

Case Report

Uncommon Peritoneal Anomaly of Spleen Associated with the Unusual Relationship of Spleen with the Left Lobe of the Liver

Satheesha NB, Srinivasa Rao S (✉), Narendra P, Anitha G, Surekha DS, Naveen K, Ashwini A, Swamy RS

Department of Anatomy, Melaka Manipal Medical College (Manipal Campus), Manipal University, Manipal, Udupi District, 576104 Karnataka State, India.

Abstract

Though congenital anomalies of the spleen are quite common, the peritoneal anomalies of the spleen are very rare. In the present case, we observed two unusual phrenico-splenic ligaments connecting the spleen to the diaphragm. Apart from this, the left lobe of the liver was elongated and was related to the diaphragmatic surface of the spleen. The splenic artery had a straight course to the spleen, indicating the possible restricted movements of the spleen. Knowledge of such unusual relation of spleen is essentially important for the surgeons as the elongated left lobe of the liver might get ruptured in addition to the spleen in the fractures of the left 9th, 10th and 11th ribs. Awareness of the straight course of the splenic artery is also of importance to Radiologists performing arterial splenoportography.

Keywords: Congenital anomalies, spleen, splenic artery, phrenico-splenic ligament, diaphragm

Correspondence:

Srinivasa Rao Sirasanagandla, Department of Anatomy, Melaka Manipal Medical College (Manipal Campus), International Centre for Health Sciences, Manipal University, Madhav Nagar, Manipal University, Udupi District, 576104 Karnataka State, India. Tel: +91-820-2922644 Fax: +91-820-2571905 Email: seenaih.anat@gmail.com

Date of submission: 22 Oct, 2012

Date of acceptance: 28 Feb, 2013

Introduction

Spleen is the largest lymphatic organ in the human body. It is situated in the left hypochondrium between the stomach and diaphragm. It is approximately 12 cm long and 7 cm wide, and it is completely surrounded by greater sac. It is tetrahedral in shape and presents two ends, two surfaces and two borders. Its upper border usually shows characteristic notching. The diaphragmatic surface is convex and smooth, and it is separated from the left lung, pleura and 9-11th ribs by the diaphragm. The irregular visceral surface is related to the left kidney, stomach, tail of the pancreas and splenic flexure of colon. It is fixed in position by the two peritoneal ligaments; the lienorenal and gastrosplenic ligaments. The phrenico-colic ligament provides the additional support from below. These ligaments are the remnants of the dorsal mesogastrum that is formed during the intrauterine life. The abnormal development of the dorsal mesogastrum

may lead to the formation of accessory peritoneal ligaments. We here report a case of unusual peritoneal ligaments of the spleen and its variant relation with the left lobe of the liver.

Case Report

During the dissection classes for the medical undergraduate students, we observed variations of position and peritoneal relations of the spleen. These variations were found in a male cadaver aged approximately 50 years. The spleen was reduced in size and had its normal gastrosplenic and lienorenal ligaments. In addition to these, there were two unusual peritoneal ligaments extending from the anterior (lower phrenico-splenic ligament) and posterior (upper phrenico-splenic ligament) poles of the spleen to the diaphragm (Fig.1 and 2). The splenic artery was not tortuous. It took a straight course along to upper border of the pancreas to the splenic hilum. The left

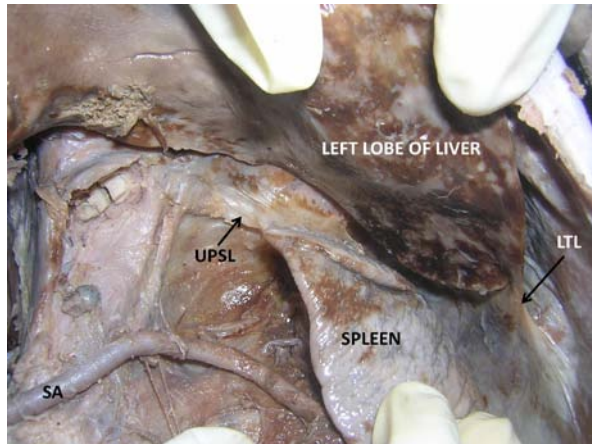


Figure 1: Closer view of the relationship between the left lobe of liver and the diaphragmatic surface of the spleen. Note the splenic artery (SA), upper phrenico-splenic ligament (UPSL) and left triangular ligament (LTL).

lobe of the liver was elongated and it intervened between the diaphragm and the diaphragmatic surface of the spleen (Fig. 1 and 2). The left triangular ligament extended to the diaphragm from the left lobe of the liver just above the lower phrenico-splenic ligament (Fig. 1 and 2).

