resolution of the alveolar and interstitial hematoma. Although the lesions themselves do not require treatment, necrotizing pneumonia or secondary infection should be considered in patients with a troubled clinical course.⁴

This work by Schwarz and colleagues will be instrumental in encouraging the use of this often-overlooked donor pool. We look forward to the publication of more series to help standardize acceptable parameters for contused lungs and better guide donor evaluation.

References

1. Schwarz S, Rahimi N, Kifjak D, Frommlet F, Benazzo A, Jaksch P, et al. Lungs from polytrauma donors with significant chest trauma can be safely used for transplantation. *J Thorac Cardiovasc Surg*. 2022;163:1719-31.e2.
2. Hoetzenecker K, Benazzo A, Stork T, Sinn K, Schwarz S, Schweiger T, et al. Bilateral lung transplantation on intraoperative extracorporeal membrane oxygenator: an observational study. *J Thorac Cardiovasc Surg*. 2020;160:320-7.e1.
3. Fulton RL, Peter ET. The progressive nature of pulmonary contusion. *Surgery*. 1970;67:499-506.
4. Cho HJ, Jeon YB, Ma DS, Lee JN, Chung M. Traumatic pulmonary pseudocysts after blunt chest trauma: prevalence, mechanisms of injury, and computed tomography findings. *J Trauma Acute Care Surg*. 2015;79:425-30.

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Commentary: “Cont”used though still used donor lungs for transplantation

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“Time heals all wounds; meanwhile, you have to move along with it” is a common sentiment meant to support an individual with a broken heart. Bruised tissues will discolor over time following the spectrum of colored pencils (Figure 1). Likewise, pulmonary contusion may take a few weeks to fully heal.

Organ shortage remains the most important hurdle to offering life-saving lung transplantation to more patients on the waiting list. Based on data from the Organ Procurement and Transplantation Network for 2019, the rate of lung transplantation from deceased donors was only 22.9% (n = 2714), lower than that of heart (29.9%) and liver (70.5%).¹ Donor lung utilization can be boosted by active donor management,² acceptance of nonstandard

Bruised tissues will discolor over time following the entire spectrum of colored pencils.

CENTRAL MESSAGE

Bruised though not unused;
contused donor lungs from
polytrauma victims with good
gas exchange can be safely
transplanted with comparable
outcome to noncontused lungs.

criteria donor lungs at offer,³ and organ quality assessment in the donor hospital.⁴

Motor vehicle accident was the mechanism of death in nearly 10% (1146 of 11,870) of deceased organ donors in the United States in 2019.¹ Severe chest injury in a trauma victim may result in pulmonary contusion with endobronchial bleeding and ventilator-induced pneumonia, reducing the likelihood of the victim being considered a suitable lung donor. However, contused lungs in a polytrauma victim may show sufficient organ function to support life. In this issue of the *Journal*, authors from the Vienna Lung Transplant Group report that donor lungs from selected polytrauma victims can be safely transplanted. Posttransplantation outcomes were compared between recipients of contused lungs (n = 44) and recipients of noncontused lungs (n = 58) from polytrauma victims. A group

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FIGURE 1. Bruised tissues will discolor over time following the entire spectrum of colored pencils.

of 650 lung transplant recipients from nontrauma donors served as controls.⁵ No significant between-group differences were found in primary graft dysfunction (PGD) or days of mechanical ventilation days, and 1-year and 5-year survival were comparable in the 2 groups.

Three issues are important to address. First, donors in the contused and noncontused polytrauma groups were significantly younger (median, 22 years [range, 17-43 years] and 33 years [range, 23-46 years], respectively) compared with the control group (median, 46 years [range, 32-54 years]) ($P < .001$). After propensity matching to protect against the potential confounder of younger donor age, early and late outcome parameters remained comparable.

Second, oxygenation capacity ($\text{PaO}_2/\text{FiO}_2$) did not differ across the donor groups (mean, 458 ± 105 mm Hg in the contused polytrauma group, 457 ± 97 mm Hg in the noncontused polytrauma group, and 442 ± 98 mm Hg in the control group; $P = .339$), suggesting that only those contused lungs providing sufficient gas exchange were selected. We understand that the authors could not investigate the impact of variable grades of donor lung contusion on outcome owing the retrospective nature of this study and the limited number of cases. Incorporating a pulmonary injury scale based on chest computed tomography in existing donor scores⁶⁻¹⁰ may help better fine-tune the presence of lung contusion as a potential donor risk factor for early mortality following lung transplantation. Theoretically, ex vivo lung perfusion for better functional donor lung assessment can be done, although pulmonary contusion is considered a relative contraindication for this technology because of possible parenchymal leak with loss of perfusate.

