

GASTRO-PANCREATIC AND GASTRO-DUODENO-PANCREATIC LIGAMENTS: A CASE OF TWO UNUSUAL INHABITANTS OF THE OMENTAL BURSA AND THEIR CLINICAL IMPLICATIONS

*Ashaolu J.O.¹, Abimbola O.O.¹, Ukwenya V.O.²

1. Department of Anatomy, Faculty of Basic Medical sciences, Bowen University, Iwo, Osun State, Nigeria.
2. Department of Anatomy, Faculty of Basic Medical sciences, Ekiti State University, Ekiti State, Nigeria.

*Corresponding Author to Ashaolu, James Olumide Department of Anatomy, Faculty of Basic Medical sciences, Bowen University, Iwo, Osun State, Nigeria. Olusco172003@yahoo.com+234-8137609462

ABSTRACT

This paper reports a cadaveric case of two unusual peritoneal structures; namely, the gastro-pancreatic and gastro-duodeno-pancreatic ligaments. The gastropancreatic ligament is a broad peritoneal structure that holds the stomach and the pancreas together and has occasionally been reported while gastro-duodeno-pancreatic ligament is our new finding. It attaches the stomach, duodenum and the pancreas. The existence of these ligaments may create clinical conditions such as internal herniation or viscera kinking and they limit the movement easing function of the omenta bursa. It is important that such anatomical variations be brought to the knowledge of anatomists, surgeons and radiologists.

Key words: gastro-pancreatic ligament, gastro-duodeno-pancreatic ligament, omenta bursa, peritoneum, variation, omental foramen, cystoduodenal ligament

INTRODUCTION

Usually there is no formation of ligamentous structures within the omenta bursa but if they exist, their presence could hinder the movement easing function of the stomach, increase tendencies of intestinal herniation and volvulus. Peritoneal variant folds are most commonly reported around the supracolic compartment of peritoneal cavity and they occasionally include cystocolic ligaments, cystogastrocolic ligament, cystoduodenal ligament, jejunal congenital band, gastro-pancreatic ligament or anomalous fold joining the greater omentum to liver, gall bladder, lesser omentum and kidney (Ashaolu et al., 2011; Pamidi et al., 2008; Satheesa et al., 2009; Williams et al., 1995).

Previous reports suggest that the GP ligament connects the stomach to the pancreas and lying within the omenta bursa. Crymble first reported the gastropancreatic ligament in 1913, Erenbourg and Reggiani (1985) and Tsutsui et al. (1995) later reported on the same. To the best of our knowledge, no existing literature has documented the occurrence of GDP ligament, which we currently report alongside the GP ligament.

We report a case of combined occurrence of the gastro-pancreatic (GP) and gastro-duodeno-pancreatic ligaments (GDP).

CASE REPORT

Aberrant peritoneal ligaments- the gastro-pancreatic (GP) and gastro-duodeno-pancreatic ligaments (GDP)-were found in the abdominal region of a male cadaver

during routine supervision of Medical students' dissection in the Anatomy Department of the College of Health Sciences, Bowen University, Iwo, Osun

State, Nigeria. Following the removal of the greater omentum, which suspended on the greater curvature of the stomach. The stomach was turned upwards to reveal the omental bursa. We found these unusual ligaments. The gastro-duodeno-pancreatic ligament was connecting the inferior aspect of the pylorus of the stomach, inferior aspect of superior part of duodenum and medial aspect of the descending part of duodenum, and distally, the superior part of head and body of pancreas.

The GDP ligament possesses a thicker medial border and a thinner lateral aspect. To the right of the ligament, the GP ligament was found. The GP ligament is a relatively wider structure attaching the stomach to the pancreas. Meanwhile, we found the right gastro-omental vessel and portal triad structures: inferior part of portal vein, common bile duct and gastroduodenal artery in the GDP ligament.

A large foramen was found between the right and left part of the GP ligament, that we herein name as post-omental foramen. The right part attaches the body of pancreas to the lesser curvature and contains diverging branching form left and right gastric vessels and some fatty tissue. The left part of the GP ligament attaches the tail of pancreas to the greater curvature of stomach and contains the left gastro-omental vessels. The inferior part of the GP ligament contains the splenic artery.

An inter-ligamental pouch was found between the GDP and GP ligaments. A probe inserted through the omental foramen from the right was only visible behind the post-omental foramen. GDP and GP ligaments divided the omental bursa into a superficial part and a deep part. These ligaments were made up of two layers that are continuous with the visceral peritoneum of neighboring structures and this infers that aberrant ligaments are not mere peritoneal adhesions.

