Role of duplex scanning in management of acute limb ischemia

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Master (MSc) Thesis, 2006

Abstract

Background: acute limb ischemia (ALI) defined as any sudden decrease or worsening in limb perfusion that causes a potential threat to limb viability. The treatment of ALI is an emergency situation; minimizing any delay in relieving the occlusion is essential, whereas risk of limb loss increases with the duration of the acute ischemia. The choice and priority of further management is largely based on the etiology of ALI (Thrombotic versus embolic occlusion). The role of duplex scanning in ALI has not been properly evaluated. We propose that non-invasive evaluation using duplex scanning could have a crucial role in the diagnosis and management of acute limb ischemia; it can help in differentiating embolic occlusion from thrombotic event.

Patients and methods: 97 patients presented by picture of non-traumatic acute limb ischemia were subjected to: history of factors predisposing to acute ischemia, risk factors for atherosclerosis, cardiovascular examination, functional classification of ALI according to SVS/ISCVS, local arterial examination, electrocardiogram, echocardiography with and without TEE, detection of the site of occlusion by using CW doppler, duplex scanning (B-mode, pulsed-doppler ultrasound and color doppler). For the occluded segment, the following points were evaluated: state of the arterial wall at the occlusion, the difference in diameter compared to the contralateral side, presence of calcification, length of occlusion, distal run-off, echogeneity of occluding material. The operative data obtained from the surgeon about the occluded segment and the causes of occlusion (embolus versus thrombus) were used to confirm the data given by duplex.

Results: this study recruited 97 consecutive patients with 107 occlusions; mean age was 50.3 ± 19.7 years with age range between 8 and 85 years. 54 occlusions (50.5%) were detected in males while 53 (49.5%) were detected in females. The prevalence of risk factors of atherosclerosis: 35 occlusions (32.7%) were detected in smokers, 39 (36.4%) were detected in hypertensive patients (HTN), 27 (25.2%) were in diabetics (DM), and 15 (14%) had previous history of cerebrovascular disease (CVD). 25.2% of the occlusions were class I, 43.9% were class IIa, 23.4% were class IIb, and 7.5% were class III. 35 cases of the total occlusions were detected in the popliteal artery (POP), and 24 in the superficial femoral artery (SFA). Causes of occlusion determined by surgery or angiography were classified into embolic on healthy artery (40 cases), embolic on atherosclerosed artery (15 cases), and thrombotic occlusion (52 cases). Grouping of the occlusions according to comparison between data obtained by duplex and data obtained by surgery and/or angiography: 55 patients with documented embolic occlusion (by surgery or angiography), 50 patients with documented thrombotic occlusion (by surgery or angiography), 2 patients who were diagnosed as embolic occlusion by duplex scan, and proved to be thrombotic by surgery or angiography (2 cases).

Conclusion: duplex scanning can play a crucial role in management of acute limb ischemia; it can accurately differentiate thrombotic from embolic occlusion, with sensitivity of 100% and specificity of 96.2% in embolic occlusion, while showed a sensitivity of 96.2% and specificity of 100% in thrombotic occlusion.

Keywords
acutelimbischemia, CardiovascularSurgery, transeosophageal, echocardiography, CW Doppler,