

Length of Hepatopancreatic Ampulla and Its Clinical Importance in Karnataka Population

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Abstract

Background: Presence of septum and anatomical knowledge of hepatopancreatic ampulla morphometry plays major role in understanding safety surgical procedures of duodenal cancers. **Objective:** to study the length of hepatopancreatic ampulla in Karnataka population. **Materials and Methods:** 50 formalin fixed cadavers (Male - 41; Female - 9) with age group ranged between 35 - 60 years from the departments of Anatomy, J.J.M Medical College, Davengere, Karnataka & Government Medical College, Palakkad, Kerala to study the length of hepatopancreatic ampulla and its clinical importance. Coloured solution was injected at the junction of major and minor pancreatic duct to study the length of hepatopancreatic ampulla. The length of the hepatopancreatic ampulla was measured till its opening into duodenal papilla. **Results:** The presence of hepatopancreatic ampulla was observed in 39 specimens out of 50 cases. The measurement of length of the hepatopancreatic ampulla revealed that the length varied from 2 mm to 10 mm. The length varied from 1 to 2 mm in 3 (6%) out of 50 specimens and 3 mm or more in 36(72%) specimens. The hepatopancreatic ampulla was absent in 11 specimens (25%) due to presence of complete septum till the duodenal orifice in the present study. **Conclusion:** The present study gives basic knowledge in understanding the extension of hepatopancreatic ampulla from its point of origin to termination before planning a surgery.

Keywords: Ampulla, Hepatic duct, Pancreatic duct.

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INTRODUCTION

The ampulla of Vater also known as the hepatopancreatic ampulla. The hepatopancreatic ampulla corresponds anatomically with the dilated junction of the common bile duct and the main pancreatic duct within the major duodenal papilla. The ampulla is specifically located at the major duodenal papilla [1]. It is an important landmarks presents halfway along the second part of the duodenum and marks the anatomical transition from foregut to midgut [2]. Various smooth muscle sphincters regulate the flow of bile and pancreatic juice through the ampulla. The sphincter of the hepatopancreatic ampulla (Oddi) is composed of sphincters surrounding the terminal parts of the bile and pancreatic duct, its functional importance and anatomical complexity has long been a matter of discussion among anatomists, physiologists, surgeons, and endoscopists. The sphincter of Oddi controls the introduction of bile and pancreatic secretions into the duodenum, as well as preventing the entry of duodenal contents into the ampulla [3]. The endoscopic guided removal of gall stones obstructing the orifice of hepatopancreatic

ampulla causing reflux of bile into pancreatic duct [4]. Both the ducts pass obliquely through the wall of the duodenum for a distance of about 15 mm and form a short dilated hepatopancreatic ampulla (of Vater), which empties into the major duodenal papilla [5]. This ampullary appearance is inconstant, and its existence is disputed by some investigators. Considered more widely and realistically from the surgical viewpoint, the ampulla of Vater constitutes the junction of the biliary, pancreatic, and digestive tracts. The ampulla of Vater is the site of tumors, often with a threatening prognosis and the surgical treatment of which may be consequently difficult. It is also commonly the site of disorders specific to or caused by the neighboring organs that affect biliopancreatic emptying. The present study under taken to study the length of hepatopancreatic ampulla and its clinical complications in Karnataka population.

MATERIALS AND METHODS

We have utilized 50 formalin fixed cadavers (Male - 41; Female - 9) with age group ranged between 35 - 60 years from the departments of Anatomy, J.J.M

Medical College, Davengere, Karnataka & Government Medical College, Palakkad, Kerala to study the length of hepatopancreatic ampulla and its clinical importance. Pancreas was removed along with duodenum and dissected on its posterior surface to expose the main and accessory pancreatic ducts. The duodenum was opened along its convex margin and the interior was cleaned to expose the mucosal surface. Coloured solution was injected at the junction of major and minor pancreatic duct to study the length of hepatopancreatic ampulla. The length of the hepatopancreatic ampulla was measured till its opening into duodenal papilla. The specimens were duly numbered, preserved in 5% formalin. Photographs of each specimen were taken by digital camera and the length was marked with linear line with dots at both the ends.

RESULTS

The presence of hepatopancreatic ampulla was observed in 39 specimens out of 50 cases (Table-1). The common bile duct and pancreatic duct traversed together obliquely through the wall of the duodenum and form a short dilated hepatopancreatic ampulla (Ampulla of Vater) and empties into the major duodenal papilla. The hepatopancreatic ampulla was absent in 11 specimens (25%) due to presence of complete septum till the duodenal orifice in the present study (Figure-1). The measurement of length of the hepatopancreatic ampulla revealed that the length varied from 2 mm to 10 mm. The length varied from 1 to 2 mm in 3 (6%) out of 50 specimens (Figure-2) and 3 mm or more in 36(72%) specimens (Figure 3 & 4). The hepatopancreatic ampulla was absent in 11 specimens (25%) due to presence of complete septum till the duodenal orifice in the present study (Table-2).

