



Full Length Research Article

STUDY OF SPLENIC NOTCHES IN A HUMAN CADAVER

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ABSTRACT

In humans, spleen is one of the largest and single secondary lymphoid organ with high vascularity. The spleen develops from the mesoderm and during its development, different lobules are formed, which fuses with each other later on which is indicated in the form of the lobulations in adult spleen that can be seen on the superior as well as on the inferior borders. The study was done in the department of Anatomy of DM- Wayanad Institute of Medical Sciences, Meppadi, Kerala and Srinivas Institute of Medical Sciences, Mangalore, Karnataka. A total of 60 adult human cadaveric spleens were studied. Out of the 60 spleens observed, 57 (95%) spleen showed notches on the superior border, 2 (3.33%) spleen showed notches on the inferior border. 1 (1.67%) spleen did not show any notches on both superior and inferior border. Spleno-megaly is common in case of malaria, kalazar, typhoid, acute and chronic leukemias. In these common cases, the physician feels the notches of spleen on the superior border. It is essential for the surgeons and radiologists to become completely aware of anatomical variations that may help in accurate clinical diagnosis and treatment of the disease.

INTRODUCTION

In humans, spleen is one of the largest and single secondary lymphoid organ with high vascularity (Kato *et al.*, 2007). Being connected to both the circulatory and lymphoid system, spleen performs two main functions related to hematological as well as immunological system. The spleen develops from the mesoderm and during its development, different lobules are formed, which fuses with each other later on which is indicated in the form of the lobulations in adult spleen that can be seen on the superior as well as on the inferior borders (Sant, 2002). The number of notches varies from zero to six, but commonly, only one or two notches were seen. The superior border of the spleen possesses characteristic notch on its anterior part (Borley, 2008; Skandalakes, 2004 and Coetzee, 1982). Normally spleen is not palpable, but if it is enlarged two or three times of its normal size then it is palpable. Usually abnormally enlarged spleen is identified by palpating the splenic notches. When spleen is enlarged, it enlarges towards the umbilicus and right iliac fossa.

MATERIALS AND METHODS

The study was done in the department of Anatomy of DM- Wayanad Institute of Medical Sciences, Meppadi, Kerala and

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Srinivas Institute of Medical Sciences, Mangalore, Karnataka. A total of 60 adult human cadaveric spleens were studied. Splenic notches and fissures were studied with regard to its different borders. The data obtained was tabulated, analyzed statistically and compared with the previous studies.

RESULTS

Out of the 60 spleens observed, 57 (95%) spleen showed notches on the superior border, 2 (3.33%) spleen showed notches on the inferior border. 1 (1.67%) spleen did not show any notches on both superior and inferior border. The number of splenic notches on the superior border varied between 1 and 4. But the majority of the spleens showed notches that varied between 1 and 2 on the superior border.

DISCUSSION

Spleen is a very important organ because of its function in relation to immunological and cytological activity especially with regard to its R.B.C storage and blood filtration potential (Williams *et al.*, 2008). Spleno-megaly is common in case of malaria, kalazar, typhoid, acute and chronic leukemias. In these common cases, the physician feels the notches of spleen on the superior border. Different animals show variations in the presence of notches on its borders. The spleen in carnivores is large with notch on all the borders whereas spleen is less notched in anthropoids (Parsans, 1901). In human, 1 to 4

splenic notches on the superior border are described by the previous workers.

