects. Nowadays, multiphase MRI, or multiphase CT in case of MRI contraindication, is the first choices of hepatobiliary imaging.

**Keywords:** Phrygian Cap, Gall Bladder Anomaly, Laparoscopic Cholecystectomy

## 1. Introduction

The gallbladder is a pear-shaped organ and stores bile. Normally, the gallbladder is about 7 cm long and 3 cm wide and is located on the undersurface of the liver. Since the introduction of cholecystectomy in 1882 [1], many gallbladder variations are known. These variations include anomalies of form, location or number of gallbladders. It occurs due to fold in gallbladder fundus upon its body and resembles the soft conical cap worn by people of ancient Phrygia (central Turkey) as shown in figure below.

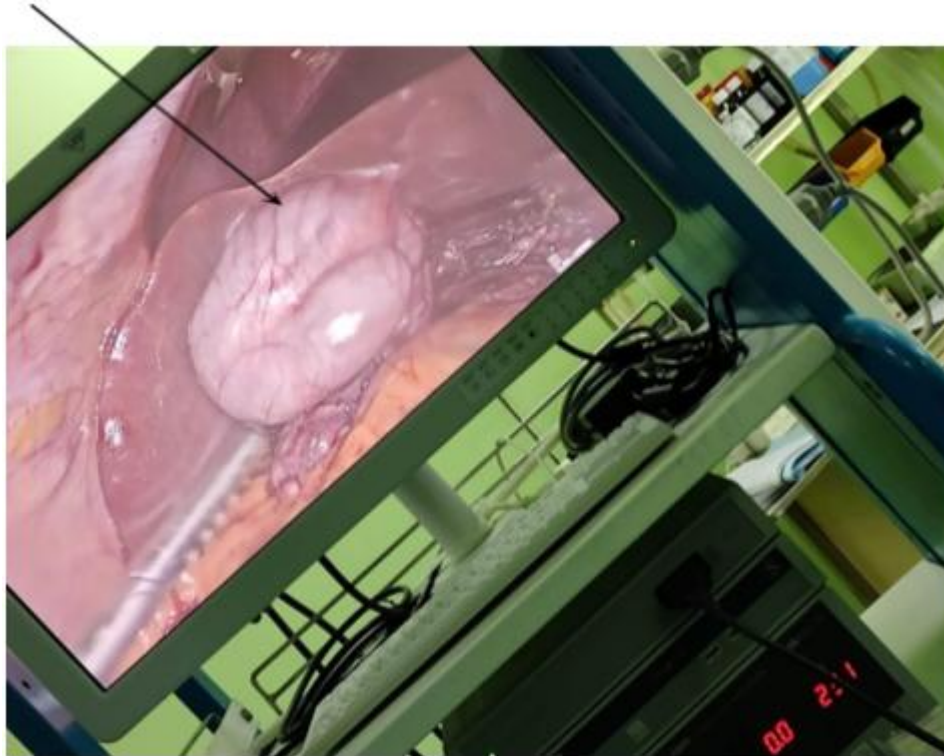


Gallbladder anomalies arise from changes in embryological development. During the fourth week of gestation, the liver, gallbladder and biliary tree arise as a ventral bud from the most caudal part of the foregut [2, 3]. The original hepatic diverticulum differentiates caudally into the gallbladder [3]. A folding of the fundus during embryological development causes a so-called Phrygian cap. A Phrygian cap is a

congenital abnormality of the gallbladder [4, 5] and has an incidence of 4% [6]. It is the most common congenital anomaly of the gallbladder and can simulate a mass in the liver during hepatobiliary imaging [5], which may suggest a tumour. It can also simulate a duplication of the gallbladder [7]. A Phrygian cap, however, has no pathological significance. It is therefore important to use proper imaging techniques to differentiate between a Phrygian cap and other diagnoses. We report the case of a young patient with sporadic pain in the right upper abdominal quadrant and discuss the imaging aspects and treatment of a Phrygian cap.

## 2. Case Report

A 32-year-old female, presented in outpatient department with history of 2 episodes of right upper abdominal pain which was associated with vomit and was non-radiating since last 6 months. On clinical examination, abdomen was soft no positive Murphy's sign. Baseline routine investigation like Complete Blood Count, Liver Function Test, Kidney Function Test, Prothrombin time, and Viral Markers and Ultrasound examination was done (which showed a multiple calculus in the gall bladder largest measuring 16mm with wall thickening). Due to persistence of symptoms, patient was posted for elective laparoscopic cholecystectomy. Intra-operatively, the gall bladder was elongated, adhered to surrounding structures and a Phrygian cap was present over gallbladder.