Table-1: Distribution of length of the Hepatopancreatic ampulla (%)

Length of the hepatopancreatic ampulla (mm)	No. of specimens	Percentage
1 to 2 mm	03	5
3 mm or more	36	70
Absence of hepatopancreatic ampulla	11	25
Total	50	100

Table-2: Length of the Hepatopancreatic Ampulla

No. of cases having the hepatopancreatic ampulla	Length of the hepatopancreatic ampulla in mm.									
	1	2	3	4	5	6	7	8	9	10
39	0	3	5	11	6	3	5	0	3	3

Table-3: Comparison of Results of Various Workers on the Length of the Hepatopancreatic Ampulla

Sl. No.	Author	No. of cases	Length of hepatopancreatic ampulla	
			1 to 2 mm (%)	3 mm or more (%)
1	Baldwin (1911) [17]	90	14 (15.5)	55(61.2)
2	Singh I (1956) [14]	100	9(9)	54(54)
3	Present study	50	3(6)	36(72)

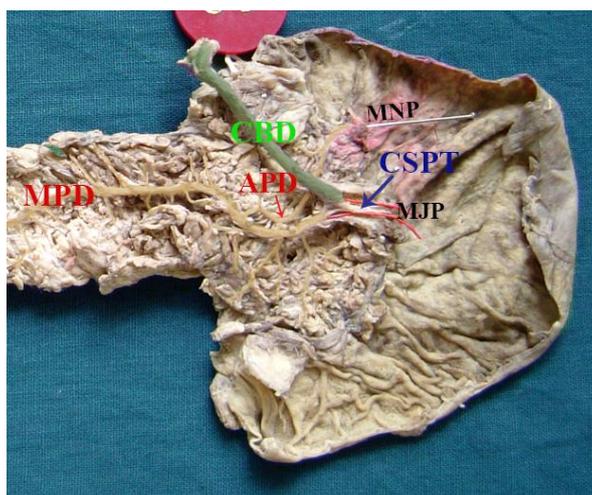


Fig-1: Absence of hepatopancreatic ampulla due to the presence of septum till the duodenal orifice (MPD: major pancreatic duct; CBD: common bile duct; MNP: minor duodenal papilla; APD: accessory pancreatic duct; MJP: major duodenal papilla; CSPT: complete septum)

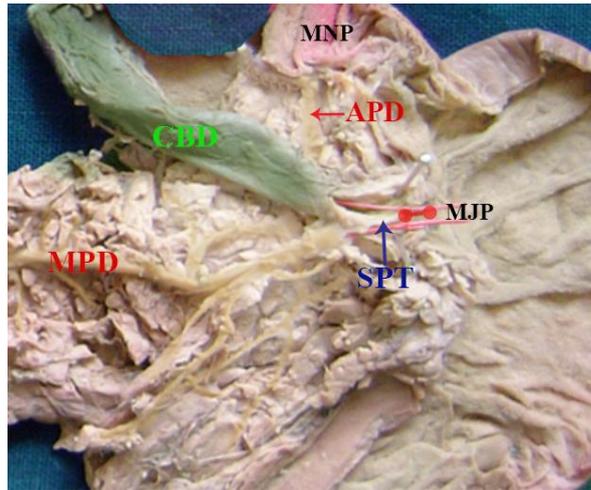


Fig-2: Hepatopancreatic Ampulla of 2 mm Length (Between Two Red Dots) (MPD: major pancreatic duct; CBD:commonbile duct; MNP: minor duodenalpapilla;APD: accessory pancreaticduct; MJP: major duodenalpapilla; SPT: septum)

