

Mechanical function of internal jugular vein valve: Post analysis of M-mode imaging under cardiac monitoring

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dynamic behavior of the valve and its importance in regulating the cerebral blood out flow pathway.¹⁻³ However, the mechanism of the valve opening and closure, as well as the normal opening time, have not been investigated before. The aim of the present study was to investigate the IJV valve physiology in healthy young adults by means of ultrasound imaging.

Methods

Twenty-four healthy young adults (16 males, 8 females, 21.79±0.79 y.o.) were enrolled in this study. Each volunteer underwent B and M-mode ultrasound scan of the neck veins in a supine position. The data of IJV leaflets movement and IJV blood velocity were extracted from images with the associated ECG trace to analyze the opening and closure cycles of IJV leaflets. Two methods were introduced: open separation distance time (OSDT) and logical test to the

Background

Since the internal jugular vein (IJV) valve is the only protective valve between the brain and heart, recent studies have focused on the

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open separation distance fraction (OSDF) of IJV valve (Figure 1).

Results

The normal open time OSDT in this study included 70% of the dynamic valve cycle. Doppler early peak velocity occurred at the end of T wave and a late peak velocity occurred at the end of diastole (P wave) (values are shown in Table 1). This finding was present in 83% of the sample subjects.

Conclusions

The normal open time of the IJV valve might be a new physiological parameter paving the way for further studies in the field of cerebral venous return.

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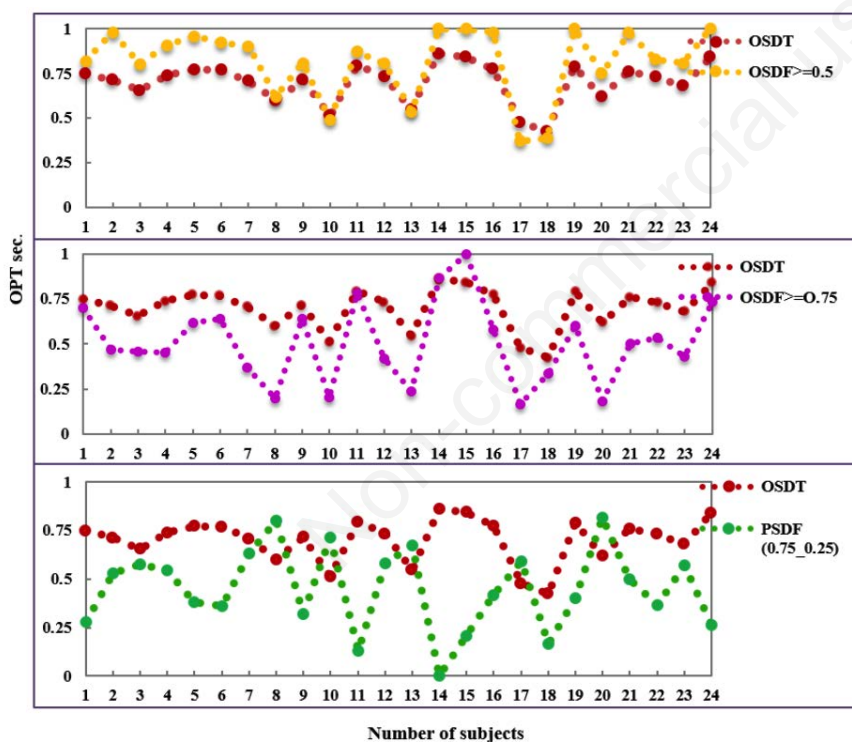


Figure 1. Open separation distance time of the valve (OSDT) in method 1 is plotted as a reference to open separation distance fraction (OSDF) of thresholds 0.5, 0.75 and 0.25. The chart shows a strong compatible trend between OSDT and OSDF≥0.5.

Table 1. Valve opening and closure separation distances times (OSDT, CSDT), separation distance (SD) and Doppler velocity.

	OSDT (sec)	CSDT (sec)	SD (cm)	Velocity (cm/sec)
Mean	0.70	0.30	0.45	58.5
± sd	0.12	0.12	0.20	34.97

Mean values and standard deviation (sd).