

Mechanical cardiorespiratory supports in general thoracic surgeon

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Provenance and Peer Review: This article was commissioned by the editorial office, *Current Challenges in Thoracic Surgery*, for the series "Mechanical Extracorporeal Cardio-Respiratory Supports in General Thoracic Surgery". The article did not undergo external peer review.

Received: 02 August 2020; Accepted: 02 September 2020.

doi: 10.21037/ccts-2020-mec-06

View this article at: <http://dx.doi.org/10.21037/ccts-2020-mec-06>

The application of Extra-Corporeal Life Supports (ECLS) has been increasing in the last few years (1,2). Historically, extracorporeal circulation was introduced for the management of severe intraoperative hemorrhagic complications resulting in extremely poor outcomes. However, with further application of these devices in lung transplantation, thoracic surgeons have gained more experience becoming more confident in the management of extracorporeal circulation especially in Extracorporeal Membrane Oxygenation (ECMO).

It has been confirmed in literature the efficacy of extracorporeal circulation intra-operatively in lung transplantation and challenging airway surgery; this in fact confirmed by its safety due to multiple factors including low-risk of bleeding, minor risk of thrombosis and better biocompatibility for the patient (3).

ECLS include: standard extracorporeal circulation machine, ECMO, pumpless interventional lung assist devices, extracorporeal CO₂ removal devices and others (1,2,4).

The use of mechanical cardiorespiratory support generally and more specifically the ECMO, in the last decade, has been gaining more popularity in thoracic surgery; this of course due to the excellent results published by major thoracic surgery centers (1,2,5). Indeed, the intraoperative use of ECMO has become a common practice in complex airway surgery in order to avoid complex ventilation techniques intra-operatively or jet ventilation as well as to facilitate the airway anastomosis with a tubeless

surgical technique and ensure better hemodynamic and respiratory stability to patients (5).

Simultaneously, the use of ECLS supports have become a tool widely used in the pre-operative setting for the stabilization of thoracic emergencies such as the major thoracic traumas with respiratory failure, severe tracheal stenosis, massive pulmonary embolism, etc. These techniques allow stabilizing the patient and avoiding major complications leading to high rate mortality. Post-operatively, the use of ECMO in different settings has become a common and effective practice in the treatment of ARDS and other diseases such as massive pulmonary embolisms and more recently in the treatment of septic shock patients (1,2,6-9).

Thoracic surgery ECMO supports finding an increase application in the management of post-operative complications following lung resections and in patients undergoing major surgery for neoplastic disease (1,2,10,11). In fact, to date there is no evidence to support that the intra-operative or post-operative use of assisted circulation systems might lead to dissemination of neoplastic cells leading to increased risk of metastasis; hence, extracorporeal circulation has been used and reported in the literature to perform oncological thoracic operations that required resection of the large vessels or part of the cardiac chambers and therefore required cardioplegic arrest or circulatory support during the surgical procedure (1,2,12).

In addition, thoracic surgeons should be an integral part of the multidisciplinary group in the ECMO reference

centers for the management of an eventual complications that the supported patients might develop during their hospital stay (13,14).

Therefore, thoracic surgeons nowadays should be trained and develop skills in the management, indications and techniques inherent to the various types of cardio-circulatory and respiratory support (15). In summary, these devices definitely should be additional armamentarium in the surgeon hands in order to offer the best outcome and manage different clinical and surgical scenarios and not being limited to only lung transplantation.

Acknowledgments

Funding: None.

Footnote

Conflicts of Interest: The authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/ccts-2020-mec-06>). The series “Mechanical Extracorporeal Cardio-Respiratory Supports in General Thoracic Surgery” was commissioned by the editorial office without any funding or sponsorship. Drs. AD and NA served as the unpaid Guest Editors of the series. The authors have no other conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/ccts-2020-mec-06

Cite this article as: Dell'Amore A, Asadi N. Mechanical cardiorespiratory supports in general thoracic surgeon. *Curr Chall Thorac Surg* 2020.