

Ultrasonographic Measurement of Splenic Length in Relation with Height in Gujarati Population

Ramkumar K. Singhal*, Dhara Patel**, S.M. Patel***, Anuj K Shrivastava****

Abstract

Introduction: The spleen is the largest organ in the reticuloendothelial system; it shows variations in size and weight at different periods of life in different individuals in different conditions. The spleen, normally lies entirely within the rib cage, has a maximum cephalocaudal diameter of 13 cm by ultrasonography or maximum length of 12 cm by radionuclide scan, and is usually not palpable. Only 10-15% of normal spleen is palpable. **Aim:** To study the splenic length by ultrasonography in relation to height of adult population. **Material and Methods:** A prospective study was conducted on 300 individuals, 150 males and 150 females, aged between 20-60 years. USG was done by using ESAOTE MY LAB 40 machine in Radiology Department Sir T Hospital Bhavnagar. Measurement of spleen was taken by using convex 2.5-6.6mhz probe. Individual was positioned on couch in supine and right lateral position for examination with deep inspiration. Spleen length was measured on longitudinal coronal image from dome to tip through hilum. The height of patient was recorded by Stadiometer with accuracy of 0.1 cm. **Results:** The study shows the splenic length increased with height in both male and female. The length of the spleen was less in females than males with each corresponding groups of height. **Conclusion:** This study provides the information that splenic length increases with the increase in the height, in both male and female.

Keywords: Spleen; Ultrasonography; Height; Length; Stadiometer.

Introduction

The spleen is the largest organ in the reticuloendothelial system; it shows variations in size and weight at different periods of life in different individuals in different conditions [1]. The spleen, normally lies entirely within the rib cage, has a maximum cephalocaudal diameter of 13 cm by ultrasonography or maximum length of 12 cm by radionuclide scan, and is usually not palpable. Only 10-15% of normal spleens are palpable.

The spleen size may give information regarding diagnosis of various gastrointestinal and

haematological diseases so estimation of size of spleen is important in diagnosis, treatment and prognosis of variety of disorder [2] Ultrasound has been found to be accurate and reliable for measurement of spleen with lack of radiation, low cost, noninvasive investigation [3].

Materials and Methods

A prospective study was conducted on 300 individuals, 150 males and 150 females, aged between 20-60 years. USG was done by using ESAOTE MYLAB 40 MACHINE in Radiology department, Sir Takhtsinhji hospital Bhavnagar. Measurement of spleen was taken by using convex 2.5-6.6 MHz probe. Individual was positioned on couch in supine and right lateral position for examination with deep inspiration.

Spleen length was measured on longitudinal coronal image from dome to tip through hilum. The height of patient was recorded by Stadiometer with accuracy of 0.1 cm.

Author's Affiliation: *Assistant Professor, Department of Anatomy, Pacific Institute of Medical Sciences, Udaipur, Rajasthan. **Tutor, ***Professor & Head, Department of Anatomy, Government Medical College, Bhavnagar **** Medical Officer, Mandavi, Gujarat.

Corresponding Author: Ramkumar K. Singhal, Assistant Professor, Department of Anatomy, Pacific Institute of Medical Sciences, Udaipur – 313003 Rajasthan.
E-mail: drramkumarsinghal@gmail.com

Result

In this study, splenic length was measured in relation to height and following results were noted. It

shows the splenic length is increased with height in both male and female.

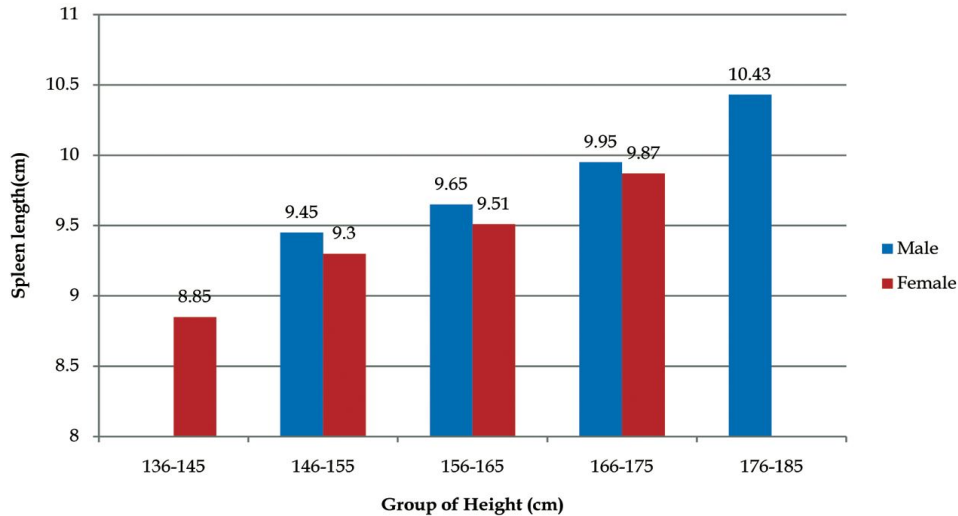
The length of the spleen was less in females than males with each corresponding groups of height.

