Case Report

Spleen with multiple notches: A rare anatomical variant with its clinical significance

Kusum R. Gandhi, Sushama K. Chavan, Sneha A. Oommen
Department of Anatomy, Rural Medical College, PIMS, Loni, Maharashtra, India

ABSTRACT

Two or three notches on the superior border of spleen are not an uncommon presentation. As many as seven notches were observed in a spleen of 32 year old female in Rural Medical College, PIMS, Loni, Maharashtra, India, during autopsy. Along the superior border of spleen six notches were present and one notch was observed on the broad anterior pole. A 2.8 cm long fissure was also seen on the renal visceral surface of the specimen. This unusual anatomical variation may lead to difficulty while distinguishing the spleen from adjoining organs in patients of splenomegaly. The variation is explained on the basis of embryological development. A sound knowledge of such variation is essential for physicians, surgeons, radiologists, and of course the anatomists.

Key words: Fissure, splenic notch, splenomegaly, superior border

INTRODUCTION

In humans, spleen is the largest, single secondary lymphoid organ with high vascularity.[1] Being connected to both the circulatory and lymphoid system, spleen performs hematological as well as immunological function. In an average adult, the spleen is wedge shaped with the dimensions of 3—4 cm thick, 7 cm broad, 12 cm long, and 150 g in weight. Spleen has two surfaces: visceral and parietal surface and the three borders: superior, inferior and intermediate. The superior border separates the gastric area from the diaphragmatic surface and the inferior border separates the renal area from the diaphragmatic surface.[1] The superior border of the spleen possesses characteristic notch on its anterior part.[1-4]

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The splenic notch, along the superior border of the spleen, is the most reliable feature used by the physicians in day-to-day clinical practice to palpate the enlarged spleen and distinguish it from adjoining organs. Variation in the number and location of notches may interfere in the manual and radiological identification of spleen. We are reporting a very unusual presentation of spleen having seven notches and a fissure. This will help to guide the surgeon and also enhance the medical knowledge regarding morphology of this mystery organ.

CASE REPORT

The specimen of spleen was encountered in a 32-year-old female, after all the legal procedures that were under examination in the Department of Forensic Medicine of Rural Medical College, PIMS, Loni, Maharashtra. The spleen was detached from its various attachments after conforming that there is no accessory splenic tissue in any of the splenic ligaments and hilum. The peritoneum was reflected from all the surfaces of spleen. The splenic vessels were cut at the hilum. After washing the organ under tap water the measurements were taken with the help of spreading and sliding vernier caliper. The length was 12.4 cm, breadth 5.2 cm, width 3.2 cm, and weight 110 g. The notches on superior border and anterior pole were carefully cleaned. Along the superior border, six notches were present at variable distances in addition to a prominent notch on the anterior pole. A fissure of length 2.8 cm was also seen on the renal surface of the specimen as shown in Figure 1. The other abdominal organs were found as normal. A photograph of the variation was taken after the dissection [Figure 1]. Finally an attempt was made to explain the abnormality in the light of embryological development and to establish its clinical implications.

DISCUSSION

Morphologically, the notches along the borders of spleen are very variably present in different animals. The spleen in carnivores is large with notch on all the borders whereas spleen is less notched in anthropoids.[5] Ox, goat, sheep, and horse have been found to display no notches whereas cat,

ADDRESS FOR CORRESPONDENCE:
Dr. Kusum R. Gandhi, Department of Anatomy, Rural Medical College, PIMS, Loni, Maharashtra - 413 736, India. E-mail: gandhikusum.r@gmail.com

