



MORPHOMETRIC STUDY OF SPLEEN IN CADAVERS OF SOUTH COASTAL REGION

Anatomy

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ABSTRACT

Introduction: The spleen has always been a mysterious organ of seemingly occult function as well as a forbidding organ of extreme vulnerability for the surgeon. But on both fronts, it has yielded considerable ground. The spleen is the largest soft, highly vascularised, lymphatic organ located partially in the epigastrium and mainly in the left hypochondrium. Spleen acts as a filter for blood, storage of lymphocytes and platelets. Old red blood cells are recycled in the spleen. It metabolizes the haemoglobin removed from old senescent RBCs. The knowledge of morphometric variations of spleen helps clinicians, radiologist and surgeons to differentiate it from the various splenic injuries and pathologies. **Aims:** The aim of the study is to find the morphometric variations of spleen. **Materials and Methods:** The present study was done on 68 adult human spleens of unknown sex. The morphometric features like shape, presence of notches, length, breadth and thickness were noted. **Results:** Out of 68 spleens studied, five different shapes of the spleen were observed. 32 spleens were wedge shaped (41%), 20 spleens were triangular shaped (20%), 16 spleens were tetrahedral (12.8%), 16 spleens were oval shaped (20.5%), 0 spleens were irregular shaped (0%). 26 spleens (33.33%) had notches on its superior border, 4 spleens (5.12%) had notches on its inferior border, 32 spleens (41%) had notches both in their superior and inferior borders, 16 spleens (20.51%) were found with absence of notch on either of its borders. The presence of splenic fissure on diaphragmatic surface were noted in 9 (11.53%) spleens. The length of the spleen varied between 7cms to 19cms, the breadth of the spleens varied between 4cms to 12cms and the thickness of the spleens varied between 2cms to 8cms. **Conclusion:** The knowledge of morphometric features of the spleen is of great importance to the clinicians, radiologists and surgeons for their surgical procedure.

KEYWORDS

INTRODUCTION:

The spleen is a haemo-lymph organ and belongs to reticulo-endothelial system. It is highly vascular. It is haemo-lymph because spleen filters blood by taking out worn-out erythrocytes or any microbial antigens from the circulation whereas lymph nodes filter lymph. In foetal life spleen manufactures erythrocytes and after birth it manufactures lymphocytes. Each splenic lymphatic follicle is traversed eccentrically by an arteriole, and is surrounded by red pulp. The spleen is the major repository of mononuclear phagocytic macrophage cells in the red pulp and of lymphoid cells in white pulp. The spleen mainly lies in the left hypochondrium and partly in the epigastrium. The axis of the spleen is oblique, and is directed downwards, forwards and laterally coinciding with the left tenth rib. The spleen is usually flattened and oblong in form. If the colic impression is prominent, it is tetrahedral; if the colic impression is absent, it resembles the segment of an orange. The length of the spleen is 12 cms, breadth being 7 cms, thickness is 3 cms and weighs about 150 gms. Spleen has anterior and posterior ends, superior and inferior borders and two surfaces; diaphragmatic and visceral surfaces¹. On the superior border, near the anterior end, there may be one or two notches, persisting from the lobulated form of the spleen in early foetal life². The spleen is the most vascular organ in the human body which is involved in the regulation of circulating blood volume. Approximately 350 litres of blood passes through it per day. The spleen receives approximately 5% of the cardiac output and 40% source of the blood in the portal circulation^{3,4}.

The need for the study of the morphometric variation of spleen is for its haematological and immunological function which highlights correlating it clinically. Partial splenectomy is also practiced now a days instead of total splenectomy. Thorough knowledge regarding the variations in the different parameters of spleen is highly essential for the surgeons, radiologist for diagnostic and surgical purposes.

2. Aims and Objectives The aim of the study is to find the morphometric variations of spleen.

3. MATERIALS AND METHODS:

The present study was done on 68 adult human spleens of unknown sex which were collected from the department of Anatomy, Narayana medical college, Chinthareddypalem, Nellore. All the spleens were observed for their morphometric features like shape, number of notches on borders and measurements were taken for length, breadth

and thickness using vernier calliper. All these observations and measurements were tabulated, statistically analysed and compared with previous studies.

1. Length - maximum distance between the two ends of the spleen.

2. Breadth - maximum distance between two points at the same level on the superior and inferior borders.

3. Thickness - Midpoint of both the visceral and diaphragmatic surfaces.

4. RESULTS:

Out of 68 spleens studied, five different shapes of the spleen were observed. 32 spleens were wedge shaped (41%), 20 spleens were triangular shaped (20%), 10 spleens were tetrahedral (12.8%), 16 spleens were oval shaped (20.5%), 0 spleens were irregular shaped (0%). 26 spleens (33.33%) had notches on its superior border, 4 spleens (5.12%) had notches on its inferior border, 32 spleens (41%) had notches both in their superior and inferior borders, 16 spleens (20.51%) were found with absence of notch on either of its borders. The presences of splenic fissure on diaphragmatic surface were noted in 9 (11.53%) spleens. The length of the spleen varied between 7cms to 19cms, the breadth of the spleens varied between 4cms to 12cms and the thickness of the spleens varied between 2cms to 8cms.

5. DISCUSSION

The spleen is an important haemo-lymphoid organ. Splenomegaly is commonly seen in case of malaria, typhoid, infectious mononucleosis and leukaemia's. In these conditions, the clinicians can palpate the splenic notches commonly present on their superior border and differentiate it from other organs.