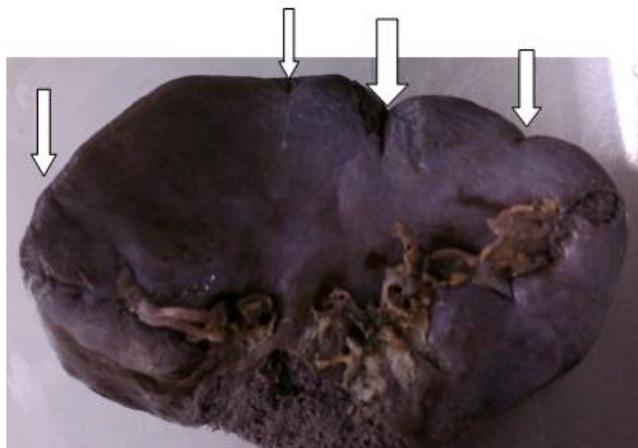


Fig. 1. Showing 4 notches on its superior border

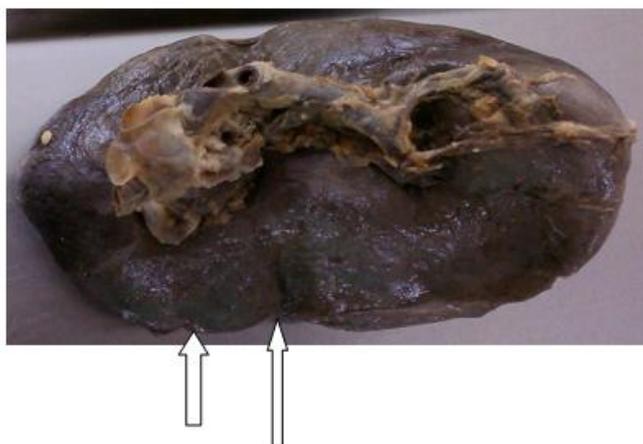


Fig. 2. Showing 2 notches on its inferior border



Fig. 3. showing absence of notches on both superior and inferior border seen from costal surface

Table 1. Showing the presence or absence of notches in relation to superior and inferior border

Observation	Number	Percentage %
No. of spleens with notches on the superior border	57	95
No. of spleens with notches on the inferior border	2	3.33
No. of spleens without notches	1	1.67

Table 2. Comparison with other researchers on notches at superior border

Researchers	Percentage %
Soyluolu AY <i>et al</i> (1996)	70
Skandalakis PN <i>et al</i> (1993)	78.6
Ungor B <i>et al</i> (2007)	95
Siva Nageswara Rao Sundara Setty <i>et al</i> (2013)	70
Present study	95

Table 3. Comparison with other researchers on notches at inferior border

Researchers	Percentage %
Parsons, F.G (1901)	8
Srijit Das (2008)	2
Siva Nageswara Rao Sundara Setty <i>et al</i> (2013)	14
Present study	3.33

In our study we observed in one spleen without any notches on both of its borders. Is splenomegaly occurs in unnotched spleens, surgeons may misdiagnose as renal swelling on left costal margin. But renal swelling has resonant sound on percussion, slight movement on respiration, ballotability, bimanually palpable and insinuation of the hand in between the renal swelling and anterior abdominal wall.

Conclusion

Presence of notches are very helpful for any clinician or radiological investigation and also for anthropological studies. Splenic notches are very common on superior border than on the inferior border. It is essential for the surgeons and radiologists to become completely aware of anatomical variations that may help in accurate clinical diagnosis and treatment of the disease.

REFERENCES

Borley N. Spleen in Standring S Gray’s Anatomy. 40th ed. London: Churchill Livingstone Elsevier; 2008. p. 1191-4.
 Coetzee T. Clinical anatomy and physiology of the spleen. *S Afr Med J* 1982;61:737-46.
 Das S, Abd Latiff A, Suhaimi FH, Ghazalli H, Othman F. Anomalous splenic notches: A cadaveric study with clinical implications. *Bratisl Lek Listy* 2008; 109:513-6.
 Kato T, Tzakis AG, Selvaggi G, Gaynor JJ, Takahashi H, Mathew J, *et al*. Transplantation of the Spleen Effect of Splenic Allograft in Human Multivisceral Transplantation. *Ann Surg* 2007; 246:436-46.
 Parsans FJ, Notches and fissures of the spleen. *Anat Physiol* 1901; 35:416-27.
 Sant S. Embryology for medical students. New Delhi: Jaypee brothers' medical publishers (p) ltd., 2002; 203-04.
 Setty SNRS, Katikireddi RS. A cadaveric study of human splenic notches and fissures. *Int J Health Sci Res.* 2013; 3(9):40-44.
 Skandalakes EJ. Surgical Anatomy [The Embryological and Anatomical Basis of Modern Surgery] In Spleen, Paschalides Medical Publications. Vol. 2. Athens, Greece. 2004. p. 1231-77.
 Skandalakis PN, Colborn GL, Skandalakis LJ, Richardson DD, Mitchell WE Jr, Skandalakis JE. The surgical anatomy of the spleen. *Surg Clin North Am.* 1993 Aug; 73(4):747-68.

Soyluolu AÝ, Tanyeli E, Marur T, Ertem AD, Özku• K, Akkýn, SM. Splenic artery and the Relation between the tail of pancreas and spleen in a surgical anatomical view. Karadeniz Týp Dergisi 1996; 9:103- 107.

Ungor B, Malas MA, Sulak O, Albay S. Development of spleen during the fetal period. *Surg Radiol Anat.* 2007 Oct; 29(7):543-50.

Williams, NS. Bulstrode, CJK Ronan O'Connell, P. Bailey & Love's. Short Practice of Surgery. Hodder Arnold. London., 25th ed .2008; 1101-1110.
