“Normal Values of Spleen Size by US in Egyptian neonates, and Infants”

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Introduction

Sonography provides a quick as assessment of spleen dimensions without any risk of radiation. The normal range of spleen sizes in children determined with sonography has been reported elsewhere. However, available data are limited for the spleen in children, which causes difficulty in defining hepatomegaly and splenomegaly sonographically. Our purpose was primarily to document the normal range of dimensions of the spleen in children. The relationship of each dimension with sex,age,body weight, height, and body surface area was determined.

Objective

To evaluate splenic dimension by ultrasound in Egyptian neonate and infants.

Method

This prospective study involved 300 pediatric subjects (200 girls and 150 boys)with normal physicalor sonographic findings who were examined because of problems unrelated to the measured organs. The subjects were 1 days to 48 m old. The measured spleen was sonographically normal. At least two dimensions were obtained for spleen. Relationships of the dimensions with sex, age, body weight, height, and body surface area were investigated. Suggested limits of normal dimensions were defined. The study was carried out using a cross sectional research design and convenience sampling method at University hospital's of AZHAR between January 2016 and May 2019.

Exclusion criteria

Subjects with tropical splenomegaly syndrome (malaria and typhoid fever), lymphadenopathy, sickle cell disease, obesity, splenic parenchymal mass lesions, accessory spleen and cysts were excluded as normal subjects because of possible enlargement or reduction of the spleen.

Inclusion criteria

Subjects with no history of malaria, typhoid fever, malnutrition, sickle cell disease or obesity and subjects with no evidence of splenic parenchymal mass lesions, abnormal echotexture of the spleen, accessory spleen and cysts were included as normal subjects.

Equipment

The sonographic examinations were performed with high resolution real time scanner (mylab ESAOTY, Biomedical Electronics Co. Ltd, ITALY) manufactured in 2008 with 3.5,5,7 MHz convex transducers. Using the available freeze-frame capability, all the sonographic measurements were made with curvilinear probes using the electronic calipers. Demographic data were collected on each participant at the time of their pre-participation physical examination. This information included age, sex, height and body weight whereas BSA and BMI were computed from measured height and weight.

Method

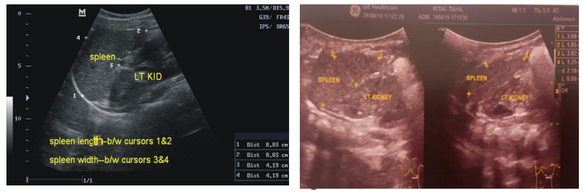
Scanning technique

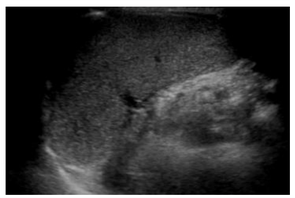
A coupling medium was first applied to the area being scanned to ensure good transmission of the ultrasound beam into the subjects.
The technique of right lateral decubitus position in the coronal plane was adopted for this study because of superior advantage of obtaining easily the longest dimension of the spleen and reproducibility of measurement Longitudinal size measurement was performed between the most superomedial and the most inferolateral points of the spleen. The transverse dimension was measured between the hilum and the most superolateral margin of the spleen. The choice of probe depends on the age and physique of the subjects.

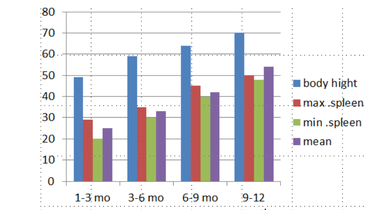
Results

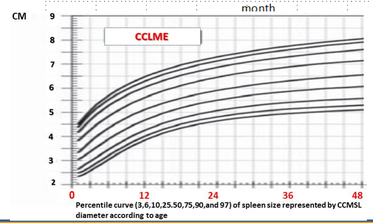
The results were analyzed for Dimensions of the measured spleen statistically different in boys and girls. Longitudinal dimensions of spleen showed the best correlation with age, body weight, height, and body surface area. Height showed the strongest correlation. This correlation was a polynomial correlation

age	Body height (cm)	No	Max length	Min length	Mean	SD	Expected Value of Mean	Lower meet	Upper meet
1-3M	49.2-59.9	50	2.9 cm	2cm	2.5 cm		2.5cm	2 cm	3 cm
3-6M	59.8-64.1	50	3.8 cm	3 cm	3.3 cm		3.3 cm	3.3cm	3.8cm
6-9M	64.1-70.1	50	4.5cm	4 cm	4.2 cm		4.3 cm	4 cm	4.5cm
9-12M	70.1-74.1	50	5 cm	4.8 cm	5.4 cm		5 cm	4.8cm	5 cm
12-15M	74.1-77.7	50	5.5 cm	5.3cm	5.5cm		5.5cm	5.3cm	5.5cm
15-18M	77.7-80.7	50	6.5cm	6.3cm	6.4cm		6.5cm	6.3cm	6.5cm
18-24M	80.7-85.1	50	7.5cm	7cm	7.3cm		7.5cm	7.3cm	7.5cm









discussion

by US such as supine, LT anterior oblique, RT lateral decubitus positions. A RT lateral decubitus position in the coronal plane was mostly preferred in previous studies because of superior advantage of obtaining easily the longest dimension of the spleen and reproducibility of measurement. Accordingly, a RT lateral decubitus position in the coronal plane was used as the plane of measurement in this study and strong correlations were found with the body parameters. This result is in accordance with the findings of Konus et al. In this study, spleen size was analyzed in terms of length and width which are simple, reproducible, reliable and objective measurements. Measurement of spleen length was reliable within and between sonographers.

Discussion

Measurement of spleen width was, however, less reliable as evidenced by only moderate intra- and inter rater reliability in this study. These findings support the historical assessment of visceral organ size based on longitudinal length measurement. Because the measurement of spleen width is less reliable, defining splenomegaly on the basis of spleen volume may be more uncertain.

Conclusion

Determination of pathologic changes in the spleen size necessitates knowing the normal range of dimensions for the spleen in healthy neonates, infants, Presented data are applicable in daily routine sonography. Body height should be considered the best criteria to correlate with longitudinal dimensions of the spleen

recommendation

The established normal parameters can be used to determine the pathologic changes in the size of the spleen in routine US ex. in this population. The methods of measurement and analysis used in this study are standardized and easy to apply. Findings are handy and reliable and are suitable particularly for US units with large numbers of patients. A longitudinal dimension of the spleen should primarily be correlated with patient height and findings to be compared with tables of normal parameters.

References

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