Gallbladder was resected from all the adhesions, cystic duct and artery was ligated using Ligaclips.

Gallbladder was extracted via epigastric port and rest all incisions were closed. Histopathological examination

showed chronic cholecystitis. Postoperative period was uneventful and patient was discharged on postoperative day 2. During follow up visits after one week, all port sites were health and sutures were removed. Resected specimen is shown in figure below.



### 3. Discussion

The folded fundus deformity is called a Phrygian cap. It is the commonest congenital abnormality of the gallbladder. This anatomical variation was first described by Boyden in 1935 [8]. He named the deformity after the Phrygian cap, an ancient conical cap with the top pulled forward. This cap is associated in antiquity with the inhabitants of Phrygia, a region what is now called central Turkey. A Phrygian cap is a benign anatomical abnormality and normally causes no symptoms. Sometimes patients complain of pain in the right upper quadrant of the abdomen. The Phrygian cap is of no

clinical importance other than to not mistake it for pathology. A Phrygian cap can be identified with ultrasonography, CT scan, oral cholecystography, cholescintigraphy [9] nowadays also by multiphase MRI. CT and ultrasonography are not always conclusive. According to Meilstrup et al. [9] and Smergel and Maurer [10], delayed imaging by cholescintigraphy is then needed to identify the Phrygian cap because it can show delayed filling of a portion of the gallbladder during hepatobiliary imaging. When the gallbladder shows filling after a couple of hours, a mass lesion can be excluded. The literature about imaging techniques of the Phrygian cap is outdated. In our case, this

deformity was not detected on the preoperative USG scan. Cholecystectomy is indicated in case of symptomatic cholelithiasis.

#### 4. Conclusion

Phrygian cap is a most common anatomical developmental anomaly of gallbladder which is mostly found incidentally either during imaging or during perioperative period. When the gallbladder appears smaller than the gallbladder fossa or a mass is seen in the fundus on hepatobiliary imaging, a Phrygian cap should be in the differential diagnosis. Multiphase images by MRI or CT scan should be obtained to exclude a tumor mass. Phrygian cap is also sometimes misdiagnosed as liver mass or gallbladder stone. It is an asymptomatic anatomical anomaly which doesn't require prophylactic cholecystectomy unless, it causes symptoms or complication of gallbladder disease.

#### References

- [1] Hardy KJ: Carl Langenbuch and the Lazarus Hospital: events and circumstances surrounding the first cholecystectomy. *Aust N Z J Surg* 1993; 63: 56–64.
- [2] Severn CB: A morphological study of the development of the human liver.1. Development of the hepatic diverticulum. *Am J Anat* 1971; 131: 133–158.
- [3] Rappaport AM, Wanless IR: *Diseases of the Liver*, ed 7. Philadelphia, Lippincott, 1993, p 1.
- [4] De Csepe J, Carroccio A, Pomp A: Soft - tissue images. 'Phrygian cap' gallbladder. *Can J Surg* 2003; 46: 50–51.
- [5] Lamah M, Karanjia ND, Dickson GH: Anatomical variations of the extrahepatic biliary tree: review of the world literature. *Clin Anat* 2001; 14: 167–172.
- [6] Edell S: A comparison of the Phrygian cap deformity with bistable and gray scale ultrasound. *J Clin Ultrasound* 1978; 6: 34–35.
- [7] Dalal S, Chauhan TS, Kumar R, Choudhury SR: Pseudo - duplication of the gall bladder due to Phrygian cap – a case report. *Internet J Surg* 2013; 29.
- [8] Boyden EA. The Phrygian cap in cholecystography: a congenital anomaly of the gallbladder. *Am J Radiol.*1935; 33: 589. [Google Scholar]
- [9] Meilstrup JW, Hopper KD, Thime GA. Imaging of gallbladder variants. *AJR Am J Roentgenol.*1991; 157: 1205–1208. [PubMed] [Google Scholar]
- [10] Smergel EM, Maurer AH. Phrygian cap simulating mass lesion in hepatobiliary