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Effective neurally-adjusted ventilatory assist weaning off mechanical ventilation in separated conjoined thoraco-omphalopagus twins with sternal MEDPOR implant patch

Here we describe our experience on weaning off mechanical ventilation of two separated thoraco-omphalopagus conjoined twins (18 months old, sister 1 weighing 8 kg, sister 2 7 kg) and repaired with sternal MEDPOR implant patch in October 2018 in our Hospital.

The conjoined pericardium was divided and a Pericardiocel membrane were applied to close the pericardium defects while the sternal defects have been closed with MEDPOR implant patch fixed with titanium bars and sutured to sternal arch on each sister.

Their intraoperative time passed on uneventful, notwithstanding the sister 2 required adrenaline support to manage low cardiac output syndrome due to longer pericardium manipulation than sister 1. After 10 hours of multidisciplinary surgical procedure they were admitted in the Pediatric Intensive Care Unit and begun a shared postoperative plan for 48 hours of complete analgesia and sedation with morphine and midazolam, and controlled mechanical ventilation prior allowing any weaning off mechanical ventilation attempt.

The weaning off mechanical ventilation has been deeply discussed among the intensivists, considering a new respiratory physiology, new heart-lung interaction and sudden remodeling of chest anatomy of the separated sisters: hence, our experience with neurally-adjusted ventilatory assist (NAVA) in previous challenging cases led us to consider it as effective weaning strategy.[1, 2]

The NAVA nasogatric tube was applied to each sister on postoperative day (POD) 2 and NAVA support was started according to the electrical activity of the diaphragm; in the meanwhile, sedative tapering was assessed based on the guidelines of the Italian Society of Neonatal and Pediatric Anesthesia and Resuscitation (SARNePI).

On POD 3, sister 1 was scheduled for weaning of mechanical ventilation with a NAVA setting prior to extubation with peep 5 cmH_2O, trigger Edi 0.5 mcV, NAVA level 1 cmH_2O/mcV, and FiO_2 0.3. She was treated with conventional full-face mask non-invasive ventilation,

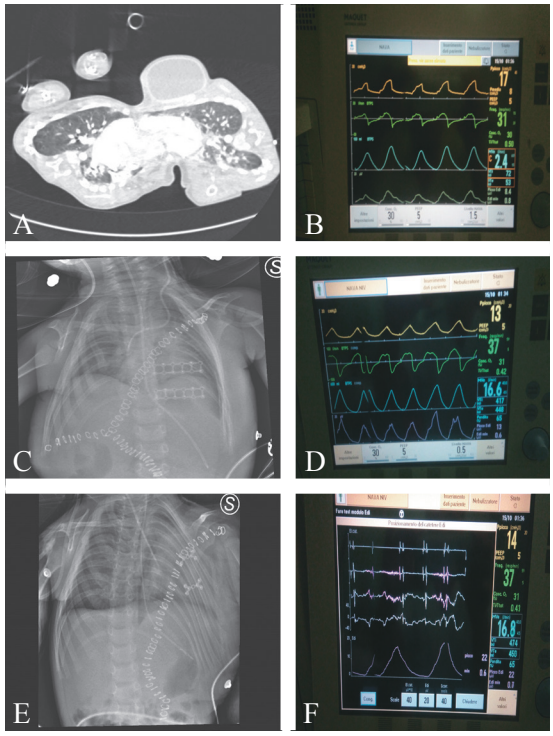

Figure 1.—Use of postoperative invasive and non-invasive NAVA ventilation on the two separated twins: A) preoperative CT image; B) sister 1 NAVA setting for invasive ventilation; C) chest X-ray image during sister 2 Helmet NAVA non-invasive ventilation; D) sister 1 NAVA non-invasive ventilation setting; E) chest X-ray during sister 1 Helmet NAVA non-invasive ventilation; F) sister 1 NAVA non-invasive ventilation Edi catheter positioning.

with pressure support 10 cmH_2O and peep 5 cmH_2O, notwithstanding she developed worsening of pulmonary function with respiratory failure rapidly, due to atelectasis occurrence, and required intubation again with mechanical ventilation.

In order to enhance the following weaning off mechanical ventilation outcomes in both sisters, we planned again invasive NAVA ventilation and non-invasive NAVA ventilation, for both sisters, too.

During invasive NAVA ventilation they both were tapered for analgesia and sedation, introducing also dexmedetomidine to lead them as calm as possible to extubation. Helmet interface, a more tolerate and requiring less sedation device among children according to current literature, was the choice for non-invasive ventilation NAVA on POD 7 and POD 11 for sister 1 and sister 2, respectively (Figure 1). non-invasive ventilation NAVA were delivered by 'infant high' size Helmets, peep 5 cmH_2O, 1.5 mcV/cmH_2O NAVA level in the immediate post-extubation time, and the flow limit rose up to 40 L/min in order to manage air leak and allow Helmet correct inflation. In our opinion, the use of non-invasive ventilation NAVA, supported the sisters reducing auto and double triggering, late and premature cycling, and ineffective efforts,[3] leading them to an actual close to new physiologic respiratory pattern surgically created.

As a matter of fact, both patients have been managed in complete comfort, no atelectasis development were found, enteral nutrition were widely tolerated, and they shifted to high flow nasal cannula regularly on the second and third day after extubation, respectively.

To date, this is the first case of management of separated conjoined thoraco-omphalopagus twins with NAVA. The recent literature[4, 5] seems to confirm its role in effectively reducing patient-ventilator dyssynchrony, atelectasis development, and in allowing sedative drug saving in pediatric intensive care among challenging patients with rare congenital malformations of chest and undergone actual invasive thoracic surgery.

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Incomplete clinical evaluation regarding protective effects of dexmedetomidine on stress and inflammatory responses

We have read with great interest the presented studies regarding the effects of an alpha-2 adrenoceptor agonist dexmedetomidine (DEX) on inflammatory mediators and stress responses in patients undergoing non-cardiac surgery.[1, 2] However, we have several questions regarding two articles from the same institute.[1, 2]