

## Original Article

### Assessment of Congenital Abnormalities of Spleen- A Clinical Study

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#### **ABSTRACT:**

**Background:** The spleen is the greatest single mass of lymphatic tissue that lies between the left kidney, stomach and diaphragm. It has three surfaces: diaphragmatic, gastric and renal surface and the two borders: superior and inferior. Various congenital anomalies may affect the spleen, starting with common anomalies, such as an accessory spleen, up to rare conditions such as a wandering spleen and polysplenia. **Aim of the study:** To estimate the frequency of congenital anomalies in spleens by studying on cadavers. **Materials and methods:** The study was conducted in the Department of Human anatomy of the medical institution. For the study, we studied 20 cadavers with respect to the location, blood supply and any congenital variations in the spleen. The study was done during the routine abdominal dissection of the cadavers during MBBS first year lectures. **Results:** In the present study, we studied 20 spleens. Out of the 20 spleens in the present study, we observed that 16 spleens were normal in their location and had arterial supply from a single splenic artery. We observed 3 cases of splenunculi where accessory splenic tissue was single and situated near the tail of the pancreas. **Conclusion:** From the results of present study this can be concluded that multilobulated spleen even though is a rare anomaly can occur in patients generally. The radiographers should be aware of such congenital anomalies during evaluating routine radiographs.

**Key words:** congenital abnormalities, Spleen, dissection, anatomy

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#### **INTRODUCTION:**

The spleen is the greatest single mass of lymphatic tissue that lies between the left kidney, stomach and diaphragm.<sup>1</sup> It has three surfaces: diaphragmatic, gastric and renal surface and the two borders: superior and inferior. The gastric surface meets the diaphragmatic surface on the superior border.<sup>2</sup> The renal surface is marked by renal impression. This surface meets gastric and diaphragmatic surfaces respectively on the inferior border and a margin close to the splenic hilum.<sup>3</sup> The spleen removes old erythrocytes, white cells and platelets. It plays vital roles in regard to blood storage, formation of lymphocyte and defense against foreign particles<sup>4</sup>. Various congenital anomalies may affect the spleen, starting with common anomalies, such as an accessory spleen, up to rare conditions such as a wandering spleen and polysplenia. Most of these anatomic variants have no clinical significance; they need, however, to be recognized by the radiologist as such.<sup>5</sup> Awareness of these variants is important for the radiologist to interpret the findings correctly and avoid mistaking them for a clinically significant abnormality.<sup>6</sup> Hence, the present study was conducted to estimate the frequency of congenital anomalies in spleens by studying on cadavers.

#### **MATERIALS AND METHODS:**

The study was conducted in the Department of Human anatomy of the medical institution. The ethical clearance for study protocol was obtained from ethical committee of the institution. For the study, we studied 20 cadavers with respect to the location, blood supply and any congenital variations in the spleen. The study was done during the routine abdominal dissection of the cadavers during MBBS first year lectures.

#### ***Procedure for inspection of spleen:***

First the peritoneum was opened and stomach was delineated. To locate the position of the spleen, we observed the fundic portion of the stomach and after the spleen was located, we further traced the branches of splenic artery from celiac trunk to the spleen to check for any possible anomalies or variations. Furthermore, spleen was also observed for any abnormality with respect of shape, presence of lobulation, presence of any notches over its superior, inferior and medial bodies, and presence of any accessory splenic tissue. All the observations during the study were noted for further analysis.

#### ***Statistical analysis***

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test

were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

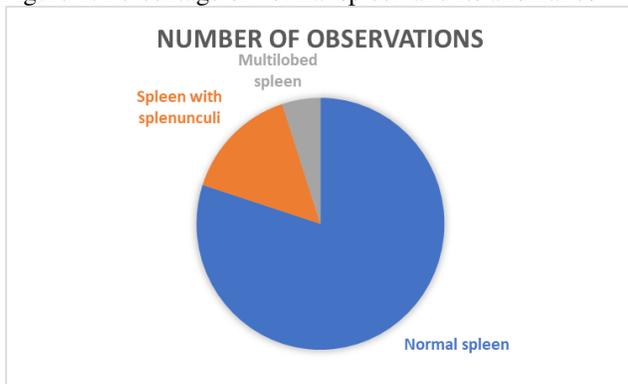
**RESULTS:**

In the present study, we studied 20 spleens. Out of the 20 spleens in the present study, we observed that 16 spleens were normal in their location and had arterial supply from a single splenic artery (Table 1). However, we observed 3 cases of splenunculi where accessory splenic tissue was single and situated near the tail of the pancreas. Furthermore, we observed one case of multilobulated spleen in a male cadaver aged around 45 years old. (Fig 1)

