

EP 10.08. Brain damage biomarkers response after umbilical cord cannulation in lamb fetuses transferred to an artificial placenta system

Sanin-Ramirez D, Illa M, Aghajani F, Moran M, Micheletti T, Nogueira MC, Del Rio R, Velilla M, Randanne Paula C, Bobillo-Perez S, Cobo T, Valenzuela I, Duran E, Sese B, De Roo-Puente Y, Bonet-Carne E, Gratacos E, Eixarch E

BCNatal | Fetal Medicine Research Center (Hospital Clínic, Hospital Sant Joan de Déu and Universitat de Barcelona), Barcelona, Spain; Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), Barcelona, Spain.

Objective

Transferring a fetus to an Artificial Placenta (AP) system requires umbilical vessel cannulation and manipulation, which creates a brief period of fetal hypoxia, potentially affecting fetal brain perfusion. We aimed to evaluate the effect of umbilical cord cannulation on serum levels of brain damage biomarkers in lamb fetuses transferred to an AP system.

Methods

- 16 consecutive lamb fetuses (105-125 days of gestational age) transferred from the maternal womb to an AP system.
- Umbilical vessels were sequentially cannulated, in the first period one vein and one artery ("partial cannulation"), followed by cannulation of the second artery ("total cannulation").
- Procedure duration (partial cannulation and total cannulation times) and surgical complications were recorded. Serum levels of brain damage biomarkers including S100B and neuronal specific enolase (NSE) were evaluated at baseline, 30 minutes after connection, and 6, 24 and 72 hours throughout the AP run.

Conclusion

Umbilical cord cannulation required to transfer a fetus to an AP system was associated with changes in brain injury biomarkers, showing a pattern similar to those described in the literature for extracorporeal circulation in neonates and adults. These findings suggest that umbilical cord cannulation is unlikely to cause severe or persistent brain damage and provide valuable insights into the safety of this procedure.

Results

S100B levels increased rapidly at 30 minutes and gradually decreased within 72 hours in AP, while baseline NSE levels were the highest, with a second peak at 24 hours, and finally decreased by 72 hours.

