

Study of Splenic Notches and Fissures in Bangladeshi Cadaver

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Abstract

Background: Splenic notches are important landmark for the clinician to differentiate enlarged spleen from left kidney during abdominal palpation. Notches are usually present in the upper/superior border of spleen which represents the lobulated development from the left wall of dorsal mesogastrium and fuses with progress of age.

Objective: To find out the incidence, position, number of splenic notches and fissures in Bangladeshi cadaver.

Methods: This descriptive cross sectional study was done from July 2007 to June 2008 on 120 formalin fixed cadaveric human spleens in the department of Anatomy at Mymensingh Medical College, Mymensingh.

Results: In the present study, splenic notches were found in 85% of cases. In relation to sex the notches were found in 86.2% of male and 81.81% of female cadaver. In upper border notches were found in 84% of cases which were 1-7 in number. In lower border notches were present in 36.67% of spleens and are 1-3 in number. Splenic fissure was found in 9.19% of male and 9.09% of female spleen.

Conclusion: Adequate knowledge of splenic morphology will be helpful for the clinical diagnosis of splenic disease.

Keywords: Spleen, Notch, Lobule, Fissure.

Introduction

The spleen is the largest organ in the reticuloendothelial system. It has been standard practise, for many years, to use splenic size as an indicator of disease activity in a variety of disorders of the reticuloendothelial system.¹ Enlargement of the spleen has been a matter of concern to physicians as far back as ancient Greece, when it was almost certainly associated with endemic malaria. The more recent observation of how often an enlarged spleen was associated with various blood diseases confirmed the relationship between the spleen and the haemopoietic system. In some of these diseases the effect of splenectomy made this relationship even more apparent.² The conditions causing massive enlargement of the spleen include Chronic Myeloid Leukemia, Myelofibrosis, Kala-Azar, Gaucher's disease, Bilharziasis, Thalassemia Major, Splenic cysts and Tumours.^{3,4} Splenic

notches are important landmark for the clinician in clinical practice to differentiate enlarged spleen from left kidney and suprarenal gland during abdominal palpation. Splenic notches usually present in the upper/superior border which represent the lobulated development of spleen from the left wall of dorsal mesogastrium and fuses with progress of age.^{5,6,7} In some cases Splenic notches also found in lower/inferior border. The presence of fissures in the splenic surfaces may be misinterpreted as splenic lacerations or lobulation.⁸

Materials and Methods

This cross sectional and descriptive study was carried out from July 2007 to June 2008 on 120 human spleens collected from Bangladeshi cadavers of both sexes (male and female) age ranging from birth to 80 years. Specimens were collected from dead bodies that were undergone post-mortem examination in the morgue of the department of Forensic Medicine of Mymensingh Medical College. The spleens were collected from the individual who died within 12-24 hours and discarded those spleens which were apparently ill or debilitated; also discarded the samples which were found with considerable sign of decomposition. Since no autopsy is done for routine hospital death or other deaths from natural causes in our country, most of the specimens were collected from bodies where the cause of death was meidcolegal i.e. road accident, suicidal, homicidal.

The dead bodies were kept on the autopsy table in supine position and an identification number were allotted for each. The particulars of the body (age, sex, cause of death) were recorded in a record book against respective specimen number. During post-mortem examination of a cadaver, abdominal cavity was routinely exposed by classical midline incision from suprasternal notch to symphysis pubis. Anterior abdominal wall was retracted and structures related to anterior aspect of the spleen were pushed aside by hand and spleen was removed. Just after removal from the bodies, the spleens were cleaned gently with running tap water. Blood and blood clots were removed as far as possible. Than spleens were brought to the department of Anatomy, Mymensingh Medical College. All fat and other unwanted associated tissue were removed from the spleen. The collected specimens were tagged by a piece of waxed cloth which bore the given identifying number along with the

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age of the cadaver and were placed in 10% formal saline solution for 48-72 hours for fixation. Ignoring a little hardness and shrinkage, further study was carried out with these preserved specimens. To observe the incidence, number, position of notches in borders and fissure on the surfaces, spleens were removed from the preservative and soak them well by dry cloth. Collected data was noted in a tabulated form. Data were classified and analyzed by SPSS computer program and finding of the present study were compared with national and international studies.

Results

According to Table-I, Splenic notches were found in 75 (86.2%) of male cadaver out of 87 and 27(81.81%) of female cadaver out of 33. In 15% of cases, there was absence of notch like Figure-2. Notches were absent in 12(13.80%) of male and 6(18.1%) of female. According to Table-II it was evident that in 84% of cases notches were present in upper border of spleen. There was 1 notch in 30 cases, 2 notches in 31 cases, 3 notches in 19 cases, 4 notches in 15 cases, 5 notches in 3 cases, 6 notches in 2 cases, 7 notches in 1 case like Figure-1. It was also observed that in 44(36.67%) of cases notches were present in lower border like Figure-3. There was 1 notch in 23 cases, 2 notches in 20 cases and 3 notches in 1 case. During this study Splenic fissure was seen in diaphragmatic and visceral surface of spleen in 08(9.19%) of male and 03 (9.09%) of female spleen (Table-I and Figure-3).

