



VARIATION IN SIZE, SHAPE AND LENGTH OF THE FISSURE IN SPLEEN: A CASE STUDY

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ABSTRACT

Spleen is solid friable, vascular organ, belonging to the reticuloendothelial system. Spleen is the largest lymphatic organ, Its immunological and hematological functions are being well realized now-a-days and variation in its shape, location, number, and size are frequently seen in humans. Enlarged spleen can be palpated through the anterior abdominal wall. Extension of the enlarged spleen is always downwards and towards the right iliac fossa. However, peritoneal anomalies of spleen are very rare. Knowledge of these peritoneal anomalies will be helpful in surgery and management of conditions affecting spleen .

Materials and Methods: The present study included 5 human cadaveric spleen(fig.1,2,3,4,5)respectively. The morphological features of the spleen like its length, breadth, width and weight were measured. The shape, poles, borders, surfaces and the impressions on the spleen were observed. **Results:** The organs was also observed for its abnormal shape and presence of notches on its superior margin the lengths of the spleens varied between 5 cm to 13 cm, with an average of 9.66 cm. Their breadth was between 3.5 and 9.5 cm. The average breadth was 6.22 cm. Their widths varied between 1.5 and 5.5 cm, with an average of 3.06 cm. The weights of the spleens showed great variations, ranging between 80 and 300 gm, with an average of 145.76 gm **Conclusion:** The findings of the present study will be of fundamental importance to the physicians, surgeons and radiologists and of course, this knowledge is very important for the anatomists during their routine classroom dissections.

Keywords: Lymphoid organ, Splenic Notch,Enlarged spleen, lobulated ,fissure, hilum.

INTRODUCTION: The spleen is a wedge shaped organ that lies relative to the 9th and 11th ribs and is located in the left hypochondria and partly in the epigastrium. Thus, the spleen is situated between the fundus of the stomach and the diaphragm. The spleen is highly vascular and reddish purple in color; its size and weight may vary. A healthy spleen is not palpable.

Development: The spleen develops in the cephalic part of dorsal meso-gastrium (from its left layer; during the sixth week

of intrauterine life) into a number of nodules that fuse and form a lobulated spleen. Notching of the superior border of the adult spleen is evidence of its multiple origin.

Gross Anatomy: The spleen's 2 ends are the anterior and posterior end. The anterior end of the spleen is expanded and is more like a border; it is directed forward and downward to reach the midaxillary line. The posterior end is rounded and is directed upward and backward; it rests on the upper pole of the left kidney.

The spleen's 3 borders are the superior, inferior, and intermediate. The superior border of the spleen is notched by the anterior end. The inferior border is rounded. The intermediate border directs toward the right.

The 2 surfaces of the spleen are the diaphragmatic and visceral. The diaphragmatic surface is smooth and convex, and the visceral surface is irregular and concave and has impressions. The gastric impression is for the fundus of the stomach, which is the largest and most concave impression on the spleen. The renal impression is for the left kidney and lies between the inferior and intermediate borders. The colic impression is for the splenic flexure of the colon; its lower part is related to the phrenicocolic ligament. The pancreatic impression for the tail of the pancreas lies between the hilum and colic impression.

Hilum: The hilum can be found on the inferomedial part of the gastric impression. The hilum transmits the splenic vessels and nerves and provides attachment to the gastrosplenic and splenorenal (lienorenal) ligaments.

Peritoneal relations: The spleen is surrounded by peritoneum and is suspended by multiple ligaments, as follows:

- The gastrosplenic ligament extends from the hilum of the spleen to the greater curvature of the stomach; it contains short gastric vessels and associated lymphatics and sympathetic nerves.
- The splenorenal ligament extends from the hilum of the spleen to the anterior surface of the left kidney; it contains the tail of the pancreas and splenic vessels.
- The phrenic colic ligament is a horizontal fold of peritoneum that extends from the splenic flexure of the colon to the

diaphragm along the mid-axillary line; it forms the upper end of the left paracolic gutter.

Visceral relations:

The visceral surface of the spleen contacts the following organs:

- Anterior surface of the left kidney
- Splenic flexure of the colon
- The fundus of the stomach
- Tail of the pancreas

The diaphragmatic surface is related to the diaphragm; the diaphragm separates the spleen from the pleura and the lung.

Vascular supply:

The splenic artery supplies blood to the spleen. This artery is the largest branch of the coeliac trunk and reaches the spleen's hilum by passing through the splenorenal ligament. It divides into multiple branches at the hilum. It divides into straight vessels called penicillin, ellipsoids, and arterial capillaries in the spleen.

The splenic circulation is adapted for the separation and storage of the red blood cells. The spleen has superior and inferior vascular segments based on the blood supply. The 2 segments are separated by an avascular plane.

Its terminal branches aside, the splenic artery also gives off branches to the pancreas, 5-7 short gastric branches, and the left gastro-omental (gastroepiploic) artery.

Nerve supply: Sympathetic fibers are derived from the celiac plexus.

Surface marking: The spleen is marked on the left side of the back with the long axis of the 10th rib. The upper border is marked along the upper border of the ninth rib; the lower border, along the 11th rib. The medial end lies 5 cm from the midline. The lateral extension ends at the midaxillary line.