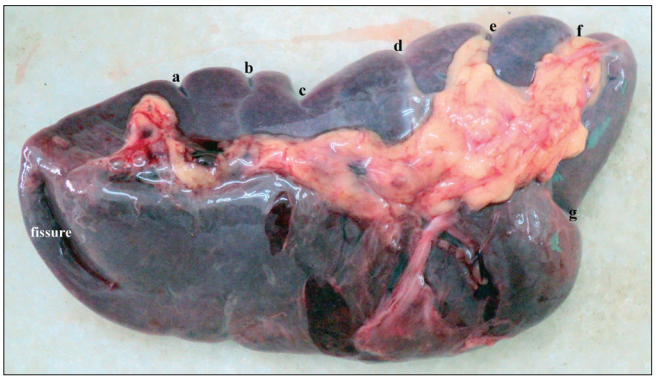

Figure 1: The specimen of spleen showing unusual presentation as seven notches along its borders. Six notches (a, b, c, d, e, and f) are present on the superior border and one distinct notch (g) is observed on the broad anterior pole of spleen. A 2.8 cm long fissure (fissure) is also observed on the renal visceral surface between the inferior and intermediate borders of specimen

dog, lion, wild dog, fox, ordinary seal have notches on all the borders.[3,5] In man, one to four splenic notches on the superior border are described by the previous workers in this field. Discrepancies do exists among previous authors regarding the number of notches, but to the best of our knowledge seven notches in a spleen are not mentioned in the literature.

Das *et al.* mentioned the presence of 0—4 splenic notches in their study on 100 spleens. They found a splenic notch on the superior border of spleen in 98% and in two cases the notch was present on the inferior border, and once they also observed a notch on the intermediate border. Bergman *et al*, mentioned the splenic notch on the inferior border in 32% of cases along with notch on the superior border.[4,6] Nayak *et al.* encountered only 50% of the splenic notches on the superior margin.[5,7] The splenic notches on the superior margin were seen in 78.6% by Skandalakes *et al.*, 70% by Soyluolu *et al.*, and 95% of cases by Ungör *et al.* respectively.[3,5,6] Gayer *et al.* in their computed tomographic study on congenital anomalies of spleen noted that occasionally the notches or clefts on the superior border of the adult spleen were sharp and extended deep up to 2—3 cm.[8,9] The fissure on the renal visceral surface in our specimen may mimic an injury or erroneously interpreted as a laceration in abdominal trauma patients during radiological investigation.[5,7]

Clinically, physicians and surgeons distinguish the enlarged spleen from adjoining viscers by the presence of splenic notch in their day-to-day practice. In the case of tumor of left kidney, the kidney is identified by its rounded border whereas the sharp anterior edge of the spleen is often notched.[4,7] Hence, an accurate knowledge about the morphological variations of spleen is mandatory to them. Further, the spleen with many notches along its surface is categorized as a distributed type with a large hilum, in which the arterial branches are small and numerous.[3,6,8] It is recommended that in these cases the surgeon should explore all the possible routes of hemorrhage in traumatized spleen and at the same time during partial splenectomy; all these branches should be carefully ligated.

The notches on the surface of spleen are formed due to its lobulated origin. The spleen develops from mesenchymal condensation in the dorsal mesogastrium during the sixth week of gestation. The mesenchymal cells between the leaflets of dorsal mesogastrium and the cells of the coelomic epithelium of the dorsal mesentery form the early spleen.[2,7,10] The proliferating cells invade the underlying angiogenetic mesenchyme, which becomes condensed and vascularized. The process occurs simultaneously in several adjoining areas which soon fuse to form a lobulated spleen. Lymphocytes migrate to the spleen late in the fetal life, from the central lymph organs. The earlier lobulated structure of the spleen disappears, but is indicated by the presence of notches on the upper border in the adult.[2,3,5,6,10]

In this era of laparoscopic splenectomies, more accurate knowledge of such anatomical variations is of fundamental importance to improve diagnostic and therapeutic performances. The clinicians need it during the routine clinical examinations of the abdomen, the surgeons while they perform surgical procedures which are related to the spleen, the radiologists during their diagnostic procedures and of course, this knowledge is very important for anatomists during their routine classroom dissections.

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