"The Death of Socrates". Courtesy Metropolitan Museum of Art, New York.

How to Define Death: Variation in Donation After Circulatory Death Policies

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Organ transplantation utilizes a shared and scarce resource. In order to best utilize this resource, a network of organ procurement organizations, hospitals and individuals must work together. National societies make recommendations for policies that govern organ transplantation recoveries, however at each tier of the network there is room for variability. Donation after circulatory death (DCD) policies are one example of organ transplantation policies that are not standardized. The American Society of Transplantation Surgeons defines death in DCD recoveries as "irreversible cessation of cardiac and respiratory function." However, many individual hospitals have policies that may differ from this practice of observing pulseless electrical activity (PEA) for the ASTS recommended wait time of 2 minutes. In this study, we examined the DCD protocols of 50 adult hospitals representing a single OPO within Michigan. We hypothesized there would be institutional variance in the definition of death, the provider who can declare death and maximum wait time for the donor to expire after extubation until organ recovery is no longer pursued. We found that there was substantial variation in how each

hospital defined death, with the most common definition being asystole. Most hospitals require a physician to declare death in DCD and the minutes to expire range from 60 to 120 minutes. Given that the difference between PEA and asystole may result in time lost and organs to become nonviable, we recommend that standard policies are created and there is increased education to physicians and designees that declare death in DCD recoveries.

INTRODUCTION

Although hospitals have policies outlining their protocol for Donation after Circulatory Death (DCD) organ donation, the rules and regulations around withdrawal practices vary significantly (1). National societies including the American Society of Transplant Surgeons (ASTS) make recommendations for DCD recoveries, and organ procurement organizations provide guidelines to hospitals within their region, but these recommendations are open to institutional interpretation (2, 3). Given the importance of timely recovery of organs for transplantation, the variation in hospital DCD policies should be analyzed to limit organ discard.

There are many aspects of DCD protocols which can be scrutinized, but one specific area of interest is how hospital policies define death to allow for organ recovery. Death in DCD recoveries is defined by the ASTS as "irreversible cessation of cardiac and respiratory function" which in practice has come to mean observing pulseless electrical activity for a predetermined wait time to insure autoresuscitation does not occur (2). However, the power to write DCD policies lies within individual hospitals, and little is known about how closely these policies follow society guidelines.

METHODS

Within this context, we sought to explore the variation in how hospital policies define death to allow for organ recovery. Additionally, we sought to investigate variation in the providers who declare death and the maximum time between extubation and death.

Using content analysis, we examined 50 Michigan adult hospitals DCD policies, all serviced by a single organ procurement organization. We hypothesized there would be substantial variation in the definition of death within Michigan hospitals.

Hospital DCD policies were identified through Gift of Life Michigan. The study was submitted to the university Institutional Review Board and met the criteria for exemption from further IRB oversight. Written policy documents were accessed using iTransplant database in August, 2021 utilizing the most up to date policy that was provided. A sample representing hospitals with diversity in location, size, and type (transplant center non-transplant center) was used. Content analysis was conducted for the hospital policies (4). The protocols were manually searched and coded for the presence or absence of a definition of death. Policies were coded by a single investigator (D.C.) and analyzed for observation of ASTS guidelines.

RESULTS

There was substantial variation in how each policy defined death, with the most common definition being asystole. **Figure 1** demonstrates the different definitions of death encountered in the hospital DCD policies and the number of hospital policies that had these definitions. Of note, policies often contained more than one definition of death in their DCD protocol. Although ASTS recommends waiting for the onset of pulseless electrical activity, this was only found in 46% of policies. Eight policies did not clearly define the declaration of death. **Figure 2** illustrates the process of DCD

