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Identifying the 'Vulnerable Plaque' in Asymptomatic Carotid Artery Disease Patients

Sir,

A number of randomised controlled trials (RCTs), conducted in the 1990s showed benefit of carotid endarterectomy (CEA) and best medical therapy (BMT) over BMT alone for patients with asymptomatic severe stenosis (70-99%) in preventing stroke.¹⁻³ Those RCTs were done before the routine use of statins and newer antiplatelet medications. It is observed over the last two decades that most patients remain stable on the current BMT, making interventions unnecessary in all patients. But few patients do become symptomatic even on contemporary BMT. Identifying and offering interventions to those selective patients is more beneficial.³ These patients usually have 'vulnerable plaques', having active inflammation, high lipid content, neovascularity, thin capsule or intra-plaque haemorrhage.¹

Many investigations have proved useful in identifying these lesions. Ultrasound (US) gives fair idea about the character of carotid plaque.² Soft plaques with high lipid content or intra-plaque haemorrhage are echolucent while fibrous tissues with calcification are echogenic with mixed areas of brightness and variations in texture.³ The plaque volume and area on ultrasound also point to an unstable plaque and predict the risk of rupture. Contrast-enhanced ultrasound can visualise plaque neovascularisation.⁴ High-resolution MRI can characterise intra-plaque haemorrhage, lipid rich necrotic core, calcification and surface disruption.⁵ High agreement between the MRI findings and histological measures of 'vulnerable plaque' has been demonstrated. Positron emission tomography (PET) imaging utilising [18F] Fluodeoxyglucose (FDG) is effective in demonstrating inflammation in carotid plaques.

Due to improved BMT and investigations technology, treatment of patients with high-grade asymptomatic carotid artery disease has shifted to 'selective' interventions, which is of paramount clinical importance.

CONFLICT OF INTEREST:

The author declared no conflict of interest.

AUTHOR'S CONTRIBUTION:

ZUR: Study concept, literature review, first draft writing, critical review, final approval and responsibility of all aspects of work.

REFERENCES

1. Kassem M, Florea A, Mottaghy FM, van Oostenbrugge R, Kooi ME. Magnetic resonance imaging of carotid plaques: Current status and clinical perspectives. *Ann Transl Med* 2020; **8(19)**:1266. doi: 10.21037/atm-2020-cass-16.
2. Rothwell PM, Eliasziw M, Gutnikov SA, Fox AJ, Taylor DW, Mayberg MR, et al. Analysis of pooled data from randomised controlled trials of endarterectomy for symptomatic carotid stenosis. *Lancet* 2003; **361(9352)**: 107-16. doi: 10.1016/s0140-6736(03)12228-3.
3. Liem MI, Kennedy F, Bonati LH, van der Lugt A, Coolen BF, Nederveen AJ, et al. Investigations of carotid stenosis to identify vulnerable atherosclerotic plaque and determine individual stroke risk. *Circ J* 2017; **81(9)**:1246-53. doi: 10.1253/circj.CJ-16-1284.
4. Coli S, Magnoni M, Sangiorgi G, Marrocco-Trischitta MM, Melisurgo G, Mauriello A, et al. Contrast-enhanced ultrasound imaging of intraplaque neovascularisation in carotid arteries: Correlation with histology and plaque echogenicity. *J Am Coll Cardiol* 2008; **52(3)**:223-30. doi: 10.1016/j.jacc.2008.02.082.
5. Saam T, Cai JM, Cai YQ, An NY, Kampschulte A, Xu D, et al. Carotid plaque composition differs between ethno-racial groups: An MRI pilot study comparing mainland Chinese and American Caucasian patients. *Arterioscler Thromb Vasc Biol* 2005; **25(3)**:611-6. doi: 10.1161/01.ATV.0000155965.54679.79.

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