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Original Research

Evaluation of congenital abnormalities of spleen: A cadaveric 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. 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. The spleen may be involved in a large variety of congenital and acquired disorders. Significant overlap in imaging features among these various conditions is seen; therefore, clinical information is important. **Aim of the study:** To evaluate congenital abnormalities of spleen: A cadaveric study. **Materials and methods:** The study was conducted in the Department of Human Anatomy of the medical institution. For the study, we studied 30 cadavers with respect to the location, blood supply and any congenital variations in the spleen. All the observations during the study were noted for further analysis. **Results:** In the present study, we studied 30 spleens. Out of the 30 spleens in the present study, we observed that 22 spleens were normal in their location and had arterial supply from a single splenic artery. **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.

Keywords: Spleen, congenital abnormality, accessory spleen

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INTRODUCTION:

The spleen is the greatest single mass of lymphatic tissue that lies between the left kidney, stomach and diaphragm. [1] It has three surfaces: diaphragmatic, gastric and renal surface and the two borders: superior and inferior. [1] The gastric surface meets the diaphragmatic surface on the superior border. 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. [2] 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. [3] Size and shape of the spleen exhibit a wide variability. While the shape is influenced by adjacent organs, determination of the normal size of the spleen can be tricky. It has been suggested, that—on transverse CT images—a maximum diameter of up to 10 cm and a perpendicular diameter of up to 6 cm can be considered normal. In adults, the craniocaudal diameter usually does not exceed 15 cm. [4, 5] The spleen may be involved in a large variety of congenital and acquired disorders. Significant overlap in imaging features among these various conditions is seen; therefore, clinical information is important. [6] Hence, the present study was conducted to evaluate congenital abnormalities of spleen: A cadaveric study.

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 30 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 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.

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 statistically significant.

RESULTS:

In the present study, we studied 30 spleens. Out of the 30 spleens in the present study, we observed that 22 spleens were normal in their location and had arterial supply from a single splenic artery (Table 1). However, we observed 5 cases of splenunculi where accessory splenic tissue was seen in patients and situated near the tail of the pancreas. Furthermore, we observed 3 cases of multilobulated spleen. (Fig 1)

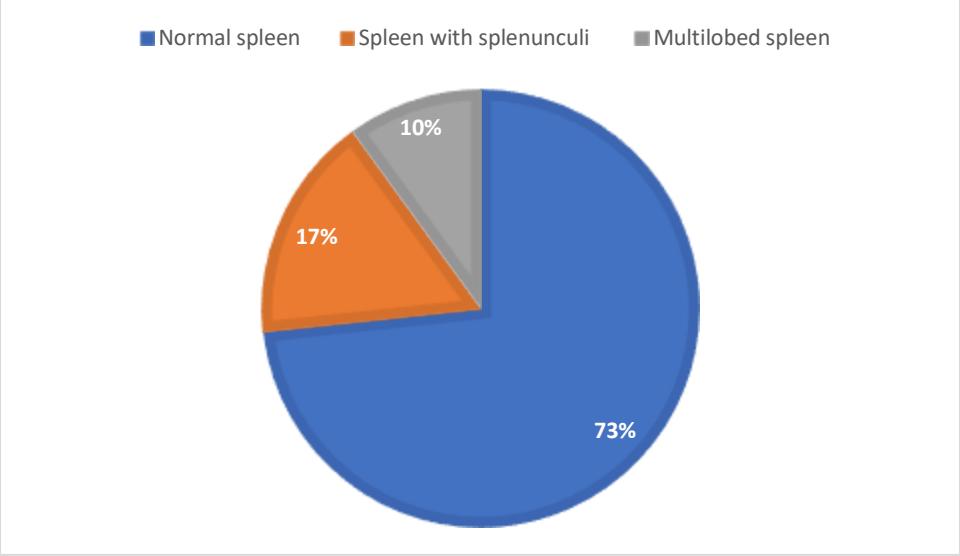
DISCUSSION:

In the present study, we studied 30 spleens. Out of the 30 spleens in the present study, we observed that 22 spleens were normal in their location and had arterial supply from a single splenic artery. 5 cases had splenunculi and 3 had multilobed spleen. The results were statistically non-significant. The results were compared with previous studies from the literature. Mohammadi S et al evaluated the incidence of accessory spleen in Iranian cadavers. Sixty hundred and ninety three spleens (541 males, 152 females) were excised from cadavers in the dissection hall of Mashhad Forensic Medicine Organization cadavers. Inclusion criteria were as follows: Fresh Iranian cadavers with no history of alcohol, poisoning or drug abuse, and no evidence of pathologic abnormality or injury to the spleen.

