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Editorial

Heart transplantation following donation after euthanasia

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Heart transplantation (HT) is markedly constrained due to a critical shortage of suitable organs from donors in brain death (DBD). Transplantation of hearts donated after circulatory death (DCD) has emerged as a potentially valuable strategy used to address the critical shortage of suitable organs. Although excellent clinical results have been published for DCD heart procurement from controlled DCD donors (1), data from heart donation following euthanasia are scarce (2). The practice of euthanasia is legal in a limited number of countries (3). Organ donation after euthanasia raises several legal and ethical controversies and currently this practice is only performed in Belgium, the Netherlands, Spain and Canada in very restricted conditions. Indeed, euthanasia for adults was legalized in Belgium in 2002, within the legal and ethical framework defined in the Belgian Act on Euthanasia. The patient must find him or herself in a medically futile situation, of constant and unbearable physical or mental suffering without any prospect of recovery, resulting from a serious and incurable disorder caused by illness.

Donation after euthanasia could potentially help ease the shortage of organs for transplantation, and reduce the transplant waiting list. In fact, it is estimated that 10% of all patients undergoing euthanasia in Belgium could potentially donate at least one organ (4). In organ donation after euthanasia, the procurement procedure is performed after the declaration of circulatory death. Compared with DBD, grafts recovered as DCD undergo an additional warm ischemic insult due to progressive hypoxia and the circulatory arrest occurring between the lethal injection and the declaration of death. However, recent studies have concluded that organs such as kidneys, livers and lungs transplanted following euthanasia yield similar, and sometimes even superior, outcomes compared to other controlled DCD (5-7). To our knowledge, there has been only one report on human HT following donation after euthanasia (2). An experimental paper evaluating the function of human hearts donated after euthanasia described the procurement of two hearts donated after euthanasia for research purposes, using the direct procurement and machine perfusion technique (8).

Since the amendment of our local procurement protocol in 2022 using thoraco-abdominal normothermic regional perfusion (TA-NRP) (2), we have successfully proceeded to two cases of adult DCD HT following euthanasia. The two donors were a 46-year-old male, and a 56-year-old female diagnosed with amyotrophic lateral sclerosis and neurodegenerative disease, respectively. Both patients'

euthanasia request was accepted in accordance with the Belgian law. The euthanasia and organ procurement procedures were carried out as previously described (2). The warm ischemic time was seventeen minutes for the first donor, and sixteen minutes for the second donor. Shortly after onset of reperfusion, both hearts regained their function. Both recipients were listed on heart transplant waiting list for dilated cardiomyopathy, with a past medical history of left ventricular assisted device implantation three months, and one year prior to transplantation, respectively. The heart grafts were transplanted in the orthotopic position using the bicaval technique. The suture time was 49 minutes for the first recipient, and 67 minutes for the second recipient. The first recipient experienced bleeding-related hemodynamic instability in the first 24 hours after the surgery requiring temporary mechanical circulatory support (2). Both recipients were discharged home and remained well with excellent heart function at eighteen and five months after transplantation, respectively.

Several ethical issues are relevant to heart donation after euthanasia when following our local protocol. First, premortem heparin administration is approved in Belgium, which may not be the case in other countries. Both euthanasia procedures were performed in the patient's room which was located on the ward and not in the operating room. To reduce the warm ischemic interval, both patients were transferred to the operating room during the five minutes no-touch period. This approach is authorized in Belgium but not in the Netherlands.

The second point are the ethical concerns and objections raised on the use of NRP. Some advocate that by restarting the circulation the death donor rule is violated. A recent publication seems however to invalidate the possibility of restoring brain perfusion with TA-NRP when appropriate technical measures are applied (9). In a consensus document The American Society of Transplant Surgeons supported the use of NRP taking all ethical concerns into consideration (10). Another important ethical issue is a strict separation (in time, location, physicians and nurses involved) between the processes of euthanasia, organ donation and transplantation. Finally, organ donation after euthanasia and particularly when the heart is recovered requires the mobilisation of substantial human resources and is time consuming.

Heart donation following euthanasia is very rare with only two clinical cases described so far using TA-NRP. This technique may help reduce the problem of organ shortage in those countries where organ donation after euthanasia and TA-NRP are possible.

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Footnote

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