Table 1: Observation after inspecting the spleen in different cadavers

Characteristics of spleen	Number of observations	p-value
Normal spleen	16	0.21
Spleen with splenunculi	3	
Multilobed spleen	1	
Total	20	

Figure 1: Percentage of normal spleen and its anomalies



**DISCUSSION:**

In the present study, we studied the spleen of 20 cadavers. We observed that 16 cadavers had normal spleen, 3 had splenunculi and one had multilobulated spleen. The results were statistically non-significant and were compared with previous studies.

Romer T et al observed that 199 patients showed an accessory spleen (11%). Size of accessory spleens ranged from 3 to 20 mm (mean 10 mm). In 60% the accessory spleen was located at the level of the splenic hilum and in 33% at the level of the lower pole. In 46% the accessory spleen was located medially and in 43% ventrally. 19 patients presented with two (1.1%) and seven patients with three accessory spleens (0.4%), respectively. One patient showed splenosis and one patient showed an enlarged accessory spleen (5 cm) secondary to a splenic apoplexy (i.e. hemorrhagic infarction) of the accessory spleen, caused by torsion. Authors concluded that accessory spleens may be identified in about 11% of patients.<sup>7</sup>

Das S et al conducted a study on anomalous splenic notches and discuss their clinical importance. The lobulated form of the spleen in early developmental phase is represented by notches at a later period which occur at the superior border. The superior border which separates the gastric impression from the diaphragmatic surface has notches near its lateral end. Considering the fact that there is paucity of literature on the presence of splenic notches, we performed the study on 100 formalin fixed cadaveric spleens to observe the presence of notches. The notches were observed on the superior and inferior border in ninety-eight and two cases, respectively. The anomalous presence of fissures on the diaphragmatic surface was observed in two cases.<sup>7,8</sup>

Rodrigues CJ et al studied the structural arrangement of elastic fibers in the splenic capsule from 16 human cadavers ranging in age from 1 month to 76 years by histologic sections stained with selective methods for elastin. In infants the elastic fibers of the splenic capsule were homogeneously intermingled with collagen fibers, an arrangement that stabilizes the capsule during spleen growth and enlargement. With aging, collagen fibers predominate in the outer capsular surface over elastic fibers with the latter more evident in the deep lamina of the splenic capsule. In elderly individuals, the elastic fibers shorten, fragment, and thicken. It was concluded that the progressive decrease in the amount of elastic fibers in the splenic capsule with aging may restrict splenic distention and contribute to involution of the spleen as one grows older. Chaware PN et al studied the morphological variations of the spleen and compared them with the findings of previous studies. They included 111 human cadaveric spleens. 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. Accessory splenic tissues, if they were present, were noted. 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. Various shapes of the spleens were observed in the present study. Most of the spleens were wedge shaped [61.26%], followed by tetrahedral [21.61%] and triangular [12.61%] shapes. Additional oval and irregular shapes of the spleens were observed in 3.60% and 0.09% cases respectively. In all the spleens, two poles, two borders and two surfaces were observed. The diaphragmatic surface of the spleen showed a uniform morphology while its visceral surface showed gastric, renal, colic and pancreatic impressions. The splenic notches were present on the superior as well as on the inferior borders. In most of the cases [74.76%], the notches were found on the superior border. The number of notches varied from zero to six, but in most of the cases [58.55%], there were 1 or 2 notches. Accessory spleens were found in 4.50% cases, in the form of roundish nodules. They were

observed at the hilum of the spleen. It was concluded that 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.<sup>9, 10</sup>

#### CONCLUSION:

From the results of present study this can be concluded that multilobulated spleen even though is a rare anomaly can occur in patients generally. The radiographers should be aware of such congenital anomalies during evaluating routine radiographs. An accessory spleen has clinical significance in that they may result in diagnostic errors for the oncologists or the persistence of the symptoms after splenectomy

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