**Lay Summary - Original**

Death is the gradual shutdown of vital systems in the body, including the heart and brain. Understanding how and when the brain and heart stop working is crucial for medical decisions, especially in organ donation. Accurate timing is critical to, above all, ensure that donors cannot experience suffering, while also preserving the viability of organs for transplantation.

In this study, we monitored seven patients in intensive care who were taken off life-support after decisions were made with their supplementary decision makers to allow for natural death. Using specialized monitoring tools, we measured blood flow in the brain, electrical activity in the brain, and heart function before and after life support was withdrawn.

We found that brain blood flow stopped before brain activity which stopped before the heart stopped pumping. Importantly, in all cases the brain shuts down before the legal criteria for death were met.

These findings provide reassurance to families and healthcare providers about the process of death and contribute to public trust in organ donation. They also offer important insights for new medical technologies that could improve how organs are preserved for transplant without putting the donor at risk. While this study involved only a small number of patients, it provides essential groundwork for future research into the complex process of dying.

**Lay Abstract - Editied**

Death involves the gradual shutdown of vital systems, including the brain and heart. Deciding the *exact* moment of death is challenging but it is necessary that we get it right. Nowhere is this more important than in the context of organ donation.

Before doctors can recover organs, they must ensure that the donor can no longer feel pain or suffer -- that the patient is brain dead. At the same time, every minute of delay in declaring death increases the risk of organ damage and reduces the chances of a successful transplant.

Current guidelines are likely overly cautious, requiring doctors to wait until the heart stops to ensure the donor is truly brain dead. While these guidelines are very conservative for the sake of donor protection, it may also harm potential recipients by lowering organ quality or availability. It can even prevent honouring the donor’s wishes if they wait too long and their organs are no longer viable. To address this, we need better tools to directly measure brain function, so doctors can confidently declare brain death and begin organ recovery sooner. This was the purpose of our study.

We monitored seven patients in intensive care whose families decided to withdraw life support and allow a natural death. Using specialized tools, we measured brain activity and blood flow, two related measures of brain function, during the dying process.

Our results showed that both measures of brain function stopped well before the current conservative guidelines are met. This reassures families and healthcare providers that donors do not experience suffering during organ recovery. It also suggests that organ recovery could happen earlier, improving organ quality without adding any risk to donors.

While our study included only a small number of patients, it lays essential groundwork for our future research aiming to validate these findings across a wider range of patients and organ recovery techniques. We hope this work will deepen our understanding of the dying process while improving the critical practice of organ donation.