A Case of Living-Donor Segmental Lung Transplantation and Concomitant Nuss Procedure in a Pediatric Patient with Pectus Excavatum

Objective: Severe chest wall deformities are considered a contraindication for lung transplantation. We herein report a pediatric patient who underwent living-donor segmental lung transplantation and simultaneous correction of a severe pectus excavatum.

Case Video Summary: A ten-year old boy with severe pectus excavatum was referred to us due to drug-induced interstitial pneumonia after chemotherapy for neuroblastoma. While on a wait-list of deceased-donor lung transplantation, he developed intractable pneumothorax and became bedridden. It was unlikely for the patient to survive until deceased-donor was allocated, thus we planned living-donor lung transplantation. His chest cavities were very small due to the progression of restrictive lung disease and pectus excavatum. The donors were his old sisters in their twenties. It was obvious that donors' lower lobes were two large for the boy. We planned to use bilateral basal segmental grafts, however, anatomical size-matching based on CT volumetry was estimated to be 255%. Expanding boy's chest cavities appeared to be mandatory to implant oversized segmental grafts. Therefore, we planned to perform concomitant Nuss procedure. In donor basal segmentectomy, intersegmental plane was developed in vivo by a cautery based on indocyanine green orientation and S6 segment was preserved. The divided intersegmental planes were then covered with fibrin glue and absorbable pieces of polyglycolic acid sheet in order to prevent air leakage. Bilateral basal segmental graft implantation was performed though the clamshell incision under cardiopulmonary bypass (CPB). The implant technique of the basal segment was similar to that of the lower lobe graft. The basal segments were vertically rotated 90° after implantation. Right pulmonary venous anastomosis required an auto-pericardial conduit. After discontinuation of CPB, 2 pectus bars were placed to expend chest cavities. Delayed chest closure was required and the chest was closed on postoperative day (POD) 7. The patient discharged home without oxygen therapy 2 months after the transplantation. Six months after the operation, the boy is able to carry out daily activities. As for the two donors, postoperative course was uneventful and preserved S6 segments expanded well.

Conclusion: Living-donor segmental lung transplantation with concomitant Nuss procedure is feasible for a selected patient with pectus excavatum.

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