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WORD COUNT	972	TIME SUBMITTED	25-MAR-2022 09:26AM
		PAPER ID	84049025

Name of Journal: *World Journal of Transplantation*
Manuscript NO: 74979
Manuscript Type: LETTER TO THE EDITOR

Can adequate hemodynamic management of brain-dead donors improve donor organ procurement?

Thet MS *et al*. Commentary

Abstract

There is increasing evidence that adequate donor management with a goal of optimization of organ function is essential to maximize the number of organs that can be procured. Therefore, identification of the cause of hemodynamic instability is crucial in order to direct the right therapy. Several donor management goals for better hemodynamic management including serial echocardiography can guide hemodynamic management in potential donors to increase both number and quality of donor hearts.

Key Words: Brain-dead donors; Hemodynamic; Management; Organ procurement

Thet MS, Verzelloni Sef A, Sef D. Can adequate hemodynamic management of brain-dead donors improve donor organ procurement? *World J Transplant* 2022; In press

Core Tip: There is increasing evidence that adequate donor management with a goal of optimization of organ function is essential to maximize the number of organs that can be procured. Early identification of potential donors and adequate donor management are essential in order to expand the donation pool and improve transplantable organ quality. The authors have summarized the available evidence on therapeutic strategies for hemodynamic management and monitoring.

TO THE EDITOR

In the complex donation process, early identification of potential donors and adequate donor management are essential in order to expand the donation pool and improve transplantable organ quality[1,2]. Lack of evidence from randomized controlled trials still remains one of the main issues regarding the management strategies in donation after brainstem death (DBD) along with acceptance of more marginal donors with comorbidities and worldwide variability in donor management strategies due to various constraints. Most of the current guidelines are based on pathophysiological explanations, observational data and standard critical care practice[3]. Lazzeri *et al*[4]

should be congratulated for aiming to summarize the available evidence regarding hemodynamic management of DBD in the era of consistently increased donor organ demand. In their article, authors focused especially on vasoactive-drug support and therapeutic goals[4]. The authors emphasized a loss of up to 20% of DBD organs due to inadequate intensive care management as one of the key concerns, which can be prevented with active donor management in intensive care[4]. Brain death can be often accompanied with considerable physiological instability, which, can induce deterioration in organ function before retrieval if not managed carefully[2]. In addition to a well-known rule of 100, the authors discussed several more donor management goals for better hemodynamic management including: (1) Invasive arterial pressure monitoring aiming mean arterial pressure ≥ 65 mmHg; (2) Urine output ≥ 1 mL/kg/h; (3) Central venous pressure monitoring (aiming 8-10 cm H_2O); (4) Lactate measurements; (5) Mixed venous oxygenation saturation; and (6) Serial echocardiography[4,5]. There is increasing evidence that adequate donor management with a goal of optimization of organ function is essential to maximize the number of organs that can be procured[5-7]. Therefore, identification of the cause of hemodynamic instability is crucial in order to direct the right therapy.

In this context, the role of pulmonary artery catheters (PAC) is not clearly described; whether the routine placement of PAC is warranted or not, since PAC insertion is not without risk of injury to the donor heart, including ventricular arrhythmias, bundle branch blocks, and even cardiac or pulmonary artery perforation[8]. However, appropriate hemodynamic monitoring is a prerequisite in assessment of volume status and response to therapy; therefore, the authors should have addressed the role of initial intravascular volume replacement and the need for assessment of volume status. Pathophysiological changes in DBD donors make the clinical assessment of volume status even more challenging, hence appropriate monitoring is of paramount importance in guiding fluid replacement. Recent guidelines suggest that the primary therapeutic goal should be to maintain euvolemia while isotonic crystalloid solutions should be the preferred when considering fluid replacement[9].

Serial echocardiography monitoring is suggested, yet it is not defined clearly whether we should rely on transthoracic echocardiography (TTE) or we should use more often TEE[3]. Interestingly, in a large study of 472 donor hearts, Casartelli *et al*[10] performed exclusively TTE for evaluation of ejection fraction. On the other hand, we would like to highlight that TEE can provide therapeutic benefits over TTE in critically ill, mechanically ventilated patients, even when the views with TTE are deemed adequate[11]. Importantly, serial echocardiography should be performed to evaluate recovery of function in neurogenic stunned myocardium and guide hemodynamic management in potential donors to improve availabilty and quality of donor hearts[3]. It is again highlighted that the benefits of the use of dopamine in renal transplant patients are not directly translated to donor hearts in heart transplantation[4]. Among vasopressor drugs, norepinephrine (NE) is the mainstay of cardiovascular support with the addition of vasopressin in cases of higher vasopressors requirements, and this is in line with current practices in many of the centers, as highlighted by the authors[4]. However, recent guidelines propose rather dopamine as the catecholamine of choice, and judicious NE usage due to concerns that it can increase both afterload and pulmonary capillary permeability and stimulate coronary vasoconstriction[9]. These guidelines recommend the use of dopamine as a first line therapy, with addition of NE when the requirement of dopamine exceeds 10 mcg/kg/min. However, the data on this is variable with a retrospective analysis stating otherwise[12]. Furthermore, NE may be associated with worse cardiac graft function and worse post-transplant survival[13]. Moreover, vasopressin with its action on the V2 receptor will treat diabetes insipidus at the same time. It is also not evident whether it would require further therapy with selective V2 receptor therapy. However, as the authors did not perform systematic review, this could lead to extrapolation bias. Lastly, while there are many reasons why a significant number of potential organs are not donated and successfully transplanted, hemodynamic instability of the donor is an essential and modifiable factor.

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