

Dilemma of Dying, Death and Dead: A Literature review in Evolution of Concept of Death and its use in Organ Transplantation in India

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Abstract

Death can be defined legally and medically. It is a process. With the advent of modern resuscitation and advanced techniques in surgery and immunosuppression, death as a concept started to evolve. Brain, heart and lungs were no longer considered essential to declare death. Different criteria of the moment of death were declared and improved upon. Finally, in 1971 with the acceptance of the Minnesota criteria, brain stem death was considered. In India, with the passage of Transplantation of Human Organ Act in 1994 brainstem death became legal and organ donation after brain death was allowed for the first time. The recent amendments to the act have simplified the process of transplantation in medico-legal cases. Our study was undertaken to understand the concept of death, brainstem death and its application in our country.

Keywords: Death; Concept Of Death; Brain Death; Transplantation, Transplant act.

Introduction

Death legally speaking is death of a human being unless contrary appears from the context¹. Medically, the concept of death has evolved. Marie Bichat in his concept of Bichat's tripod of life believed that heart, lungs and brain were like a tripod. The breaking of one may lead to death. Many tests like

Magnus test, Icard's test, Winslow's test had been devised and discarded in the evolution of the concept of death².

Gradually, with the concepts of suspended animation and in 1950's and 1960's modern resuscitation and transplantation the concept of the perishing of the three organs to declare death was questioned. Death has always been considered a process.

State legislations were passed on transplantation of organs like the ear, eyes and kidney. In 1994 with the passage of the act of Transplantation of Human Organ Act a regulatory body was then formed to regulate the removal of organs from the living and dead donors³.

Methodology

We did a literature search and reviewed the concept of evolution of death and transplantation of organs. Our keywords were death, concept of death, brain death, transplantation, transplant act. After studying the available literature in varying time frames, we compared the different types of brain death. We specifically studied the human organ transplant act of India and studied the differences between the act and amendments and instructions in medico-legal cases. We did this study to understand the concept of death. As forensic practitioners, we often come across declaration of brain death in medicolegal cases. This study was undertaken to understand how the concept of death came to be and how the Act in India has facilitated the transplantation of organs.

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Discussion

Applied anatomy

The brain has three parts- forebrain, mid brain and hind brain. The brainstem includes the midbrain, pons and medulla. The vital centres (respiratory and vasomotor) are situated in the lower part of the floor of the fourth ventricle formed by the medulla. An injury to the medulla is, therefore, usually fatal⁴.

Concept of death

The concept of brain death evolved with advent of positive pressure ventilation in 1950's. 'Coma de passe' became a known entity and Guy Alexander in 1963 and Schwarb focussed on brain as an organ to determine death⁵.

Brain death concept evolved from cortical brain death, whole brain death and brain stem death.

Studies to declare death

In 1968, the Harvard criteria of brain death was developed. It emphasised the role of brain in death. unreceptivity, un-responsivity, no respiratory movements, no reflexes and flat EEG at an interval of twenty-four hours was given⁶. Criticism was that it did not pin-point the moment on the death. It ignored other aspects of death and spectra of coma was not considered.

Declaration of Sydney at around the same time had also given its guidelines⁷. A comparative glance at the two declaration is in table 1

Philadelphia protocol in 1969 emphasised the testing of spinal reflexes and certification by two doctors and repetition of tests after two hours⁸. The major criticism of this protocol was switching off the respirator between two tests and testing of spinal and brain reflexes. Neuro-surgeons, Mohandas and Chouin 1971 suggested to look for brain stem death. The Minnesota criteria laid down by them underlined no spontaneous movement or respiration and testing of brain stem reflexes and repetition of tests after twelve hours⁹.

Criticism and use worldwide

Whole brain death has been criticized as pituitary neuro-endocrine functions, somatic integrative

Table 1: Comparative glance of the Harvard Criteria and Declaration of Sydney

Points	Harvard criteria	Declaration of Sydney
Reasons	1. Artificial means 2. Organ donation	
Concept of death	Irreversible coma	Not provided
Brain death	Irreversible coma	-
Clinical criteria	Given	-
Ancillary test	EEG	EEG
Termination of life support	Declare dead-turn off respirator	Determine death- stop attempts
Legal Status	Recommended USA to implement the criteria	Allows organ removal where it is legally allowed
Diagnosis of death and transplantation	Doctors declare dead	
Not transplantation doctors		

functions and electroencephalogram changes are retained. Brain stem death cannot be differentiated from profound locked in state and cortical brain activity cannot be tested. However, brainstem death was recognised. United Kingdom recognises brainstem death and United states recognises whole brain death. In India, due to the passage of the act, brainstem death is declared when harvesting of organs is contemplated^{10, 11, 12}.

Legislation in India

The transplantation of Human organs Act was passed in 1994 and amended in 2011. and tissues Act was passed in India in 1994 and rules were framed in 1995³. Before, this law there were state level legislation like The Bombay corneal grafting Act, 1957, The eyes (authority for use for therapeutic purpose) Act 1982, The Ear drums and Ear bones Act, 1982 and The Maharashtra Kidney transplantation act, 1982. With the passage of the act, brain death became legal in India.

Comparative glance at the guidelines

The deceased organ rate in India is 0.26 per million population¹³. From the passing of legislation in this regard in 1994 to present a lot of progress is made in encouraging organ donation. Significant changes in rules of 2014 are that declaration of brain death now is not restricted to hospitals registered for organ transplantation. Any hospital with an intensive care unit is allowed for harvesting organs. Such hospitals can

apply for non transplant organ retrieval centre sanction. This has facilitated organ harvesting at some peripheries where Intensive care facilities are available. In the board of four medical experts who certify brain stem death, presence of neurosurgeon and neuro-physician is not mandatory. An anaesthetist, physician or surgeon are also included in the board of medical experts certifying brain death. A mandatory counselling in the intensive care units of relatives for organ donation has encouraged donation. The treating doctor has to confirm if the potential donor had pledged to donate their organs. The presence of transplant co-ordinator is essential to have the hospital registered for transplant. Punishment for organ commerce in living donation is severe³.

Transplant in medico-legal cases

Most of the brain death cases are due to accidents and road traffic accidents have a major share in it. In medico-legal cases an autopsy at a state authorised medico-legal centre is warranted. The issue is the time of initiation of post mortem. According to the new rules, the time when the organ is retrieved, the forensic practitioner can make their notes. If the forensic practitioner finds that examination of the organ is not necessary for ascertaining the cause of death in that case, he can allow the harvesting of the organ. The forensic practitioner are expected to aid in the procedure. In some states, post mortem is done at the time of harvesting the organs. In some states, post-mortem is waived off ^{3,14, 15, 17, 18}.

Conclusion

A literature review of the concept of dying clearly shows that it is a process. With the advent of modern resuscitation and newer advances in technology transplantation of organs is possible. With more studies, declaration of death saw a major evolution. Brain stem death saw the light of the day due to extensive research and testing. Transplantation of organs is possible and better due to exhaustive studies in evolution of brainstem death.

With the passage of legislation in India of transplantation of organs, brain death was legally defined in India. Recent amendments like the mandate choice clause for organ donation in Indian driving license has made a significant change in outlook on organ donation in India. The mandatory presence of transplant co-ordinator in licensed centres has improved the organ donation

rate. Most importantly, with the simplification of harvesting of organs in medico-legal cases, the rules have made a significant change in broadening the aspects of organ harvesting.

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