A cadaveric study of human spleen in South Gujarat region

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Abstract:

Introduction: Spleen is embodied vascular & lymphatic tissue. The spleen is quite essential in immunological and hematological dis-arranges. **Aims:** The purpose of the investigation is to ponder morphological types of the spleen. Old red blood cells (RBCs) are recycled in the spleen, and platelets and white blood cells are stored in it. **Material & Methods:** Normal human cadaveric spleens were removed from the abdominal cavity by detaching them from several attachments from the abdomen and splenic vessels were cut close to the hilum. Flotsam and jetsam and greasy tissues were cleaned meticulously with running tap water. Using a weighing machine, spleens were weighed. Measurements were calculated by Vernier caliper. The study was carried out on 50 specimens of spleen in the Department of Anatomy, Smt. B.K.Shah Medical college and research center, Piparia. **Result:** Out of 50 spleens, 24% spleens had been triangular, 14% spleens had been tetrahedral and 48% spleens had been wedge formed. The savage size used to be 96.4 mm, the cold blooded broadness 61.9 mm, the remorseless width used to be 48.6 mm, the merciless weight used to be 140.8gms. **Conclusion:** Present study considers will offer assistance radiologists, physicians and surgeons in diagnosing diseases of the spleen.

Key words: Cadaveric study, Spleen, Human

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Introduction:

The spleen has a colourful history. The English name “spleen” is unclear. The word spleen is derived from the Greek word “Splancknon” which mince, “Viscous” or ‘‘Spaw” which mince “to draw”. English dictionary meaning of word “spleen” is ‘ill temper‘. In Past people believed that the function of the spleen is to draw spoiled blood. They attribute this to ‘dark purple, red colour spleen. In ancient Greece the spleen was thought to be the source of

black bile and it is related to melancholy. The ancient authors wrote that the spleen is the “seat of laughter” and the locus of “conflicting emotions”.[1]

The Spleen is an auxiliary lymphoid organ due to the fact that it is the location of development of lymphocyte and their activation and opening of a resistant response, the spleen is organ of hemopoeisis some time recently bone marrow development.[2] The Spleen is an enormous epitomized mass of vascular and lymphoid tissue. Through spleen is a part of the circulatory system, it is generally described with the lymphatic organs because of the very large population of lymphocytes present in it.[3] The spleen has(0.33 %) most essential blood perfusion rate.[4,5] The size and weight of the spleen vary with age and sex. It can also vary slightly in the same within the individual under diverse conditions. Within the adult, it is ordinarily 12cm long, 7cm wide and 3-4cm wide.[6] The two extremities of the organ are connected by superior and inferior borders. The superior border often possesses one or more notches near its anterior end while the inferior border is smooth. The organ has two easily distinguishable surfaces-the diaphragmatic surface and the visceral surface.[7]

The spleen could be hemo-lymph organ and has a place in the reticulo-endothelial system (RES). It is hemo-lymph due to the fact of the following reasons. Each splenic lymphatic follicle is navigated unpredictably by means of an arteriole and is encompassed by using red pulp. Spleen has diaphragmatic and visceral surfaces, superior and anterior borders and inferior and posterior extremities.[8]

Filtration of unwanted elements from the Hematopoitic system by phagocytosis is the major function of spleen.[9] It filters blood cells and is the site of immune responses to blood borne antigens. During fetal life, the spleen is a hemopoietic organ producing granulocytes and erythrocytes (RBCs). The spleen also serves as a major reservoir for blood.[10] It performs the same function of blood that lymph nodes perform for lymph.[11] The spleen has both morphological and immunologic functions.[12]

In grownups, spleen is commonly 12 cm long, 7 cm wide, and 3 cm wide, weight round 150 gm on the other hand it levels from 80 to 300 gms. The spleen isn't viewed as a stomach muscle absolutely fundamental for a person's endurance.[13] Regardless, an investigation of its morphology is as yet basic because of its wide scope of varieties in morphology and hematological immunological capacities. Advance, incredible data around the morphological varieties is outstandingly basic to the doctors and specialists for any obsessive states of spleen.[14,15]