Table 1: Splenic length in relation to height Male

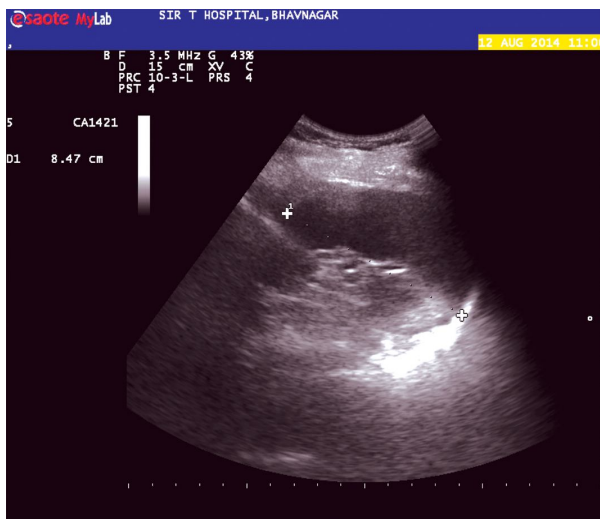
Height Group	Mean ±SD	Range	
146-155	9.4581 ± 0.9431	8.31-10.33	F = 7.71
156-165	9.6581 ± 1.1381	7.59-11.9	
166-175	9.9556 ± 1.0537	7.39-11.9	P = 0.0001
176-185	10.43424 ± 0.8266	8.39-11.78	

Table 2: Splenic length in relation to height: Female

Height Group	Mean ±SD	Range	
136-145	8.8541 ± 0.7518	7.15-10.33	F = 0.20
146-155	9.3077 ± 1.1304	6.83-11.93	
156-165	9.5192 ± 1.0691	6.89-11.74	P = 0.8972
166-175	9.8724 ± 1.1297	7.59-11.44	



Graph 1: Splenic length in relation to Height in both sexes



USG IMAGE showing measurement of splenic Length

Discussion

It is observed that the splenic length is increased with height in both sexes. In one study the splenic size was evaluated in patients with sarcoidosis and thrombocytosis, the splenomegaly was present in 57% of the patients (using sonographic criteria to evaluate the size), but only clinically palpable in 8% of the cases [4].

Rosenberg *et.al.* studied that the upper normal limit of the splenic length was observed to be 12 cm for girls of 15 years or more and 13 cm for boys of 15 years or older. These findings were slightly different from the findings of the present study [5].

Konus *et.al* and Singh A *et.al.* Proposed that the splenic length was correlate best with body height.

This was similar to the finding of our study [6]. Spielmann *et.al*, have studied that the spleen length was greater in male athlete than female. In our study the length is greater in male than female but the mean value of length is lesser than the Spielmann's study [7].

Conclusion

By this study we concluded that the length of spleen increases with height in both male and female. It also revealed that the ultrasonography is the current procedure of choice for routine assessment of spleen size (normal = a maximum cephalocaudal diameter of 13 cm) because it has high sensitivity and specificity and is safe, non-invasive, quick, mobile, and less costly.

References

1. Susan Standring, Harold Ellis, Healy JC, David Johnson, Andrew Willims, Barry KB, Neil RB, et.al. Spleen. Gray's anatomy, (40th edition); 1191.
2. Niederau C, Sonnenberg A, Muller JE, Erckenbrecht JF, Scholten T, Fritsch WP. Sonographic measurements of the normal liver, spleen, pancreas and portal vein. *Radiology* 1983; 149(2): 537-40.
3. Petzoldt R, Lutz H, Ehler R, Neidhardt B. Determination of splenic size by ultrasonic Scanning. *Med Klin.*1976; 26.71 (48): 2113-6.
4. Kataoka M, Nakata Y, Maeda T, Hosoya S, Nishizaki H, Ono Y, et al. Ultrasonographic analysis of splenomegaly in patients with sarcoidosis. *Nihon Kyobu Shikkan Gakkai Zasshi.* 1990 May; 28(5): 750-5.
5. Rosenberg HK, Markowitz RI, Kolberg H, Park C, Hubbard A, Bellah RD. Normal splenic size in infants and children: sonographic measurements. *Am J roentgenol.* 1991; 157 (1): 119-21.
6. Singh A, Ansari H, Das JK, Chandra N. Ultrasonographic Measurement of Splenic length in relation with Height in Bihari Adult population a prospective study. *J. Anat, Soc. India.* 2011; 60(2): 188-189.
7. Spielmann AL, DeLong DM, Kliewer MA. Sonographic evaluation of spleen size in tall healthy athletes. *AJR Am J Roentgenol.* 2005 Jan; 184(1): 45-9.