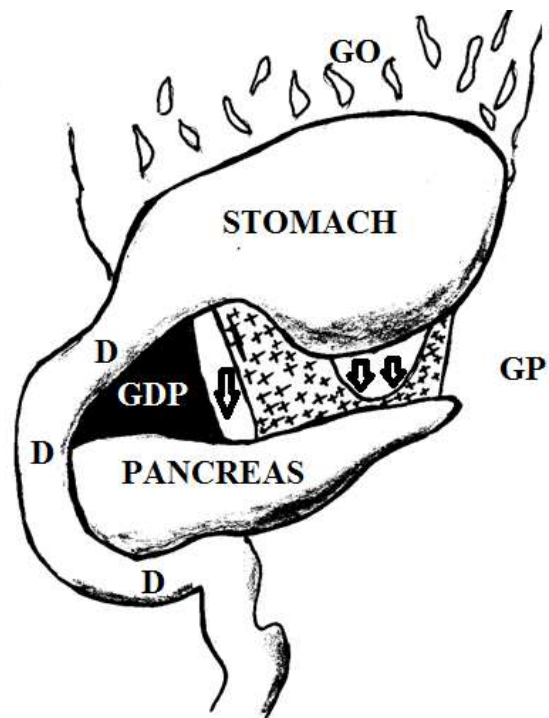
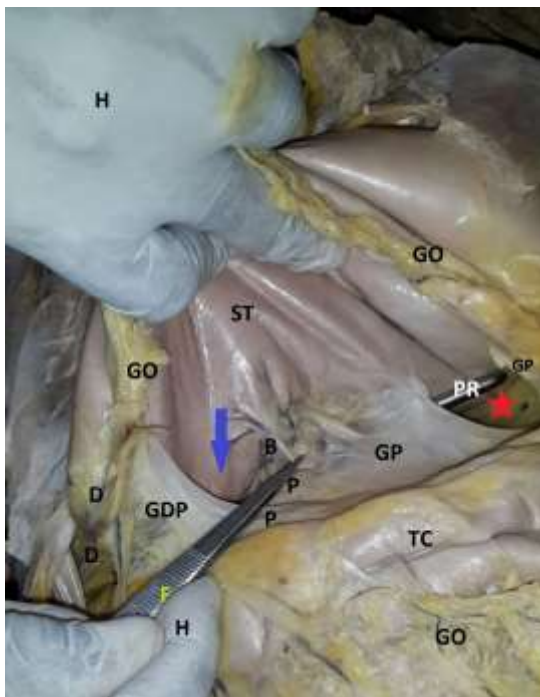


Figure 1. Photograph and illustrations showing upwardly reflected s

GP- gastro-pancreatic ligament, GDP-gastro-duodeno-pancreatic ligament, ST- stomach, D- duodenum, P- Pancreas, GO- greater omentum, TC –transverse colon, PR-probe, H-hand, Red star- post-omental foramen, B-blood vessel, Blue arrow- inter-ligamental pouch, F-Force

DISCUSSION

The GP and GDP, attach the duodenum and posterior aspect of the stomach (about the lesser curvature) to the pancreas in the posterior abdominal wall and they could delimit the movement-easing function of the omenta bursa. Nonetheless, the post-omental foramen and the inter-ligamental pouch contained in and around these variant ligaments render the omental bursa as a susceptible region for internal herniation. Herniation of abdominal viscera into omental bursa could occur through the omental foramen or deficiencies in the greater omentum while a more difficult clinical condition may arise when such hernia progress into either the inter-ligamental pouch or the post-omental foramen.

Tsutsui et al., (1995), in their clinical case, reported the entrapment of intestinal structures in the hole that exist around the gastropancreatic ligament and they performed surgical resection that ameliorated the pre-operative symptoms experienced by their patient. Since the occurrence of the GP ligament could cause a clinical condition, requiring surgical operation, it becomes imperative for abdominal surgeons to understand the vascularization of the structures. The left and right gastro-omental vessels were found in the GP and GDP respectively. The branches of left and right gastric vessels were also found in the superior aspect of GP ligament, the splenic artery also run in the inferior aspect of the GP ligament. Portal triad is mainly contained within the hepatoduodenal ligament but in this case the inferior aspect of portal triad is contained in the GDP ligament. These are structures of significant clinical implication, an iatrogenic damage to the portal triad structures may cause necrosis to the duodenum, affect bile passage into the duodenum and damage to the portal vein.

