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EDITORIAL

Increasing the number of valid lungs for transplantation: a necessity☆

Incrementar el número de pulmones válidos para trasplante: una necesidad

F. del Rio Gallegos

Coordinación de Trasplantes, Hospital Clínico San Carlos, Madrid, Spain

Solid organ transplantation is currently a well-established management option for a range of diseases. Lung transplantation in many cases proves life-saving, and in some cases is indicated on a rescue basis—representing the only possible treatment option in end-stage respiratory failure. Of all the solid organs amenable to transplantation, the lungs represent one of the least frequent interventions, because of their extreme fragility. Mechanical ventilation – essential during the period in which the donor is admitted and up until brain death – and the risk of infection associated to ventilation both exert deleterious effects upon lungs amenable to transplantation. In the year 2010 there were a total of 1502 organ donations in Spain, of which only 323 (21.5%) represented potential lung donations. In turn, of these 323 organs, only 201 reached the transplantation phase (13.3% of the total donations that year).[1] The existing shortage of organs valid for transplantation, and the consolidation of this kind of treatment as the only valid option for many patients, have made it necessary to explore new possibilities among the so-called marginal or expanded criteria donors.

The obtainment of organs from donors after cardiac death or from non-heart beating donors,[2] and the harvesting of lungs from elderly patients, are currently evaluated options that offer excellent results.

Among the usual criteria for discarding potential lung donors, smoking, radiological alterations and prolonged tracheа intubation have been those most often transgressed by different surgical groups—with good clinical results.[3,4] One of the most firmly remaining exclusion criteria is donor age—defined as 55 years, maximum. Miñambres et al.[5] studied the short, middle and long term outcomes obtained with lungs from donors over age 55 years. The results were seen to be good, and the authors concluded that resorting to such donors undoubtedly represents a valid option for dealing with the existing organ shortage. In their study, involving 33 lung transplant recipients with adequately selected donors aged 55 years or older, the survival data were found to be similar to those obtained with lungs from donors under 55 years of age.

However, the important loss of lungs potentially valid for transplantation purposes among non-marginal donors who die in Intensive Care Units has made it necessary to develop guides and recommendations aiming to minimize the damage caused by mechanical ventilation, in an attempt to increase the number of available organs. Previous studies have demonstrated the need and usefulness of applying protective measures in the brain death donor, with a view to increase the number of valid lungs for transplantation. Thus, Mascia et al.[6,7] and Noiseux et al.[8] place special emphasis on the usefulness of protective ventilation and recruitment maneuvers.

In Spain in 2006, the National Transplant Organization gathered a group of experts from different scientific societies with the purpose of developing a protocol for the maintenance of chest organ donors.[9,10] This protocol has been introduced in most Departments of Intensive Care Medicine in the country, and has made it possible to increase organ recovery and to expand the overall number of lung

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E-mail address: frio.hcsc@salud.madrid.org

transplantations performed. Undoubtedly, protective ventilation following the current recommendations for the management of patients with acute respiratory distress syndrome,[11] and the use of recruitment maneuvers and apnea test in ventilator CPAP mode, avoiding depressurization of the airway,[12] have contributed to increase the number of valid lungs. Other measures, applied by different groups, such as selective digestive decontamination for the prevention of ventilation associated pneumonia, also may be effective in securing a larger number of organs.[13,14] Without doubt, the cold ischemia time between organ explantation and implantation in the recipient plays a decisive role in the appearance of reperfusion damage. Devices are being developed, designed to maintain organ preservation with blood or preservation fluid, in order to attenuate the deleterious effects of cold ischemia.[15] Additional measures, such as adequate selection of the preservation fluid for maintaining the lungs during the cold ischemia phase, might possibly improve the transplantation results, and in future expand the inclusion criteria and thus the pool of valid organ donors.[16] It remains to be determined whether procedures aiming to ensure even more meticulous hemodynamic management of the donor, with monitorization of extravascular pulmonary water in order to keep it to a minimum, are able to contribute to rescue a larger number of organs.

The experience of the transplant teams has made it possible to expand the theoretical limits for lung donation, with the successful inclusion of donors above 55 years of age.[5] Careful evaluation of the donor, with the application of strict protocols to harvest a single lung in patients with unilateral damage, or in patients with pulmonary thromboembolism subjected to post-explantation pulmonary thromboembolectomy, are a clear illustration of the need for valid organs for transplantation and of the efficacy of the transplant teams in dealing with a healthcare problem of exceptional relevance.

There is no doubt as to the importance of establishing procedures for rescuing patients on the lung transplantation waiting list, or of the key role played in this sense by the Departments of Intensive Care Medicine as the natural setting where brain death donors are maintained, and as the reference for the development of specific procedures allowing us to increase the number of valid lung donors.

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