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A CADAVERIC STUDY OF VARIATION IN SPLENIC ARTERY

Anatomy

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ABSTRACT

The splenic artery is characterized by large individual variability on both extra-and intraorganic levels. Splenic artery is the largest branch of the Coeliac trunk and is the most tortuous artery in the body. It mainly supplies the spleen, pancreas and stomach.
The study included total of 26 cadavers from the Department of Anatomy, Government Medical College Pali and SNMC Jodhpur, Rajasthan India, A thorough knowledge of variations in origin and course of splenic artery is important while performing different surgical interventions and radiological procedures of upper abdominal regions. The ligation of splenic artery is important in surgical procedures like Haemolytic disorders, intra hepatic portal hyper tension and Bantis syndrome.

KEYWORDS

Coeliac trunk (CT), Splenic artery (SA), Hepato-splenic trunk (HST)

INTRODUCTION

Splenic artery was first discovered by Julius Ceasar Aranticus from Venice (1751), who was regarded as discoverer of splenic artery. He was the first anatomist to emphasize tortuous course of splenic artery. Leonard da vinci mentioned that in old people the splenic artery increases in thickness, grows longer, then becomes twisted like snake(1).

Anatomical variations involving the splenic artery are common and the knowledge becomes important in patients undergoing diagnostic laproscopic procedures, upper abdominal surgeries and radiological investigations which can lead to vulnerable iatrogenic surgery. Data derived from past research on cadavers and living persons has shown a plethora of variations in splenic artery. About 10-20% of the individuals display significant variations in the form of origin pattern of course and branching system (Ssonsoj-Jaroscewitsch).

The knowledge of structural and topographic aspects of blood vessels of the spleen is important for surgical interventions, planned and urgent and of immunocompetent organs, especially now with the increase of the number of surgery procedures with maximum sparing of the organs damaged by associated or isolated trauma of the abdomen. Splenorafia is often considered dangerous due to the risk of bleeding from sutured spleen tissues.

This danger can be reduced by improving the surgical techniques and detailed knowledge of topographical and morphological as well as the functional possibilities that comprise the local and regional spleen apparatus, and its surrounding anatomical structures, including collateral paths of vascularization (2).

The present study reports the anatomical variation in terminal branching pattern and tortuousity of the splenic artery. Knowledge of the existing aberrations is important in planning and conducting surgical procedure.

MATERIALS AND METHODS:

The present study was done on 26 embalmed cadavers of both sexes, during routine dissections for undergraduates. The abdomen region was dissected. The splenic artery was identified; its origin and course were observed for variations.

OBSERVATIONS AND RESULTS:

Present study was conducted on 26 cadavers during routine dissection of abdomen for undergraduates. Observations of present study were as follows:

I. Variations in Origin:

Out of 26 cases , we observed 4.16% cases unusual course and tortuosity of the splenic artery taking origin from common spleno-hepatic trunk and highly tortuous with two loop, in a male cadaver. The splenic artery after its origin, instead of turning to the left side passing forward then vertically downwards along the left side of portal vein behind the body of pancreas. After making a loop it ascended up to the superior border of pancreas and then again making another loop above the superior border of pancreas near the hilum of the spleen through the splenico-renal ligament. Splenic vein was inferior to splenic artery near the hilum of the spleen later it was anterior to the splenic artery running posterior to the body of the pancreas. The first loop of splenic artery gave pancreatic branches to body of pancreas, short gastric arteries and left gastroepiploic artery to stomach and second loop give rise to pancreatic branches to tail of pancrease and upper polar branches to upper pole of spleen.

Rest of cases 95.84% celiac trunk was normal giving origin to left gastric, common hepatic and splenic arteries.(Table No. 1)

II. Variations in tortuosity:

The splenic artery was straight and partial intra-pancreatic, straight (9%) and supra-pancreatic, highly tortuous (looped 4%) and supra-pancreatic and slightly curved and supra-pancreatic in 85% cadavers (normal 8%).(Table No. 2.)

III. Variation in terminal branches (Number of polar branches)(Table No. 3)

One polar branch: 18.18%
Two polar branches: 9.09%
Two terminal branches: 27.27%
Multiple terminal branches: 45.45%

DISCUSSION:

Coeliac trunk, the artery of foregut normally divides into left gastric, common hepatic and splenic arteries(2). This classical trifurcation of celiac trunk has been reported by Song et al., in 89.1% cases & Pandey et al., in 90.6% cases (3,4). In our present case, though the branching pattern of coeliac trunk was normal, but the splenic artery was unusual in its course and tortuosity. Variations in the origin and unusual course are usually asymptomatic but become important in patients undergoing surgical, oncological or interventional procedures.