These aberrant ligaments could also be involved in kinking of pyloric part of

stomach and duodenum or in their volvulus formation. Low et al., (1992) reported an anomalous fold that caused a constriction of the wall of the duodenum, notable radiologically. A case of obstruction of the proximal part of the jejunum by a congenital band has also been reported (Liu, 2005). The two aberrant ligamental structures are made up of two layers that are continuous with the visceral peritoneum of neighboring structures and this infers that aberrant ligaments are not mere peritoneal adhesions.

The pancreas develops from two evaginations of the foregut- dorsal and ventral pancreatic buds, which fuse to form a single organ (Williams et al., 1995). The dorsal pancreatic bud develops within the dorsal mesogastrum while the ventral pancreatic bud develops in the ventral mesogastrum (Williams et al., 1995). The dorsal pancreatic duct develops as a thickening of the endodermal tube while the ventral pancreatic bud evaginates in close proximity to the liver primordium as an evagination of the bile duct itself. Differential growth of the wall of the duodenum results in movement of the ventral pancreatic bud and bile duct to the right side and ultimately to the dorsal position (Williams et al., 1995). The ventral pancreatic duct and the bile duct rotate from a position within the ventral mesogastrum to one in the dorsal mesogastrum, which is destined to become fixed unto the posterior abdominal wall (Williams et al., 1995). The ligament joining the pancreas and duodenum commonly obliterates (Williams et al., 1995). The GP ligament might be a persistence of part of mesogastrum attaching the pancreas to the stomach in development. The GDP ligament might have been formed as a remnant of the ventral mesogastrum carried from the ventral region to the dorsal right region

especially since it contains the portal triad. The GP ligament and GDP ligament might also have been formed from unusual folding of the greater omentum attaching to the pancreas.

Furthermore, the two ligaments separate the omental bursa into two potential spaces that we herein name as the bursa omenti superioris and bursa omenti profundus. Meanwhile, earlier work by Crymble in 1913 described the spaces as the bursa omenti majoris and minoris respectively. But Crymble's description might be confusing since either of the spaces could be larger than the other. A finger inserted through the omental bursa

will only end in the bursa omenti profundus. The inter-ligamental pouch might also accumulate peritoneal fluid in inflammatory conditions.

Moreover, these folds may cause difficulty in diagnosis around the pancreas, duodenum, stomach and spleen. Therefore, the knowledge of these kinds of aberrant peritoneal fold is useful to anatomists, surgeons and radiologists.

Conflict of interest: None

Acknowledgement: We duly appreciate the enormous support received from the technical staff of the Anatomy Department of Bowen University.

REFERENCES

1. Ashaolu JO, Ukwenya VO, Adenowo TK. 2011. Cystoduodenal ligament as an abnormal fold and the accompanying anatomical and clinical implications. *Surg Radiol Anat* 33:171–174.
2. Crymble PT. 1913. Gastro-pancreatic folds: Their relation to the movements of the stomach and to the sb-divisions of the lesser sac . *J Anat Physiol*. 47:207–224.
3. Erenbourg, L, Reggiani P. 1985. A new ligament: the « gastro-pancreatic » *Surg Radiol Anat* . 7:143-144.
4. Liu C, Wu TC, Tsai HL, Chin T, Wei C. 2005. Obstruction of the proximal jejunum by an anomalous congenital band: a case report. *J Pediat Surg* 40: 27–29.
5. Low VH, Davis SJ, Yoong MS. 1992. Anomalous peritoneal folds of the duodenum. A normal variant simulating disease. *Austral Radiol* 36: 135–136.
6. Moore KL, Dalley AF. 1999. Clinically oriented anatomy, 4th edn. Lippincott Williams and Wilkins, Montreal, 711–717.
7. Pamidi N, Nayak S, Vollala VR. 2008. Cystogastrocolic fold and associated atrophy of the gall bladder. *Singapore Med J* 49: 250.
8. Satheesha NB. 2009. Abnormal peritoneal fold connecting the greater omentum with the liver, gall bladder, right kidney and lesser omentum. *Bratish Lek Listy* 200: 736–737.
9. Tsutsui S, Kitamura M, Shibabe K, Tomoda M, Ohmori M, Yoshida M. 1995. Lesser sac herniation through the greater omentum and the gastropancreatic ligament: the report of a case. *Jpn J Surg* 25:59-61.
10. Williams PL, Banister LH, Berry MM, Patricia C, Dyson M, Dussek JE, Ferguson MWJ. 1995. The Peritoneum. In: *Gray's Anatomy* 38th edn. Churchill Livingstone, New York, pp 1734–1745.