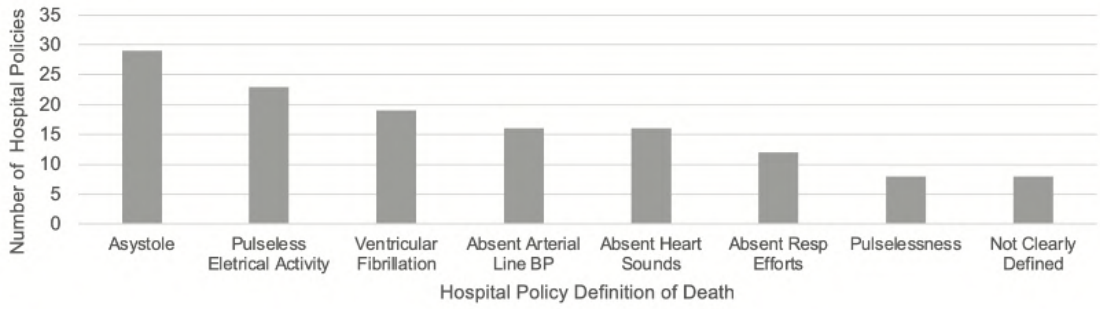

Figure 1: *Michigan hospital policy definitions of death.*

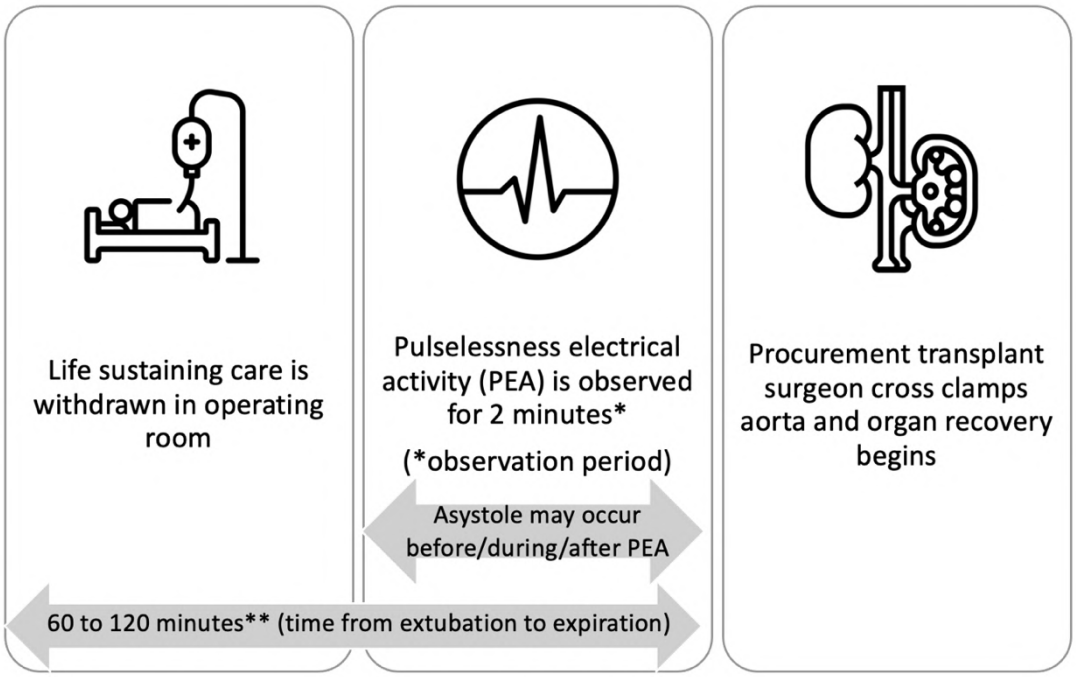

Figure 2: *Donation after circulatory death timeline from withdrawal procurement*

recoveries and how the maximum time from extubation to expiration ranged from 60 to 120 minutes in this study. Of note, 14% of hospitals allowed the recovery team to set the maximum time to expire and 14% did not provide a time within their policy. Additionally, we found that 96% of hospitals required a physician to declare death in DCD, in contrast to a nurse or advanced practice provider.

DISCUSSION

There is broad variation in the definition of death across hospitals in Michigan. This is just one aspect of many components of DCD donation that can result in delays in declaration and recovery. Given this variation in policy—or lack of documented policy at all—there are likely donors which are not declared dead until asystole (flatline of the ECG) is noted, which may jeopardize the donation intentions of the family.

This study has several limitations, including that only written DCD hospital policies were reviewed. These policies may not accurately reflect actual performance,

may be outdated and practices at the selected hospitals may not reflect hospital policy. Additionally, this study utilized a single coder and changes may have been made to polices since the data abstraction period. Finally, a diverse selection of the hospitals in Michigan was used, so conclusions about statewide policy variation should be made with caution.

In order to optimize organ utilization, a stakeholder-driven standardization of DCD policies is necessary. Beginning at an institutional level, it will be key to examine and maintain hospital DCD policies that align with current national consensus practice guidelines. Including stakeholders such as donor families, organ procurement organizations, hospital ethics representatives, hospital leadership, transplant centers, nurses, and anesthesia providers must be engaged in this work. The ASTS and the Association of Organ Procurement Organizations have put forward best practices for DCD liver recovery that serve as a model (5). There is a shared goal amongst stakeholders to maximize the gift of organ donation and a broad adaptation to a shared policy will allow for improved outcomes for donors and recipients alike.

DISCLOSURES

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Consent to participate: Not applicable.

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