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(Research Article)
Estimation of internal jugular vein pressure in healthy individuals and patients with multiple sclerosis (MS) using ultrasound image processin

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Abstract

Internal jugular vein pressure changes, as one of the central veins, indicate hemodynamic changes in the right side of the heart. Inflammation caused by MS (multiple sclerosis) causes the destruction of the endothelial layer of blood vessels. The aim of the study is to extract the pressure of the internal jugular vein from the changes in the diameter of the vein wall. 42 cases of internal jugular vein with relapsing MS (n=21) and healthy (n=21) groups were studied. Sequential B-mode ultrasound images with a minimum of 30 frames per second were recorded and stored from the jugular vein. The maximum and minimum diameters of the internal jugular vein were extracted from ultrasound images using the maximum gradient algorithm. By using the pressure-diameter relationship, internal jugular vein pressure was extracted. The maximum and minimum pressure of the jugular vein in the group of patients with MS were measured as 5.64 ± 1.62 and 5.05 ± 1.67 cmH_2O in the healthy group as 4.08 ± 1.12 and 3.58 ± 1.06 cmH_2O respectively ($p<0.05$). It is concluded that by using the processing of ultrasound images and estimating the temporal changes in diameter, it is possible to extract the pressure of the jugular vein.

Keywords: Internal jugular vein, Venous pressure, Ultrasound images, Multiple sclerosis disease.

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