Postnatal Outcome in Patients with Aortic Stenosis Undergoing Fetal Aortic Valvuloplasty: A Systematic Review and Meta-Analysis

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Introduction

Fetal aortic valvuloplasty (FAV) became the treatment of choice at selected centers around the world to improve fetal hemodynamics results in LV’s potential to become suitable for a postnatal repair, preserving a biventricular circulation (BVC). To this date, however, it is unclear in how many patients undergoing FAV (BVC) can become suitable for a postnatal repair, preserving a biventricular circulation worldwide, a biventricular circulation is ultimately achieved.

- The goal of this systematic review/meta-analysis is to determine whether there is sufficient clinical evidence to predict postnatal outcome in patients with AS following FAV to provide adequate prenatal counseling for this patient cohort.

Methods

The methodology published by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement was applied. A systematic search on prenatal and postnatal outcome in patients with AS following FAV was performed using MEDLINE, EMBASE, Web of Science and Cochrane Library:

- accessed by reading abstracts, excluding duplicates, and if suitable, full text articles were obtained and included;
- publications from 2000 to 2020 including at least 12 months of follow-up; review papers, comments, books, editorials and case reports were excluded.
- The primary endpoint was type of postnatal circulation.
- The quality of articles was assessed using the Critical Appraisal Skills Programme tool (CASP checklist). To estimate the overall proportion of each endpoint, meta-analysis of proportions was employed using a random-effects model.

Results

The primary endpoint was type of postnatal circulation. To this date, however, it is unclear in how many patients undergoing FAV (BVC) can become suitable for a postnatal repair, preserving a biventricular circulation.

Maternal FAV-related complications are rare and the majority of fetuses undergoing FAV are born alive. BVC following successful fetal intervention can be achieved in 52% of live-born patients compared to UVC.

In summary, the current available published information can serve for prenatal parental counseling in this patient cohort. However, randomized clinical trials are necessary to address this question.

Selection Process of eligible articles

Figure 1. PRISMA flow diagram for identifying articles eligible for inclusion.

Figure 2. Flow Diagram Summarizing Pre- and Postnatal Management for the Entire 266-Patient Cohort. *1 fetus lost to follow-up, 1 fetus excluded as still in utero. **Late deaths were included into the two outcome groups as reason of death was not always described (Additional File X3).

Abbreviations: BVC, biventricular circulation; FAV, fetal aortic valvuloplasty; NND, neonatal death; UVC, univentricular circulation; TOP, termination of pregnancy.

Figure 3. Forest plots of population-based CC prevalence for biventricular circulation of subjects born alive among the entire cohort.

Conclusion

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