See Article page 1546.

Commentary: A longer agonal period in lungs donated after circulatory determination of death is a gamble worth taking

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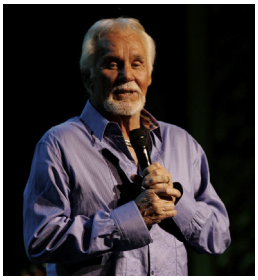

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CENTRAL MESSAGE

DCDD lungs in which the donor progresses to asystole after 60 minutes have no higher primary graft dysfunction than those donated after 0 to 20 minutes or 20 to 60 minutes.

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The surgeon deciding whether to accept lungs donated after circulatory determination of death (DCDD) on behalf of their patient must do so with limited information. Declining lungs that have met initial criteria for transplant but have experienced an agonal period of compromised perfusion while the donor progresses to asystole is done to reduce the risk of posttransplant primary graft dysfunction (PGD). The duration from withdrawal of life support to circulatory arrest is an imperfect predictor of PGD, but remains the main criterion. In the song "The Gambler," popularized by the late Kenny Rogers, the titular character exhorts a novice poker player to "know when to hold 'em, know when to fold 'em." Similarly, after a prolonged agonal period, the surgeon must decide whether to transplant those lungs, or await better lungs. Qaqish and colleagues[1] present important institutional data suggesting that it may be safe to "hold 'em" longer than is traditionally the case.

The authors grouped DCDD lungs into tertiles to represent rapid (0-20 minutes), intermediate (20-60 minutes) and late (>60 minutes) progression to circulatory arrest. These tertiles were chosen to represent intuitive categories and also to maximize the (admittedly small) number in the late group. They did not find significantly different rates of PGD between these tertiles (or comparing DCDD lungs with those implanted after neurologic determination of death).

As the authors admit, their institution's experience may represent a singular clinical benefit that may not translate. Besides their high volume of transplants, the authors' experience with ex vivo lung perfusion (EVLP) is a relevant confounder. (All lungs from the 20 donors who experienced arrest after 60 minutes were perfused with EVLP, as were 66% and 63% of those who experienced arrest in <20 minutes and 20-60 minutes, respectively.) The EVLP learning curve is formidable for both the safe operation of the EVLP platform and the interpretation of objective and subjective data that it generates.

A further limitation is the selection of the total time from withdrawal of life support to asystole as the interval to be studied. The initial postwithdrawal period may be characterized by near-normal oxygenation and hemodynamics. Indeed, the inclusion criteria for an ongoing study of DCDD heart donation includes an upper limit on the period between relative hypoxia and arrest, not the time from withdrawal of support.[2] An extra 30 minutes of relatively normal perfusion may be less detrimental than, for example, 10 minutes of hypoxia, although this is difficult to study.

Many centers are already extending their cutoff time, likely emboldened by the Toronto group's aggressive acceptance policies: Several centers in the International Society for Heart and Lung Transplantation DCDD Registry allow up to 90 minutes for progression to asystole.[3] Our own institution extends this time to 120 minutes.

At the operating table and the poker table, "the secret to survivin' / Is knowin' what to throw away / And knowin' what to keep." The authors present an avenue for expanding

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the donor pool by avoiding unnecessarily discarding lungs after slow donor progression to asystole.

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See Article page 1546.

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Commentary: Adding sand to the hourglass

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CENTRAL MESSAGE

Not every DCDD organ can be pushed out beyond 60 minutes, and risks for organ demise after extended asystole are still undetermined.

When considering valuable medical commodities, donor lungs are near the top of the list. Demand is often the principal driver of value, but resource scarcity is definitely a co-conspirator. The value of a lung allograft is seemingly driven up daily by both, and Qaqish and colleagues[1] now suggest possible relief on the supply side of the equation.

The problem is not that complex: The number of lung transplant candidates being listed exceeds the number of organs available. Because of this, listed candidates die while waiting for organs. Of eligible organ donors, a mere 20% prove suitable for lung donation (in contrast to triple that for kidney and liver transplants), which perpetuates the problem.

Ever the pioneers, lung transplant practitioners have not sat idly on the sidelines accepting this shortfall. Among recent novel strategies, use of donors from circulatory determination of death (DCDD) provides a previously untapped source of organs in addition to the classic donors from neurologic death. DCDD represents a different paradigm in organ procurement with far less control of timing of procurement, warm ischemia, and aspiration protection. Yet this new cache of organs, despite liabilities, performs admirably, with outcomes virtually indistinguishable from donors with neurologic determination of death.[2]

An impediment to broad dissemination of DCDD organs is uncertainty about which DCDD designates will actually donate! In other words, prospective donors become actual donors when they die within 60 minutes of separation from mechanical ventilation.

Why 60 minutes and not 30, 90, or 120? There is some science, but I suspect the answer is more of a theoretical concern about protracted hypoperfusion occurring while the harvesting team is waiting for cardiac standstill (asystole) after ventilator separation somehow deleteriously affecting the allograft. These patients, unlike donors dying from neurologic causes, do have some brainstem activity, and a respiratory drive is often apparent even after ventilator separation. The heart can continue beating for a surprisingly lengthy period in the presence of hypoxia, hypercardia, and

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