Right-to-left shunt screening to transcranial Doppler sonography in subjects with MRI features of small vessel disease: cross-sectional data from a large Italian clinical cohort

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Objective: Right-to-left intracardiac shunt (RLS), in most cases sustained by a patent foramen ovale, is a known risk factor for ischemic stroke in the young [1]. However, its association with white matter lesions (WMLs) is still debated [2]. This study aimed to test the prevalence of RLS to transcranial Doppler sonography (TCD) in patients with non-specific neurological symptoms, who underwent MRI, and the correlation between the magnitude of the RLS and lesion load.
Materials/Methods: We retrospectively analyzed data from 502 outpatient patients (mean age 47.8 ±13 years; 226 males, 45% of the sample) with non-specific neurological symptoms who underwent brain MRI and TCD between January 2022 and December 2024. RLS was detected using TCD with saline contrast, while the severity of WMLs was graded using the modified Fazekas visual scale.
Results: RLS presence was detected in 39% of the patients (196 subjects) while 84.9% (426 subjects) had MRI abnormalities. No difference was found in demographics and clinical variables between patients with shunt and patients without RLS. Additionally, no association was found between RLS and MRI lesions. As expected, a significant ($p<0.001$) positive correlation was found between age and the Fazekas deep white matter score (i.e., higher scores with increasing age). No effect on the lesion load was found for sex, hypercholesterolemia, diabetes, obesity, and smoke, while a significant ($p=0.016$) association was detected for hypertension (OR 1.68 of having higher Fazekas scores). No significant association was found between RLS magnitude (both at rest and during Valsalva) and Fazekas score.
Discussion/Conclusions: In patients with non-specific neurological symptoms, we confirmed a high prevalence of RLS [1], although it was not associated with an increased risk or severity of WMLs on MRI. As such, paradoxical embolism may not be a major determinant of subclinical WMLs in this population. Thus, in patients with silent WMLs and no clinical suspicion of paradoxical embolism (e.g., cryptogenic stroke, migraine with aura, embolic features), TCD screening for RLS is generally not appropriate.

References:

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