Discussion

Spleen is known to show a wide range of congenital anomalies. The common anomalies include splenic lobulation, accessory spleen and wandering spleen (1). The occurrence of congenital absence of the spleen, which is known as asplenia and presence of more than one spleen known as polysplenia syndrome are very rare (1). Spleen begins to develop during fifth week of development from the coelomic epithelium of the cranial part of the dorsal mesogastrium. In the early stages of intra-uterine life, the development of the spleen is represented by a few splenic nodules in the midline dorsal mesogastrium. Later, the position of spleen shifts from the midline to left side of abdominal cavity due to the enormous growth of dorsal mesogastrium and the rotation of the stomach. Shifting of dorsal mesogastrium establishes the formation of two peritoneal folds; the lienorenal ligament between the spleen and left kidney, the gastrosplenic ligament between the stomach and spleen (2, 3). Usually foetal spleen is lobulated, but eventually the lobules will fuse and form a single mass just before birth (2). Some of these nodules may develop independently in one of the peritoneal folds, and lead to the formation of accessory spleen (2, 4). The failure of formation of peritoneal ligaments around the spleen results in a long splenic mesentery and abnormally mobile spleen which is called as the wandering spleen (5). Polysplenia is a

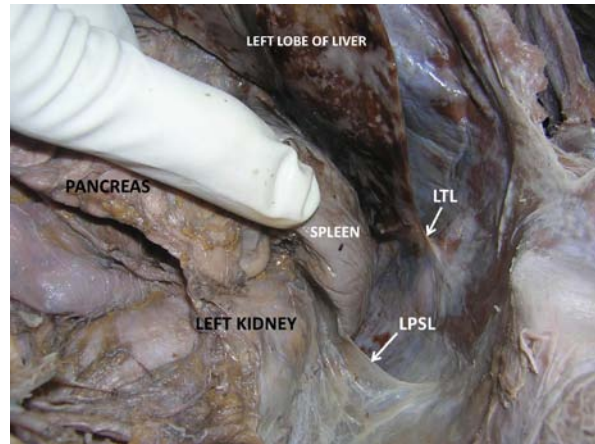


Figure 2: Dissection of the left hypochondrium showing the relationship between pancreas, spleen and liver. Note the left lobe of the liver (LL), left triangular ligament (LTL) and lower phrenico-splenic ligament (LPSL).

complex congenital syndrome in which the partial visceral heterotaxia (situs ambiguous) is associated with concomitant levoisomerism (bilateral left-sidedness) (6). Here, the splenic mass is usually divided into varying number ranging from two to six masses (6). Past researchers have reported the occurrence of each of the above mentioned congenital anomalies of the spleen and complications resulting from these anomalies have been documented (1). In the present case, we report the unusual peritoneal folds around the spleen. In addition to gastrosplenic and lienorenal ligament, there were two phrenico-splenic ligaments, the upper and lower. The existence of these peritoneal folds may be due to an embryonic adhesion between the dorsal mesentery and developing diaphragm, during the rotation of the stomach. Prior knowledge of various splenic congenital variants is important for the radiologist to interpret and diagnose the findings correctly and to avoid mistaking them as pathological conditions (1).

Further, the elongated left lobe of the liver was related to the diaphragmatic surface of the spleen. A cadaveric case of unusual relation of spleen with the left lobe of the liver has been reported (7). Knowledge of this variation is useful to the surgeons as the elongated left lobe of the liver might get ruptured in addition to the spleen in the fractures of the left 9th, 10th and 11th ribs. When the left lobe of the liver covers the diaphragmatic surface of the spleen, it is also liable to get involved in splenic puncture procedure. The tortuosity of the splenic artery is usually absent in the infants and children (8). In the present case, the straight course of the splenic artery indicated the possible restricted movements of the spleen. Knowledge of this variation is of importance to

Radiologists while performing the arterial splenoportography.

References

1. Gayer G, Zissin R, Apter S, Atar E, Portnoy O, Itzhak Y. CT findings in congenital anomalies of the spleen. *Br J Radiol* 2001; 74(884):767-72.
2. Moore KL, Persaud TVN. The digestive system. In: Moore KL, Persaud TVN, editors. *The developing human, clinically oriented embryology* (6th edn). Philadelphia, PA: WB Saunders Co, 1998:271–302.
3. Larsen WJ. Development of the gastrointestinal tract. In: Larsen WJ, editor. *Human Embryology* (2nd edn). New York: Churchill Livingstone, 1997:229–59.
4. Moore KL, Dalley AF. Abdomen. In: Moore KL, Dalley AF, editors. *Clinically oriented anatomy* (4th ed). Philadelphia, PA: Lippincott Williams & Wilkins, 1999:175–350.
5. Raissaki M, Prassopoulos P, Daskalogiannaki M, Magkanas E, Gourtsoyiannis N. Acute abdomen due to torsion of wandering spleen: CT diagnosis. *Eur Radiol* 1998;8(8):1409-12.
6. Peoples WM, Moller JH, Edwards JE. Polysplenia: a review of 146 cases. *Pediatr Cardiol* 1983;4(2):129-37.
7. Satheesha Nayak: Abnormal size, position and relations of spleen: *The Internet Journal of Biological Anthropology* 2008; 2 (1).
8. Ronald AB, Adel KA, Ryosuke Miyauchi. *Illustrated Encyclopedia of Human Anatomic Variation: Opus II: Cardiovascular System: Arteries: Abdomen: Variations in Branches of Celiac Trunk: Splenic artery.* <http://www.anatomyatlases.org/AnatomicVariants/Cardiovascular/Text/Arteries/Splenic.shtml>. Last accessed on 05/10/2012.