

### WHAT IS DEATH?

This biggest of the questions is being debated in the 14th August issue of the *New England Journal of Medicine*. What sparked three perspectives and a video round table discussion in the journal was the report of 3 children who underwent cardiac transplant from donors with cardiorespiratory arrest but not proclaimed brain dead!

Organ donation after circulatory or cardiac death is gaining acceptance. The dead donor rule states that the donor must be dead before vital organs are procured. Death is declared when there is irreversible cessation of circulation and respiration or the irreversible cessation of brain functions.

The critical question is – what duration of asystole is irreversible? In literature, spontaneous regaining of cardiac function has not been documented after 60 seconds of asystole. To be on the safer side, the Institute of Medicine has recommended that a physician should watch for 5 minutes of asystole before declaring death. The problem with donations after cardiorespiratory arrest is the tissue hypoxia especially to the heart. Long periods of asystole will definitely worsen the ischemia to organs, especially to the heart. To reduce this, transplant teams and researchers are experimenting with various protocols. Some include starting ECMO in the patient after death is declared, starting IV heparin and introducing arterial lines before declaration of death.

In the case of the three children who underwent cardiac transplant, Boucek, *et al.*, shortened the length of asystole to 75 seconds on the grounds that 60 seconds is the longest period of asystole after which a heart has spontaneously revived. These investigational protocols are straining the limits of ethics and morality. The fact that death was declared on the basis of cardiac asystole and this same heart is again reactivated in a new patient seems paradoxical to many. On the positive side, patients in dire need of organs are benefited and they fulfill the wish of family members that relatives with severe brain

injuries serve as organ donors after cessation of life-sustaining therapy and subsequent death (*NEJM* 14 August 2008).

### SIMULATION IN MEDICAL EDUCATION

We need to drastically change the way we train doctors. Traditional methods of working with cadavers, animals or live patients are fraught with problems. Patient safety issues and the need to learn complex clinical skills quickly has spurred interest in alternative techniques to complement actual patient experiences. The field of medical simulation ranges from low-cost, practising of liver biopsy on a potato to high-end surgical simulators.

Computer-based medical simulations, or virtual reality (VR), enhance learning by using visual, auditory, and haptic feedback to help physicians feel that they are making decisions and performing procedures in real life. VR also allows participants to repeat the simulation as many times as necessary to attain a level of comfort with the task. Collaboration between the video game industry, medical schools and the US military has spawned a new kind of medical simulation. They catapult the learner into a breathless, stressful situation in the emergency department or battlefield. The primary aim is not to enhance clinical skills but to practice teamwork and rapid-fire decision making. Simulation-based assessment is advancing to the point where it can revolutionize the way clinical competence is assessed in residency training programs. Mannequins, which look and act like real patients, will be capable of more than 72,000 human reactions - everything from trembling and sweating to bleeding or giving birth.

In future, the health care system will likely follow the example of the airline industry, nuclear power plants, and the military, making rigorous simulation-based training and evaluation a routine part of education and practice (*Acad Emerg Med*, July 2008; *ENT Today* July 2008).

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