In our case, splenic artery was retropancreatic in its course and also presented with a loop, which is also very rare and interesting (0.63%). This loop (proximal loop) was outside the pancreatic tissue not embedded inside the body of pancreas unlike the previous findings reported by Pandey et al. (5).

Classification of the lobes and splenic segments is presented differently in literature. According to Redmond et al (1989) splenic artery divides into two lobar branches the superior splenic artery and the inferior one, but there wasn't registered a third lobar artery(6).

According to Treutner et al (1993) the splitting of the splenic artery in two principal branches was observed in 30 spleens (bifurcation)

(93.8%) and into three main arteries – in two cases (6,2%). In 65.7% was found a superior polar artery of the II order, or three with the genesis from a branch of the splenic artery. In 28.1% of the cases the blood supply of the superior pole was directly from the splenic artery. An artery of the II or the III order from a branch of the splenic artery reached the inferior pole in 46.9% of the cases. In 46.9% of the cases the inferior polar artery originated either from the splenic artery, or from the spleno-epiploic trunk (7).

The knowledge about the course of splenic artery is important to surgeons while performing surgeries related to pancreas. It is helpful for interventional radiologists for embolisation of the splenic artery to avoid the risk of pancreatitis (8).

Arantius was the first to describe tortuosity of the splenic artery, is the most striking feature of splenic artery (9). Tortuosity protects the interior of the spleen from the sudden, strong rush of blood and thus maintains pressure. It allows movement of the spleen and permits distention of the stomach without obstruction to the splenic blood flow, as the artery passes along the stomach bed (10). Lipshutz et al, found that the tortuosity being marked and frequent in 67% of cases. In 33% of cases the tortuosity was found to be slight. Caramel, found the splenic artery to be notably tortuous in 20% of cases.

Embryology:

Embryologically the primitive dorsal aorta has given a series of ventral splanchnic arteries for the primitive gut and its derivatives. Most of these branches normally disappear, but the persistence of normally disappearing branch (branches or abnormal fusion among primitive arteries might explain the abnormal origin and the course of the splenic artery. Taking into consideration the relatively high prevalence of variation of the splenic artery, it is advisable for the surgeons operating in the area of supracolic region to keep in mind the possibility of its occurrence and of the complications to which it may lead, during surgical procedures (11).

To know these variations is significantly important during surgical and radiological procedures of the upper abdominal region in order to avoid any serious complications (12).

CONCLUSION:

Vascular anomalies usually asymptomatic; they may become important in patients undergoing diagnostic angiography for gastro-intestinal bleeding, splenic neoplasm and total pancreatectomy In the last years, there is an increase of the number of surgery procedures with maximum sparing of the organs. To perform such procedures the surgeon should be aware of the vascular anatomy of the region. The present study reports the anatomical variation in terminal branching pattern and tortuous course of the splenic artery.

Table No. 1: Showing the variation in origin of splenic artery

S. No.	Origin from	Percentage
1.	Ceolic trunck(Normal)	95.84%
2.	Hepatospenic trunk	4.16%

Table No. 2: Showing the variation in tortuosity of splenic artery

S. No.	Nature of artery	Percentage
1.	Slightly curved(Normal)	85%
2.	Straight	9%
3.	Highly curved	4%

Table No. 3: Showing the variation in terminal branches of splenic artery:

S. No.	Terminal branches	Percentage
1.	One polar branch	18.18%
2.	Two polar branch	9.09%
3.	Two terminal branches	27.27%
4.	Multiple terminal branches	45.45%

Figure 1: Showing the hepatosplenic trunk, highly coiled with looping and multiple terminal branches of spenic artery.

Figure 2: showing the splenic artery with two terminal branches and straight course.

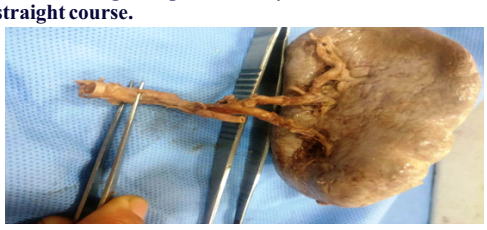

Figure 3: showing the splenic artery with two terminal branches and one polar branch.

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