FIGURE 2. A heavily bruised right donor lung (A, front side; B, back side) from a trauma victim ready for implantation in a 60-year-old male with chronic lung allograft dysfunction 8 years after undergoing primary bilateral lung transplantation for pulmonary fibrosis at University Hospitals Leuven.

Third, although recipient diagnosis overall did not differ between groups, contused lungs were transplanted in only 2 of 44 patients (4.5%) with pulmonary arterial hypertension (PAH), compared with 57 of 650 (8.8%) in the control group. Contused donor lung recipients may have been unwittingly selected, thereby avoiding patients with PAH at increased risk for developing PGD posttransplantation.

This interesting report from a well-respected and high-volume lung transplant center in Europe is the first in-depth outcome study using lungs from donors who had sustained significant chest trauma. These results may guide other lung transplant centers in considering whether to accept contused lungs from selected donors more frequently (Figure 2). This policy may further enlarge the lung donor pool, thereby decreasing total waiting time and waiting list mortality.

We should be grateful to the Vienna Lung Transplant group for bringing these types of lung donors to our attention and demonstrating that contusion per se is not an absolute exclusion criterion for lung donation. When carefully selected, bruised donor lungs can still support recipients' life immediately after transplantation, with no impact on early or long-term outcome.

References

1. Organ Procurement and Transplantation Network. National data. Accessed November 29, 2020. Available at: <https://optn.transplant.hrsa.gov/data/view-data-reports/national-data/>
2. Van Raemdonck D, Neyrinck A, Verleden GM, Dupont L, Coosemans W, Decaluwé H, et al. Lung donor selection and management. *Proc Am Thorac Soc*. 2009;6:28-38.
3. Meers C, Van Raemdonck D, Verleden GM, Coosemans W, Decaluwé H, De Leyn P, et al. The number of lung transplants can be safely doubled using extended criteria donors; a single-center review. *Transplant Int*. 2010;23:628-35.
4. Martens A, Neyrinck A, Van Raemdonck D. Accepting donor lungs for transplant: let Lisa and Bob finish the job! *Eur J Cardiothorac Surg*. 2016;50:832-3.
5. Schwarz S, Rahimi N, Kifjak D, Frommlet F, Benazzo A, Jaksch P, et al. Lungs from polytrauma donors with significant chest trauma can be safely used for transplantation. *J Thorac Cardiovasc Surg*. 2022;163:1719-31.e2.
6. Oto T, Levvey BJ, Whitford H, Griffiths AP, Kotsimbos T, Williams TJ, et al. Feasibility and utility of a lung donor score: correlation with early post-transplant outcomes. *Ann Thorac Surg*. 2007;83:257-63.
7. Smits JM, van der Bij W, Van Raemdonck D, de Vries E, Rahmel A, Laufer G, et al. Defining an extended criteria donor lung: an empirical approach based on the Eurotransplant experience. *Transpl Int*. 2011;24:393-400.
8. Loo G, Radosevich DM, Kelly RF, Cich I, Grabowski TS, Lyon C, et al. The University of Minnesota donor lung quality index: a consensus-based scoring application improves donor lung use. *Ann Thorac Surg*. 2016;102:1156-65.
9. Ehsam JP, Held U, Opitz I, Inci I. A new lung donor score to predict short and long-term survival in lung transplantation. *J Thorac Dis*. 2020;12:5485-94.
10. Schwarz S, Rahimi N, Kifjak D, Muckenhuber M, Watzenböck M, Benazzo A, et al. Comparison of donor scores in bilateral lung transplantation—a large single-center analysis. *Am J Transplant*. November 19, 2020 [Epub ahead of print].

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Commentary: Bruised and battered, but not broken—use of lung allografts from donors with chest trauma

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Samuel J. Kesseli, MD (left), Samantha E. Halpern, BA (middle), and Mathew G. Hartwig, MD (right)

CENTRAL MESSAGE

Investigation by the Vienna Lung Transplant Group demonstrates selected lungs with traumatic contusion can be safely utilized with comparable outcomes to grafts from donors without trauma.

Eligible donors with traumatic injuries comprise more than one-third of the overall deceased donor pool, tend to be