Streszczenie w języku angielskim

Abstract

Share wave sonoelastography in the assessment of liver, spleen and kidneys of healthy newborns by 2D-SWE method.

Introduction

Shear Wave Elastography, using the 2D-SWE (Two-Dimensional Share Wave Elastography) method, is a new, advanced imaging technique for non-invasive, quantitative evaluation the elasticity of organs such as the liver, spleen, kidneys and others. Current recommendations of ultrasound societies for SWE methods in the diagnosis of liver, spleen and kidney diseases are developed for adult patients, do not include newborns, infants and children.

Objective of study

The main purpose of the study was to obtain results for the liver, spleen and kidneys in healthy, full-term and free-breathing newborns, in a quantitative study of share wave elastography, using the 2D-SWE method and assess the feasibility of the study in this age group .

Additional objectives were: to establish a corellations obtained results with age, body weight, sex, time of feeding breaks and to determine whether there are significant differences in results between right and left liver lobes, between right and left kidneys, calculation of the spleen/liver index .

Material and methods

In a group of 58 healthy, full-term, free-breathing newborns, a 2D-SWE examination of the liver, spleen and kidneys was performed, in accordance with the developed test standard, (linear head, meal break of at least 60 minutes, for each organ a series of 5 acquisitions using ROI - Region of Interest, with a diameter of 5 mm, in the area of color map and wave propagation map – available quality elements of the apparatus manufacturer). The obtained results were presented in m/s and kPa, the feasibility of the study was assessed, taking as the basic criterion the reliability of measurements based on the IQR/Median index for the

value in kPa ≤ 30%, for the value in m/s ≤ 15%. Descriptive statistical methods and Spearman correlation analysis were used for statistical evaluation.

Results

Reliable results were obtained for right liver lobe in 68.97% of newborns, left lobe 67.24%, spleen 91.07%, right kidney 89.29%, left kidney 85.71% . Mean values of 2D-SWE were for right lobe of liver in m/s: 1.43, SD ±0.11, (min.1.19-max.1.66), in kPa 6.04, SD ±0.97, (4.1-8.1), left lobe in m/s 1.41, SD ±0.12, (1.17-1.64), in kPa 5.86, SD ±1,02, (3.90-7.90), for spleen in m/s 2.36, SD ±0.21(2.00-3.1), in kPa 16.99, SD ±3.21, (12.10-25.40), for right kidney in m/s 1.92, SD ±0.18, (1.52-2.31), in kPa 11.34, SD ±3,21, (7.00-16.20), for left kidney in m/s 1.88, SD ±0.16, (1.54-2.20), in kPa 10,81, SD ±1,80, (7,40-14,60). Spleen-hepatic index for results in m/s is mean 1.65, median 1.61, min.-max 1.31-2.25, SD ±0.20, for results in kPa: mean 2.82, median 2.63, min.-max. 1.75-5.19, SD ±0.73. There were no significant differences between the results obtained between the right and left lobe of the liver, between the right and left kidney, no dependence of the results on gender, time of break in feeding more than 60 minutes. The results of right and left lobe of liver were positively correlated with age, for other organs no correlation with age was found. Positive correlation of the results of the left liver lobe with body weight was found, for right liver lobe and other organs the results had no correlation with body weight.

Conclusions

2D-SWE examination of the liver, spleen and kidney using a linear transducer is a feasible technique in a group of healthy newborns. Reliable results of mean SWE values were obtained in healthy newborns. There were no significant differences between right and left liver lobes, between right and left kidney, differences for gender. The minimum 60-minutes duration of the newborn feeding break is sufficient to obtain reliable measurements. No correlation of the results with the duration of the feeding interval above this time has been shown. The methodology of the study may serve as a voice in the discussion in developing a standard for 2D-SWE examination in this age group.