Instinctive floor gives gastric, renal colic and pancreatic impressions Diaphragmatic floor is even and curved, coordinated upwards, in reverse and to the cleared out. The unrivaled outskirt disengaging the gastric impression from the diaphragmatic surface is lean, curved, and presents a couple of scores close to the horizontal end. The mediocre fringe separates the renal impression from the diaphragmatic surface and enhances at an inclination matching with the lower outskirt of the left 11 rib. As far as possible or normal end is restricted and balanced, facilitated upwards in turnaround, and medially towards the vertebral segment. As far as possible or lateral end is vast and addressed via an outskirt, which extends amongst frequent and under common fringes. It is composed downwards, progresses and in the received out the front basal end is the convergence of the frequent outskirt and lateral point and it speaks to the foremost forward anticipating portion of the spleen. Back basal point is the intersection of the second rate border and sidelong conclusion of the spleen.[16] In the enlargement of the spleen is a significant demonstrative sign in jungle fever, kala-azar, incendiary and degenerative issue.[17] In the enlarged

spleen, the front border, front part of diaphragmatic surface and notched upper border may become clearly palpable lower to the left costal margin.[18]

Methods and Materials:

The present study was conducted in the Anatomy Department, Smt. B.K.Shah Medical institute & Research Centre,Pipria, Vadodara, Gujarat.

Normal human cadaveric spleens were removed from the abdominal cavity by detaching them from several attachments from the abdomen and splenic vessels cut close to the hilum. Flotsam and jetsam and greasy tissues were cleaned meticulously with running tap water. Using a weighing machine, spleens were weighed. Measurements were calculated by Vernier caliper. Length –greatest distance between two poles. The study was carried out on 50 specimens of the spleen.

Breadth –greatest separate between two focuses at prevalent and second rate borders

Width –greatest width

Shapes closures, outskirts, and surfaces of every spleen were recognized. Inside the morphology, we recognized the nearness of splenic indents on the prevalence, middle of the road, and substandard outskirts. Extra spleen on the off chance that they were a shoe, noted for investigation.

Statistical analysis: The information gathered from this investigation was arranged, factually broke down. The varieties identified with shapes, sizes were communicated as a rate. The measurable investigation of the information was acted in Systat form 12.

Results:

The morphology of the spleen used to be centered in 50 examples with constant in formalin. We located that sorts in shapes, sizes, and ratings of spleens.

Table no. 01: Weight of spleen

Sr.No	Weight (gms)	Number of spleen	Percentage (%)
1	51-100 gms	Three	06(%)
2	101 – 150 gms	Twenty-three	46(%)
3	151 – 200 gms	Twenty	40(%)
4	201- 250 gms	Two	04(%)
5	251 – 300 gms	One	02(%)
	300 – 350 gms	One	02(%)

In present study weight of spleen diversed from 54 gms to 344 gms. 03 spleens (6%) varies from 51-100 gms. 23 spleens (46%) maximum number varied from 101 – 150 gms. 20 spleens (40%) varied from 151- 200 gms. Only 02 (4%) from 201-250 gms. 02 spleen (4%) varied from 251 – 350 gms. The average weight of the spleen was 140.8 gms.

Table no. 02 Variation in shape

Shape	No	Percentage
Wedge	Twenty-four	48%
Triangular	Twelve	24%
Tetrahedral	Seven	14%
Oval	Five	10%
Irregular	Two	04%

Out of 50 spleens, 24 (48%) were wedge shaped, 12 (24%) were triangular, 7 (14 %) were tetrahedral, 5 (10 %) Oval in shaped, 02 (04%) Irregular in shaped in this study.

Table: 03 Length of spleen

Sr.No	Length of spleen in present study	Number of spleen	Percentage (%)
1	70 – 79 mm	Two (2)	04(%)
2	80 – 89 mm	Nine (9)	18(%)
3	90- 99 mm	Fourteen (14)	28(%)
4	100- 109 mm	Twelve (12)	24(%)
5	110 – 119 mm	Eight (8)	16(%)
6	120 – 129 mm	Four (4)	08(%)
7	130 – 139 mm	One (1)	02(%)

In Present study find out about the size of spleen diverse between 71 mm to 132 mm. Maximum quantity of spleen 14 (28%) different between 90mm -99 mm. 12 numbers of spleen different between. Average length of the spleen was 96.4 mm.

