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CORRESPONDENCE

Delayed chest wall closure for oversized donor lungs after bilateral lung transplantation

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A 17-year-old boy with bilateral bronchiectasis was admitted for bilateral lung transplantation (BLTx). Chest radiography (CXR) demonstrated localized right pneumothorax, diffuse bronchiectasis with fibrosis, and a large bullous formation of the bilateral lungs (Fig. 1A), as well as severe thoracic kyphosis, a long-term consequence of maintaining his sitting posture in bed (Fig. 1B). Although the body weight, height, and chest circumference of the donor (65 kg, 162 cm, and 74 cm) and recipient (40 kg, 167 cm, and 76 cm) were well-matched in the latter two attributes, the shapes of their respective thoracic cavities were quite different (Fig. 1C). A BLTx was performed through a clamshell incision, and the ischemic times for the left and right graft were 265 minutes and 440 minutes, respectively. Profound graft edema occurred immediately after the implantation of the donor lungs, which worsened the size disparity that was already present because of the mismatched lung volumes between the donor and the recipient. Rather than closing the chest wall, the skin was temporarily closed using a Slush Plain Drape (Mnlase Inc., Reston, USA), which was sewn to the skin using a running suture. An Ioban drape (3M, St. Paul, Minnesota) was then placed over the wound (Fig. 1D), and the patient was sent back to the intensive care unit for postoperative care. Once the pulmonary edema improved, the clamshell wound was closed on postoperative day (POD) 2 without the need to tailor the donor lungs. The patient was weaned off the ventilator and eventually discharged on POD 36. The distance covered in the 6-minute-walk test was 550 m, and pulmonary functions test showed a forced vital capacity (FVC) of 2.55 L (60% of the predicted value) and a forced expiratory volume in 1 second (FEV1) of 2.49 L (65% of the predicted value) post-transplantation improved of pulmonary function.

Primary chest closure is the standard procedure for clamshell wound closure immediately after BLTx. However, for a LTx recipient receiving an oversized donor graft, such a closure can cause life-threatening complications, such as cardiopulmonary instability due to cardiac tamponade by oversized lung donors, pulmonary atelectasis followed by secondary infections, and poor healing of bronchial anastomoses. To avoid these complications, intraoperative size reduction surgery, such as anatomic lobectomy or segmental resection of allograft lung, or surgical reduction of volume by trimming the donor lungs are often considered before primary chest closure. However, tailoring the donor lungs to fit the recipient's thoracic cavity immediately after LTx has specific risks. During procurement and before implantation, the donor lung grafts require large amounts of cold organ perfusates. Moreover, the donor organs are stored in ice (at 4°C) for at least some time during the delivery process from the donor's hospital to the recipient's

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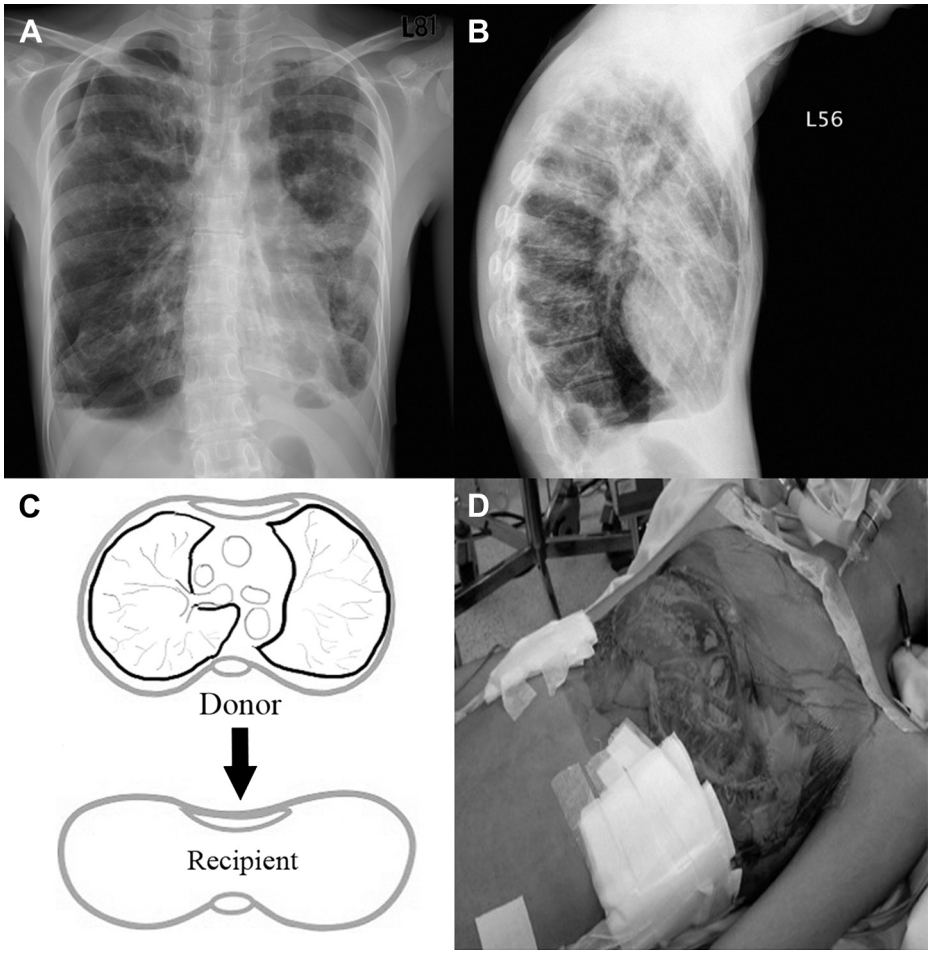

Figure 1 (A) The PA view of recipient's CXR before transplantation. (B) The lateral view of recipient's CXR before transplantation. (C). Cartoon depictions of recipient and donor thoracic cavities viewed in cross section. (D) The chest wall is temporarily closed with a Slush Plain Drape.

operating theater. Both procedures are unavoidable and cause varying degrees of donor lung edema and ischemic—reperfusion lung injury (IRLI) within the first 24 hours after transplant.[1] Performing size reduction surgery on such lungs immediately after transplant introduces the possibility of poor tissue healing, surgery-related pulmonary inflammation, or "over-trimming" of donor lungs. Delayed chest closure may prevent cardiopulmonary compression and provide better ventricular function for the newly implanted lungs. It may also allow more precise trimming of donor lungs for size mismatch once the edema of the lung graft has resolved and IRLI has regressed. Furthermore, other recent reports suggest that delayed chest closure does not increase risks of wound infections or sternal complications;[2,3] nor does it diminish post-LTx survival in comparison to that of primary chest closure.[4,5] In conclusion, delayed chest closure after LTx is feasible for the management of oversized donor lungs, with no reported difference in infection rates or mortality as compared to primary chest closure. It may also prevent unnecessary allograft resection or "over-trimming" of the donor lungs during initial transplant.

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