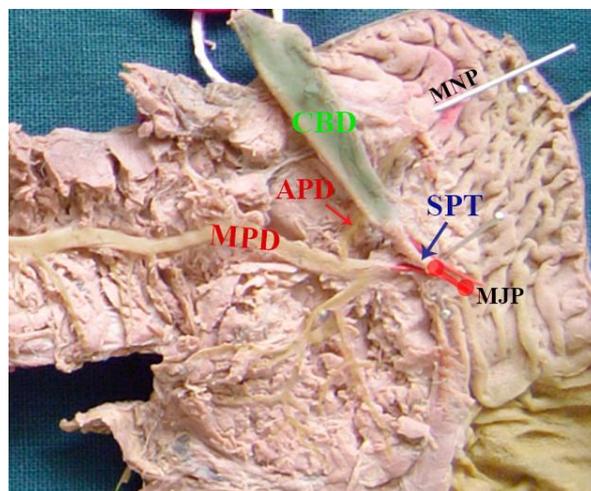


Fig-3: Hepatopancreatic Ampulla of 6 mm Length (Between Two Red Dots) (MPD: major pancreatic duct; CBD:commonbile duct; MNP: minor duodenalpapilla;APD: accessory pancreaticduct; MJP: major duodenalpapilla; SPT: septum)

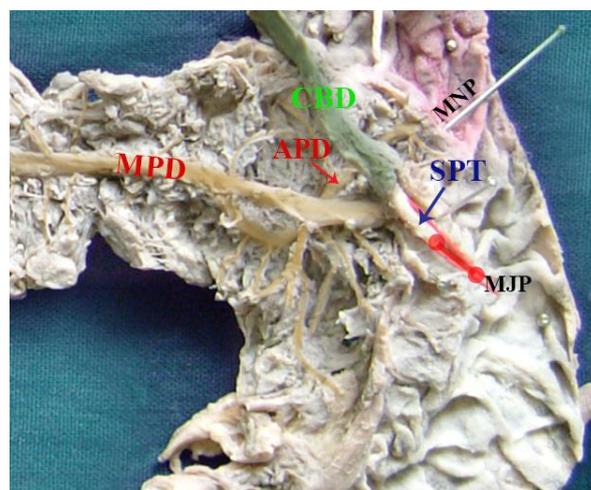


Fig-4: Hepatopancreatic Ampulla of 10 mm Length (Between Two Red Dots) (MPD: major pancreatic duct; CBD:commonbile duct; MNP: minor duodenalpapilla;APD: accessory pancreaticduct; MJP: major duodenalpapilla; SPT: septum)

DISCUSSION

Malformations and variations during the complicated embryological development of the pancreas can lead to congenital abnormalities and may prove to be important cause of pancreatitis. It varies from 1 to 14 mm in length and from 1.5 to 4.5 mm in width. If a septum is present as far as the duodenal orifice, the ampulla does not exist. It corresponds to an anatomical and functional region that comprises the junction of the common bile duct and main pancreatic duct, the sphincteric system of Oddi, a dehiscence of the duodenal wall (fenestra choledochae) and the major duodenal papilla, covered by the duodenal mucosa. The presence of ampulla of Vater in our study with an incidence of 78% is higher compared with previous literature [6]. In 48% of cases the ampulla was 5.2 mm. and in another study reported that the ampulla of Vater was from 1 to 11 mm in length, 5.0 mm or more length was noted in 30% of cases and 19 specimens presented with 3.8 mm length of ampulla [7, 8]. A study in 250 cases, three types according to the pattern of hepato pancreatic ampulla opening into duodenum stated that Type I was described as those cases where common bile duct and the main pancreatic duct joined together to form common hepato-pancreatic duct (85.5%). Type II was described as those cases where the two ducts opened on the major duodenal papilla being separated by a complete septum (5.5%). Type III (as described as those cases in which the two ducts opened separately at some distance apart (9%) where as in our study, we have not studied the pattern of the opening of the hepato pancreatic ampulla but observed the presence of septum [9]. The ampulla of Vater was measuring 5 mm or more in only 3.5% and 7.9% of cases respectively [10, 11]. It was observed that in 17% of his cases, the ampulla of Vater measured 5 mm or more [12]. The anatomic dissections of the biliary pancreatic junction of the autopsy specimens by Sterling revealed a mean length of the ampulla of Vater of 5 mm [13]. The endoscopic guided removal of gall stones obstructing the orifice of hepatopancreatic ampulla causing reflux of bile into pancreatic duct and endoscopic guided drainage of pancreatic pseudocyst and placement of stent into the pancreatic duct in case of malignant pancreatic duct obstruction require a detailed knowledge of pancreatic duct system. The length of the hepatopancreatic ampulla varied from 1 to 14.5 mm, in another study from 1 to 12 mm and from 2 to 10 mm in previous literature indicates that the findings in the present study are the incidence of hepatopancreatic ampulla is higher and in agreement with previous literature [14-17].

CONCLUSION

Our findings in the present study give knowledge in understanding hepatopancreatic ampulla from its formation to termination to the endoscopists for better outcomes in surgeries,

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Conflict Interest: NIL

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