Title: Is Nitric Oxide the game changer in Extracorporeal Circulation?

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Abstract:

Low cardiac output syndrome and the systemic inflammatory response are well recognized consequences of extracorporeal support. The mechanisms responsible are multifactorial but recent studies have shown that Nitric Oxide may be a key component in mitigating some of these processes.

Following on from literature reports detailing the use of inhaled Nitric Oxide added to the gas phase of the extracorporeal circuit(1), The Royal Children’s Hospital in Melbourne set about developing a technique to perform this safely and efficiently. This presentation will outline our initial concept and the development process leading to our final system.

In the setting of Cardiopulmonary Bypass, the technique was validated in a randomized prospective trial looking at 198 children(2). The positive results observed in this trial then stimulated our group to incorporate NO into all ECMO circuits(3). This though presented additional technical challenges which will be described.

The success of the technique in both settings has now prompted a multicenter randomized controlled trial looking at the addition of Nitric Oxide to the CPB circuit. This study aims to recruit 1470 children over a 4 year period with a reduction in length of ventilation being the primary end point and a reduction in low cardiac output state, use of ECLS and death as secondary outcomes.

It is hoped that this trial will elucidate the role that NO plays when added to the sweep gas of the oxygenator for extracorporeal circulation.