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# Internal Carotid Systolic Velocity Ratio for Assessing Carotid Artery Stenosis with Doppler Sonography

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## Abstract

**Background:** is a non-invasive, safe and inexpensive, technique. Direct examination of the extracranial carotid can be achieved, using high definition grayscale ultrasound, Doppler spectral analysis, and color flow Doppler sonography (CFDS). We in the current study tried to evaluate the utility of Peak Systolic Velocity Blood flow and Peak Systolic Velocity Ratio of ICA/CCA in diagnosing the carotid artery stenosis. **Methods:** A total of n=90 patients showed varying degrees of stenosis or occlusion of carotid vessels. The remaining 20 patients showed normal carotid arteries on the doppler study. The sonographic examination was done by a 7.5 Mhz linear array transducer of the Philips Hd7 Ultrasound System. All the examinations were performed with a doppler angle of $60^0$ and a sample volume of 1 to 5 mm. The data gathered from the duplex examination consisted of Peak Systolic Velocity of the common carotid artery and Peak Systolic Velocity of Internal carotid artery and velocity ratio between ICA and CCA (ICA/CCA). **Results:** The peak systolic velocity reading showed values of < 125cm/sec with less than 50% stenosis in n=43 cases, the peak velocity between 125 – 230 cms/sec with stenosis of 51 – 69% was found in n=8 cases. Peak velocity of 230 cm/sec with stenosis of 70% was found in n=1 case. Total block with > 80% stenosis was found in n=1 cases. Peak systolic velocity ratio of ICA/CCA out of n=57 cases <1.5 with <40% stenosis was found in n=29 cases. More than 1.5 with 41 to 60% stenosis was in n=10 cases and >1.8 with 61 to 80% stenosis was in n=11 cases. >3.7 and more than 80% stenosis was in n=4 cases and the total block was found in n=3 cases. **Conclusion**: Peak systolic velocity is a useful tool in the identification of carotid stenosis. Spectral trace was obtained in all patients and cardinal four-velocity parameters are important in the assessment of stenosis and spectral broadening was noted in all patients with significant stenosis. Peak Systolic Velocity Ratio of the internal carotid artery by common carotid artery was useful not only in identifying the patient of less than 40% stenosis with a ratio less than 1.5 but also in differentiating the patients who have more than 51% stenosis with the ratio of more than 1.5, from those who had more than 61% stenosis with ratio more than 1.8.