Background

- Congenital heart disease (CHD) is the most prevalent congenital malformation and the leading cause of infant mortality.¹
- As a consequence of surgical advancements, a steady increase in prevalence and decrease in mortality of CHD is evident.¹,²
- Children with CHD are at risk of brain injuries.
- The extent and nature of these brain injuries remain unclear due to small sample sizes, single time-point focus, and varying neuroimaging modalities.

Objective

To determine the prevalence and nature of brain injuries in children with CHD as detected on magnetic resonance imaging (MRI) during prenatal, postnatal-preoperative, and postoperative periods.

Methods

- Search Strategy: Electronic database search of CINAHL, EMBASE, PsycINFO, PubMed, and SCOPUS using Boolean techniques in the format of population AND exposure AND outcomes (e.g., child AND heart defects, congenital AND brain AND neuroimaging).
- Inclusion: Peer-reviewed original articles, published in English from inception to 12/2019, comprising non-syndromic children <21 years with CHD and reporting brain injury on structural MRI, during prenatal, postnatal-preoperative, and postoperative periods.
- As shown in Figure 1, 88 independent studies qualified for this meta-analysis.

Findings: Prevalence of Brain Injury

- Brain injuries are prevalent in more than a fifth of children with CHD across both prenatal and postnatal periods.
- A further increase is evident postoperatively, indicating the potential adverse impact of surgical intervention on brain outcomes.
- Pooled sample size 371, 1865, and 1973 children with CHD for prenatal, postnatal-preoperative, and postoperative analysis, respectively.
- Pooled prevalence of brain injuries 22% for prenatal, 35% for postnatal-preoperative, and 50% for postoperative period [Figure 2-4].
- Predominant brain injury ventriculomegaly (10%) for prenatal and white matter injury for both preoperative (24%) and postoperative (30%) [Figure 5-7].

Findings: Nature of Brain Injury

- Pooled prevalence of brain injuries 22% for prenatal, 35% for postnatal-preoperative, and 50% for postoperative period [Figure 2-4].
- Predominant brain injury ventriculomegaly (10%) for prenatal and white matter injury for both preoperative (24%) and postoperative (30%) [Figure 5-7].

References


Study contact: g.dagur@uq.net.au

None of the authors have any conflict of interest to declare.