Table no. 04 Breadth of spleens

Sr.no	Breadth of spleen (mm)	No of spleen	Percentage (%)
1	30 - 39 mm	One (1)	02 %
2	40 - 49 mm	Four (4)	08%
3	50 - 59 mm	Twenty (20)	40 %
4	60 - 69 mm	Fifteen (15)	30%
5	70 - 79 mm	Six (6)	12%
6	80 - 89 mm	Two (2)	04%
7	90 - 99 mm	One (1)	02%
8	100 - 110 mm	One (1)	02%

Table no 04, present study shows the breath of the spleens studied. The maximum breath (from 50 mm to 59 mm) in 20number of spleens (40%). Smallest breath of spleen in five (10%) number of spleens varied in size from 30 mm to 49 mm. In this present study, largest breath in 02 (04% percentage) of spleen diverse between 90 mm to 110 mm. The common breadth of the spleen was 61.9 mm. (6.19 cm) in this present study

Table no. 05 Width of spleen in present study (mm)

Sr.no	Width of spleen (mm)	No of spleen	Percentage (%)
1	20 -29 mm	Two (02)	04 %
2	30 - 39 mm	Three (03)	06 %
3	40 - 49 mm	Eighteen (18)	36%
4	50 - 59 mm	Seventeen (17)	34%
5	60 - 69 mm	Seven (07)	14%
6	70 - 79 mm	Two (02)	04%
7	80 - 89 mm	One (01)	02%

Table no 5 shows the width of spleen in the present study. The maximum width varies between 40 - 49 mm in eighteen numbers (36% percentage) of the spleen. The Smallest width of spleen varied between 20- 39 mm in 05

numbers (10% percentage) of the spleen. The largest width between 70- 89 mm in 03 numbers (06% percentage) of spleen. The average width of the spleen was 48.6 mm. in this study.

Discussion:

The spleen is a biggest lymphoid organ with numerous of the functions. It plays an imperative part within the maturation and activation of lymphocyte (L) and the start of an immune response. It is also a viscera of the hemopoiesis system in the fetus.

Table 6: Comparison of shapes of spleen between various studies

Previous study	Shape of spleen (Percentage %)				
	Wedge	Triangular	Irregular	Tetrahedral	Oval
Hollineshead et al [19]	44 %	42 %		14%	
Rao et al[20]	40 %	32 %		20%	8%
Chaware et al [21]	61.26%	12.61%	0.90%	21.62%	3.6%
Chaudhari ML et al[22]	33.87%	19.35%	6.45%	32.25%	8.06%
M Sangeeta et al[23]	33.9%	33.90%		15%	9.40%
G T Waghmode et al[24]	29.74%	14.86%		55.40%	
Present study	48%	24%	04%	14%	10%

Table no: 06, As indicated by Sivanageswara Rao et al wedge-molded (40%), Triangular-formed (32%), Oval molded (8%), and tetrahedral molded (20%). According to Holloneshead et al wedge shaped (44%), Triangular shaped (42%), and tetrahedral shaped (14%). As per Chaware et al wedge molded (61.26%), Triangular formed (12.61%), Oval molded (3.6%) and tetrahedral formed (21.62%). All above mention study compared with the present study.

Table 7: Examination of lengths, breadths, widths, loads between past investigations and the current investigation

Previous study	Weight	Lengths	Widths	Breaths

	gm	mm	mm	mm
Michels N A[25]		110 mm		70 mm
Rao et al[20]	138.4 gm	101.5 mm	39.6 mm	83 mm
Chaware et al [21]	145.76 gm	96.6 mm	30.6 mm	62.2 mm
Chaudhari ML et al[22]	150 gm	95.9 mm	45.4 mm	65.9 mm

In studies done by Rao et al[20] the length was 101.5 mm & study done by Chaware et al length was 96.6 mm and Chaudhari ML, et al[21] length was 95.9 mm which were comparable to our study where the length was 96.4cm. However, the breadth in their study by Michels et al[25] was 70 mm and Rao et al[20] breath of the spleen was 83 mm which was much higher than our study where the breadth was 61.9 mm. In a study done by M Sangeeta at al[23] width was 36.1 and Chaware et al was 30.6 mm which was smaller then present study breath was 48.6 mm. The weight of the spleen was compared with other study.

Conclusion

Information on the life systems and the capacity of the spleen is generally significant for the appraisal of disease present. Morphometric investigation in the current examination will be needful for specialists and clinicians in the conclusion and the board of various issues of the spleen. In sound expresses the spleen isn't unmistakable. Be that as it may, in development of spleen as found in intestinal sickness, kala-azar, Thalassemia, sarcoidosis and leukemia it gets obvious.

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