Venous drainage: The splenic vein provides the principal venous drainage of the spleen. It runs behind the pancreas (after forming at the hilum) before joining the superior mesenteric vein behind the neck of the pancreas to form the portal vein. The short gastric, left gastro-omental, pancreatic, and inferior mesenteric veins are its tributaries.

Lymphatic drainage

Proper splenic tissue has no lymphatics; however, some arise from the capsule and trabeculae and drain to the pancreatico-splenic lymph nodes.

Natural and Pathophysiologic Variants. listed below:

- Accessory spleens or splenunculi are natural anatomic variants formed from nodules that fail to fuse during development. These are found in various locations such as the gastro splenic ligament, splenorenal ligament, gastro phrenic ligament, and gastro colic ligament. They have also been reported to have been found in the broad ligament of the uterus and in the spermatic cord.^[2]
- Pathophysiologic anatomic variants include splenomegaly, asplenia, and auto splenectomy. Splenomegaly is the enlargement of the spleen. It occurs due to various conditions, such as infections (e.g., malaria, kala azar), malignancies (eg, lymphomas, leukemia's), and other conditions (e.g., portal hypertension). The spleen then projects toward the right iliac fossa in the direction of axis of the 10th rib.
- Asplenia is a rare condition in which a congenital absence of the spleen occurs.
- Autosplenectomy is a condition in which splenic infarction occurs due to sickle cell anemia.

Functions of the Spleen

Immune responses: After antigenic stimulation, increased formation of plasma cells for humoral responses and increased lymphopoiesis for cellular responses occurs.

Phagocytosis

One of the spleen's most important functions is phagocytosis. The spleen is a component of the reticuloendothelial system. The splenic phagocytes include reticular cells, free macrophages of the red pulp, and modified reticular cells of the ellipsoids. Phagocytes in the spleen remove debris, old and effete red blood cells (RBCs), other blood cells, and microorganisms, thereby filtering the blood. Phagocytosis of circulating antigens initiates the humoral and cellular immune responses.

Hematopoiesis:

The spleen is an important hematopoietic organ during fetal life; lymphopoiesis continues throughout life. The manufactured lymphocytes take part in immune responses of the body. In the adult spleen, hematopoiesis can restart in certain diseases such as chronic myeloid leukemia and myelosclerosis.

Storage of red blood cells

The RBCs are stored in the spleen. Approximately 8% of the circulating RBCs are present within the spleen; however, this function is seen better in animals than humans.

Anomalies of the spleen:

Agenesis:

- 1)absence of spleen
- 2)spelanculi,accessory spleens
- 3)splenic cyst arises from the embryonic cell rest and are mostly dermoids.

Case report: During routine classroom dissection in the Dept. of Rachana shareera(Anatomy)at Shree Dharmasthala

Manjunatheshwara College of Ayurveda.Hassan.The present study included 4 human cadaveric spleens(fig.1,2,3,4)respectively. The morphological features of the spleen like its length, breadth, width and weight were measured. The shape, poles, borders, surfaces and the impressions on the spleen were observed.We report a spleen, which vary in size with two fissures, present on the anterior wall of the spleen which is about 3.5cms in length fig;1,2, vary in shape and size(oval, wedge).

spleen 1: spleen which is having two fissures on different borders.

spleen 2: spleen which is having one fissure larger than the normal.

spleen 3: spleen which is having three fissures on same border and different in shape and size.

spleen 4: spleen which is having no fissure, change in shape and size.

spleen 5: spleen which is having one fissure and dividing the spleen into 2 lobes.



Fig.no 01 Posterior View with 2 Fissures



Fig.no 02 spleen with 1 fissure larger than the normal



Fig.no.03 spleen with fissures n differ in shape(oval)



Fig.no.04 spleen with no fissures and differ in shape



Fig.no.05 spleen with wedge shaped with deep fissure

DISCUSSION :

Spleen is solid friable, vascular, and dark purple colored organ ,belonging to the reticuloendothelial system .Spleen is the largest lymphatic organ, Its immunological and hematological functions are being well realized now-a-days. The spleen is a mystery organ whose structural and functional relationships have started being realized only now. As reported by Michels and as mentioned in Gray's anatomy, in the present study also, variations were found in the morphology of the spleen. The fetal spleen is lobulated, and these lobules normally disappear before the birth. Lobulation of the spleen may persist into adult life and be typically seen along the medial part of the spleen. A persisting lobule results in a variation in shape of the spleen. But sometimes the lobule may extend medially anterior to the upper pole of the left kidney and less often posterior to the upper pole of the left kidney. Although these lobules are not of any clinical importance for the patient, close relation of the splenic lobule to the upper pole of the left kidney may cause

misinterpretations as a mass originating from the kidney by the radiologists. In present study the presence of various shape and more number of fissures

CONCLUSION:

The knowledge on the anatomical variations of the spleen is of fundamental importance to the clinicians during the routine clinical examinations of the abdomen, to the surgeons while they perform surgical procedures which are related to the spleen, radiologists for their diagnostic procedure and for the anatomists during their routine classroom dissections.

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