Table 1: Observation after inspecting the spleen in different cadavers

Characteristics of spleen	Number of observations	p-value
Normal spleen	22	0.21
Spleen with splenunculi	5	
Multilobed spleen	3	
Total	30	

Fig 1: Percentage of normal spleen and its anomalies



The presence of accessory spleens, its dimension and weight investigated in cadavers. During routine postmortem examination, five cases with an accessory spleen were found in the autopsy laboratory of Mashhad legal Medicine Organization between June 2014 and July 2015. Of the cases, 3 were male and 2 were female. The accessory spleens were observed at the splenic hilum. The length of the accessory spleens ranged from 2-3.5 cm, while the range of width was between 0.5 and 2.5 cm. The accessory spleens were confirmed by histological examination. They concluded that an accessory spleen has clinical importance in some locations. When an accessory spleen is situated in another site, it may mimic some tumors such as pancreatic tumor and adrenal tumor. Anderson C et al reviewed a series of 1042 reports of necropsies on children dying at Children's Hospital of Pittsburgh. In each case, note was taken of the status of the spleen, the lobation of the lungs, the arrangement of the bronchi, the morphology of the atrial appendages, and the presence of any congenital malformations of the heart and great vessels and of any malformations of the abdominal organs. There was isomerism of the left atrial appendages in eight (0.77%), 13 (1.25%) showed isomerism of the right appendages, and seven (0.67%) had multiple spleens without having isomerism of the atrial appendages. Unexpectedly, a normal spleen was found in one patient with isomerism of the right appendages and also in a patient with isomerism of the left appendages. In one patient with isomeric left atrial appendages there was no spleen. The review showed that the morphology of the atrial appendages, and hence the arrangement of the atria, is not accurately predicted by the type of spleen. The arrangement of the atrial appendages is the most reliable guide to the recognised combinations of congenital cardiac malformations previously described as "splenic syndromes". Because there is no certain way of predicting all the malformations in patients with complex congenital heart disease, it is advisable to record separately for each patient the details of lobation of the lungs, the bronchial and atrial arrangement, anomalies of the heart and great vessels, the type of spleen, and any abnormal arrangement of the abdominal organs. [7, 8]

Unver Dogan N et al investigated the incidence and distribution of AS during routine forensic autopsies. AS were investigated in 720 consecutive autopsy cases. Fifty-four AS were found in 48 (6.7%) cases. AS were found in hilum of the main spleen in 28 cases, the great omentum in 13 cases, the pancreas in 5 cases, and the pelvis in 2 cases. There were two AS in two cases and three AS in another two cases. Awareness of the possible presence of AS is important because when splenectomy is performed for some conditions such as immune thrombocytopenic purpura, failure to remove the AS may result in the failure of the condition to resolve. Additionally, during medical imaging, AS may be confused for enlarged lymph nodes or neoplastic growths. Orlando R et al assessed retrospectively: the frequency of congenital anomalies of the spleen observed during 2650 consecutive laparoscopies and looked for possible misdiagnoses of the accessory spleen as hematological disorders or solid tumors located in the left upper quadrant of the abdomen. Congenital anomalies of the spleen were detected in 55 cases, accounting for 2.07%. Accessory spleens were observed in 44 patients (1.6%) and spleen lobulation in 11 (0.47%). An accessory spleen was the most common of the splenic anomalies. Among the 44 patients in whom an accessory spleen was discovered laparoscopically, the recognition of this anomaly prevented a relapse of a hematological disease in one case and avoided a useless exploratory laparotomy in the second, where the radiologist had interpreted this malformation as a space-occupying lesion. In the third case, the accessory spleen was initially misdiagnosed as a solid tumor of the pancreas, but was eventually recognized as a congenital anomaly by a second laparoscopy. [9, 10]

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.

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