Commentary: Cutting the losses: Using lungs from donors with substance abuse history

Lin Chen, BA,a and Usman Ahmad, MDa,b

Lung transplantation remains the only viable option for many patients with end-stage lung disease. The availability of donor lungs is a well-established limitation, with 1.2 patients on the waiting list for each donor in 2019.1 In the United States, historically only 20% of donor lungs are used. The remainder either do not meet standard acceptance criteria or are considered not suitable by individual programs. There is tremendous variation in programmatic acceptance criteria, particularly when it comes to soft, unsuitable findings. These factors include donation after cardiac death, history of smoking, substance abuse or high-risk behavior, prolonged ventilation, and in vivo poor gas exchange, among others. Greater-volume centers have been able to use well-selected organs albeit these findings and shown acceptable graft and recipient survival.2,3

The longevity of a lung allograft is limited by chronic lung allograft dysfunction, traditionally associated with donor organ quality. Donors with history of substance abuse (SA) are in general considered to pose a theoretical greater risk of transmission of blood-borne pathogens.4 The true underlying effect on chronic lung allograft dysfunction or other detrimental effect on recipients has not been clearly shown.

With the evolving opioid crisis in North America, the exclusion of SA donors will significantly impact number of available organs. Increasing evidence, including this timely report from the Toronto Lung Transplant Program, is challenging this notion.5 The authors evaluated their institutional and provincial experience and found that opioid and marijuana use did not impact rates of lung acceptance nor rates of primary graft dysfunction (PGD), but opioid users did require more ex vivo lung perfusion usage.6 Donors with a more than 20 pack-year history of cigarette smoking unsurprisingly had lower lung acceptance and greater rate of ex vivo lung perfusion, but there was no difference in PGD. Outcomes were not worse in recipients of lungs with any category of SA, although lungs from donors with any smoking history had worse outcomes than those from donors without any smoking history.

What does remain unclear at the moment is the detrimental effect of cannabis and related products on lung function and suitability or lack thereof for transplantation. There is likely a threshold of use of these products beyond which the lungs are not suitable (akin to extensive pack year smoking). However, at the current time, we do not have a reliable method to quantify cannabis use in donors and hence are not able to reliably evaluate suitability for transplant. Anecdotally, lungs from donors with cannabis use do appear to have more PGD. Careful evaluation of lung function should be performed and decision made on a case-by-case basis. Ex vivo evaluation may allow improved functional evaluation in these settings.

Our group has previously reported similar outcomes where substance use was not associated with worse longitudinal forced expiratory volume in 1 second, PGD, and short-term
outcomes.7 However, we found donor smoking pack-years and opioid use were associated with increased risk of mortality in the late phase, especially with double lung transplants. We extrapolate that had the authors stratified smoking history as a continuous pack-years instead of over or under a 20 pack-year history, they may also see a decrease in survival.

The thoracic transplant community needs to evaluate donor and organ-suitability criteria continuously to mitigate organ shortage. While smoking history and intravenous drug use do not seem to impact donor lung function and recipient survival in any significant fashion, our next and bigger challenge will be assessment of cannabis on lung function and donor pool.

References