Cardiology in the Young

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Reversing a historical association between CHD and brain abscess: fact or artefact?

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Letter to the Editor

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In their recent national analysis published in Cardiology in the Young, Ewing et al. (2025) reported an unexpected finding: children with CHD were less likely to develop a cerebral abscess compared with those without CHD (0.1% vs 0.3%, OR 0.29; 95% CI 0.23–0.36).[1] This observation challenges decades of clinical and pathophysiological understanding, since CHD, particularly its cyanotic forms, has long been regarded as a major predisposing factor for brain abscess in childhood.[2–4] Right-to-left shunting, chronic hypoxaemia, increased blood viscosity, and susceptibility to endocarditis have historically defined this association.

Rather than suggesting any biological advantage of CHD, the lower observed incidence creates a paradox when contrasted with well-established mechanisms and real-world clinical experience

The most plausible explanation lies in the intrinsic limitations of administrative, code-based datasets. The PHIS database, though robust in scale, lacks critical clinical parameters such as cyanotic versus acyanotic classification, surgical repair status, baseline oxygen saturation, and haemoglobin concentration factors that distinguish high-risk from low-risk phenotypes.[5] Pooling repaired and acyanotic cases with unrepaired cyanotic lesions inevitably leads to dilution, potentially obscuring the vulnerability of specific subgroups. Moreover, the dataset cannot establish temporal relationships between endocarditis, surgery, and abscess formation, thereby limiting causal inference.

In real-world practice, children with unrepaired or persistently cyanotic CHD remain at substantial risk for cerebral abscess, particularly in the presence of bacteraemia, endocarditis, or delayed corrective surgery.[2,3,6] Thus, the lower prevalence observed by Ewing et al. likely reflects an artefact of data structure rather than a reversal of biological susceptibility. While the declining incidence of brain abscess underscores the success of modern paediatric care, CHD itself should not be interpreted as less clinically relevant in this context.

Notably, population-based data, such as the national Danish cohort by Bagge et al., continue to demonstrate an increased hazard ratio for cerebral abscess in children with CHD even in the post-2000 era, reinforcing that methodological differences rather than a true epidemiologic reversal underlie the apparent paradox.[7]

In conclusion, this inverse association may signal progress in health-care delivery but is more plausibly a by-product of dataset composition and coding limitations. Future phenotype-specific, prospective investigations incorporating anatomic, surgical, and physiologic data are warranted to determine whether this finding represents a genuine epidemiologic transition or merely a statistical illusion.

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