When the unexpected happens: intracardiac ECMO venous cannula kinking.

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Abstract

A term newborn with a right-sided CDH and severe pulmonary hypertension with systemic hypotension required veno-arterial ECMO. Despite appropriate cannulas size, high drainage pressure exceeding 60 mmHg was needed to maintain an ECMO flow at 120 ml/kg/min. Pericardial tamponade and misplacement of the venous cannula within the azygos vein were detected. Open thorax surgery was performed, and the cannula was repositioned. Postoperative X-rays showed an anomalous tip position of the cannula, suggesting the kinking inside the right atrium (Fig. 1). Reintervention was needed to restore the cannula. Cannula problems complicate about 12.8% of all neonatal respiratory ECMO. Both cannula malposition and kinking can affect the proper functioning of the ECMO support, and they should be carefully ruled out anytime suboptimal venous drainage and insufficient ECMO flow are experienced. Nevertheless, their diagnosis can be challenging, and both X-ray and echocardiography are essential tools. In particular, incidental azygos vein cannulation represents a possible rare ECMO complication in right-sided CDH and should always be kept in mind in this specific population. The decision to reposition or replace the cannula is mandatory, although not risk-free, in case of inadequate venous drainage or case of possible cardiac or vessel perforation.

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A term newborn with a right-sided CDH and severe pulmonary hypertension with systemic hypotension required veno-arterial ECMO. Despite appropriate cannulas size, high drainage pressure exceeding 60 mmHg was needed to maintain an ECMO flow at 120 ml/kg/min. Pericardial tamponade and misplacement of the venous cannula within the azygos vein were detected. Open thorax surgery was performed, and the cannula was repositioned. Postoperative X-rays showed an anomalous tip position of the cannula, suggesting the kinking inside the right atrium (Fig. 1). Reintervention was needed to restore the cannula. Cannula problems complicate about 12.8% of all neonatal respiratory ECMO[1]. Both cannula malposition and kinking can affect the proper functioning of the ECMO support, and they should be carefully ruled out anytime suboptimal venous drainage and insufficient ECMO flow are experienced[2].

Nevertheless, their diagnosis can be challenging, and both X-ray and echocardiography are essential tools[3,4]. In particular, incidental azygos vein cannulation represents a possible rare ECMO complication in right-sided CDH and should always be kept in mind in this specific population[3]. The decision to reposition or replace the cannula is mandatory, although not risk-free, in case of inadequate venous drainage or case of possible cardiac or vessel perforation[5].

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

AM, GR, SG, FS, IA, LM, FMo and GC contributed conception and design of the manuscript; VP, CB, CC, and FMa collected the data retrospectively. AM, GR, FS, IA, SG, and GC wrote the first draft of the manuscript. All authors contributed to manuscript critical revision, read and approved the submitted version.

Legend of figure

Figure 1. Anteroposterior (A) and lateral (B) chest X-ray: Venous cannula (10 Fr Biomedicus, Medtronic®) inserted in the jugular vein (a), arterial cannula (8 Fr Biomedicus, Medtronic®) inserted in the carotid artery (b), right thorax drainage catheter (c), pericardial drainage catheter (d), and cannula tip (arrow). Even if in (A) and (B) the radiopaque portion of the venous cannula suggests a correct position, the tip (arrow) of the venous cannula is (unusually) above the radiopaque portion of the venous cannula, thus suggesting a venous cannula kinking.