The present study has observed the variations in the morphometry of spleen⁹. The most common shape was the wedge shaped, followed by triangular, tetrahedral and oval. Among the 4 different shapes noted, more commonly were wedge shaped (41%) higher to the studies of Sangeetha et al⁷, and Subhash et al⁷, followed by triangular shaped spleens (20%) higher to the study done by R Siva Chidambaram⁵ and R. Parashuram¹⁵, tetrahedral (12.8%) which is less compared to that of R. Parashuram and oval shaped (20.5%) which is more compared to that of R. Parashuram. The values are higher compared to that of the

studies done by previous authors The average length of spleen in present study was 14 cm, which is higher to the studies done by Rao et al. 10 (10.5 cm), Michels et al. 11 (11 cm) R. Parashuram10 (10.29 cm). The average breadth of spleen in present study was 9 cm, which is higher to the studies done by Sangeetha et al⁶. (6.84 cm) and Subhash et al.⁷. (6.4 cm) and R. Parashuram (6.37 cm). These values are also more compared to that of the previous authors.

The average thickness of spleen in present study was 5.2 cm, which is similar to the studies done by Sangeetha et al⁶. 6 (3.61 cm), Subhash et al.⁷. (3.3 cm), Sudharani et al⁸. (3.7 cm) and R. Parashuram et al¹⁵. (3.4 cm).

In the present study, the splenic notches were observed on the superior border in 33.33% of the specimens. In the previous studies, the splenic notches on the superior border were observed in 50% Subhash et al. 7 80% Sudharani et al.,⁸ 83% Sangeetha et al., 6 50% Nayak et al.¹², Das S et al.¹³ observed in 98% and R. Parashuram 62% of the specimens.

The notch on the inferior border was observed in 5.12% in the present study higher to the study done by Archana N et al.¹⁴3% and R. Parashuram in 4%.

The notches in the both the borders were observed in 41% of the specimens and the study done by R Parashuram it is 24%. The presence of splenic fissure on diaphragmatic surface were noted in 9 (11.53) spleens. The length of the spleen varied between 7cms to 19cms, the breadth of the spleens varied between 4cms to 12cms and the thickness of the spleens varied between 2cms to 8cms. This was not reported in the literature as far as I could search. Also in this study the values of various parameters as compared to previous studies.

6. CONCLUSION

A thorough knowledge of morphometric variations is highly essential for the clinicians, surgeons and radiologists during routine clinical examinations. These variations are to be considered during splenic transplantations, surgical procedures, during radiological studies and differentiate it from splenic injuries.

Table 1: Length Of Spleen

S.NO	Length(cm)	no. of specimens	percentage
1	7-9	34	43.5%
2	9-11	20	25.6%
3	11-13	18	23%
4	13-15	2	2.5%
5	15-17	2	2.5%
6	17-19	2	2.5%

Table 2: Breadth Of Spleen

S.NO	Breadth (cms)	no. of specimens	percentage
1	4-6	26	33.33%
2	6-8	36	46.15%
3	8-10	12	15.38%
4	10-12	4	5.12%

Table 3 : Thickness Of Spleen

S.NO	THICKNESS(cms)	no. of specimens	Percentage
1	2-3	14	17.94%
2	3-4	28	35.89%
3	4-5	22	28.20%
4	5-6	8	10.25%
5	6-8	6	7.69%

Table 4 : Weight Of Spleen

S.NO	Weight(gms)	no. of specimens	percentage
1	<70	12	15.38%
2	71-140	34	43.58%
3	141-200	20	25.64%
4	201- 250	8	10.25%
5	251-300	0	0%
6	>300	4	5.12%

Table 5 : Shapes Of Spleen

S.NO	Shape of spleen	no. of specimens	Percentage
1	Wedge	32	41%
2	Tetrahedral	10	12.8%
3	Oval	16	20.5%

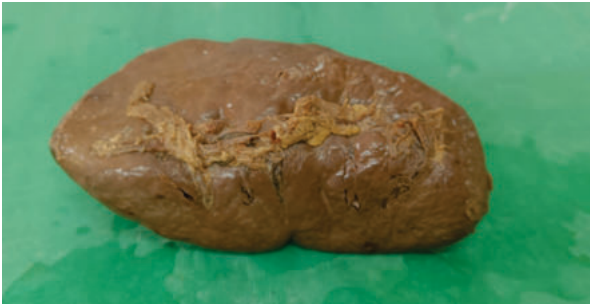
4	Triangular	20	25.6%
5	Irregular	0	0%

Table 6 : Notches Of Spleen

S.NO	Notches	no. of specimens	Percentage
1	No notches	16	20.51%
2	Notches in inferior border only	4	5.12%
3	Notches in superior border only	26	33.33%
4	Notches in both borders	32	41%
5	Presence of Splenic fissure	9	11.53%



Notch In Inferior Border



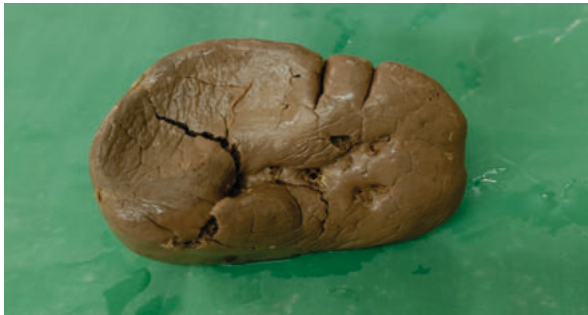
Notches At Superior Border



Notches In Both Borders



No Notches

**Triangular Shaped****Tetrahedral Shaped****Oval Shaped****Wedge Shaped****REFERENCES**

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