Table-I: Incidence of notch and fissure

Incidence of notch	Male	Female	Total
Presence of notch	75 86.20%	27 81.81%	102 85.00%
Absence of notch	12 13.80%	6 18.10%	18 15.00%
Incidence of fissure	08 9.19%	03 9.09%	11 9.16%



Figure-1: Multiple splenic notches in upper border

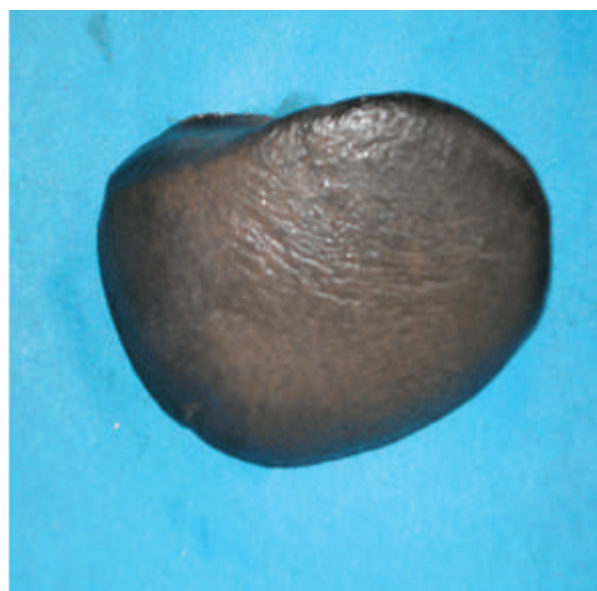


Figure-2: Absence of splenic notch



Figure-3: Splenic fissure



Figure-4: Splenic notch in upper and lower border with fissure

Table-II: Number of notches in the splenic borders

Number of notch present	Number of notches							Absence of notches
	1 Notch	2 Notches	3 Notches	4 Notches	5 Notches	6 Notches	7 Notches	
Upper border 101 (84%)	30	31	19	15	3	2	1	19(16%)
Lower border 44 (36.67%)	23	20	1	-	-	-	-	76(63.33%)

Discussion

Splenic notch has an important role during clinical examination of abdomen manually by palpation method for various disease conditions. Now a days it is very essential for the sonologist and surgeon to differentiate a mass in left hypochondriac region from left suprarenal gland and left kidney. In the present study 120 cadaveric spleens was observed and notches were found in 85% of cases. In relation to sex the notches were found in 86.2% of male and 81.80% of female. In upper border notches were found in 85% cases, one notch was present in 30 cases, two notches in 31 cases, three notches in 19 cases, four notches 13 cases, five notches in 3 cases, six notches in 2 cases and seven notches in 1 case. In the inferior border notches were present in 37.67% cases, one notch in 23 cases, two notches in 20 cases and three notches in 1 case, which is similar to the findings of Alim who studied 60 spleen of Bangladeshi cadaver in different age group in 2007 and found 1 to 4 notches present in upper border in 75% of the samples and 1-2 notches were present in lower border of the spleen in 31.6% of the samples.⁹ Rayhan in 2006 studied 70 spleens of Bangladeshi cadaver and also found 1 to 3 notches at upper border of the spleen in 88.57% samples and 1-2 notches in the lower border of the spleen in 27.4% of samples.¹⁰

The incidence and number of notches in spleen of present study in upper border were similar but in lower border it is higher than the study of Michel NA, who studied 100 spleens from 32 to 82 years of age of autopsies in Jefferson Medical College, Philadelphia In 1942. He found that, notches in the anterior border occurred in 85% cases, varied in number from 1 to 6 and in the posterior border of the spleens in 20% of cases.¹¹

In 1946, Bergman and Afifi studied with 113 operative cases and found that the anterior border was free from notches in 7% of cases. Notches on the superior border occurred in 32% cases and on the inferior border in 8% cases. Most commonly there were two notches, in one case they were 7 in number¹² which is similar to the number of notches, but the incidence of notches in upper and lower border is higher in present study. Parson FG of St Thomas hospital examine 113 spleens and mentioned that the spleen with two notches being the most common and he observed the range of 0 to 7 splenic notches in his study.¹³ Das et al studied 100 cadaveric spleen and reported upto 4 notches in their study where 98 in superior border and 02 in inferior border.¹⁴ Thanya et al in 2013 reported 09 notches¹⁵ and Gandhi et al in 2013 reported six notches examining a 32-year-old female, in the

Department of Forensic Medicine of Rural Medical College, Maharashtra¹⁶ which supports the findings of the present study.

In the present study, 9.16% spleens were found with fissure in diaphragmatic surface (Table-I) which represent the lobulated development of spleen and about 15% of spleen shows absence of notches in both borders, represent complete fusion of the lobules (Figure-2). The fissures on the diaphragmatic surface may be due to a developmental defect or linked to any mechanical pressure of the surrounding structures.¹⁴ Thamaraiselvi of Karpaga Vinayaga Institute of Medical Sciences, Tamilnadu, India, studied 50 formalin fixed spleen from the Department of Anatomy and found 1-4 splenic notch and 8(16%) splenic fissure out of 50 spleens. The presence of fissures in the spleen may be misinterpreted as splenic lacerations.⁸ Smidt of Royal Adelaide hospital observed a case of a large congenital fissure mimicking splenic hematoma in splenic scintigraphy.¹⁷

Conclusion

The feature on external surface of spleen, presence of notches and fissures can guide the clinicians, radiologist and surgeons to differentiate it from left kidney and suprarenal gland. Detail knowledge of splenic notches and fissures will help the physicians to avoid misinterpretations and take correct decision about disease diagnosis and treatment procedure. The findings of the present study will help to enrich the information for future study on spleen incorporating the presence of notches in both borders and fissures in the surfaces of spleen.

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