

## Original Article

**Dignosis and declaration of death**K Sreenivasulu<sup>1</sup>

**Diagnosis and declaration of death is the most important responsibility of a doctor. The diagnosis at various levels of hospitals is described along with confirmation tests. The modern concept of brain death is also detailed in relation to the organ harvesting and organ transplantation following the relevant Acts and Rules of India. Emphasis is laid on the rule of "No death-No Donation."**

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**Key words : Death, diagnosis and declaration of death, Brain (stem) death, organ harvesting and organ donation.**

**D**iagnosis of death is the most important responsibility of a doctor and the declaration of death must be made only after the confirmation of death. If the diagnosis of death is wrongly declared and the patient shows signs of life after the declaration of death, the doctor will be solely held responsible and the consequences may be disastrous to the negligent doctor. Hence, an attempt is made in this article by the Author, as to how to make a correct diagnosis before declaration of death, as this subject of the diagnosis and declaration of death is not dealt in the medical books.

*Definition of Death :*

Death is the permanent termination of all vital biological functions or life processes, which sustain a living organism and as such is the end of life<sup>1</sup>. The Author defines death as the multi organ failure of the vital organs of brain, heart, lungs, kidneys and liver, as the failure of one leads to the failure of other organs in course of time leading to death.

*Causes of Death :*

They are different in different countries and different within the same country due to difference in the income. Injuries are the commonest cause of death to all age and income groups. Infections (tuberculosis, malaria, HIV) are common in low income groups. Ischaemic heart disease, stroke, diabetes, hypertension, COPD, cancer, dementia etc. are common in middle and high income groups<sup>2</sup>.

*History of Death :*

Death is as old as humanity. Death has challenged the intelligence of humans since their origin and till today, in spite of great advances in science, medicine and technology, death is inescapable and every human being born is destined to die. Due to various causes, death can occur in children, adults and invariably in old age and all the ef-

forts made to prevent death have failed and no human has lived beyond 200 years in the recorded history of human beings. The death of the national leader, Sri Jayaprakash Narayan, who actually died on 08.10.1979 in Patna, was earlier declared dead by a doctor, which was announced by the then Hon'ble Prime Minister of India, Sri Morarji Desai, who, later, on the same day apologised to the nation and announced in the Parliament, that Loknayak Sri Jayaprakash Narayan was alive, as first diagnosis was wrongly made by the doctor (the exact date is available in the records of Parliament). During my internship in 1975, the patient, who was declared dead by the assistant professor of medicine, got up when the body was cut during the autopsy in the pathology department and the live patient was returned to the hospital. As he was a destitute, there was no problem to the negligent doctor. The doctor had not applied the criteria for diagnosis and failed to confirm death before declaration. In the past, there were several such Instances of misdiagnosis and wrong declaration throughout the world due to the failure of confirmation of death before declaration. The doctors, making wrong diagnosis were punished by the Governments and the courts in the event of litigation by the patients and their attending relatives. It was again due to the failure of confirmation of death before declaration. In this article, the clinical features of death, the investigations required to confirm death are detailed before the declaration of death.

*Process of Death :*

The Author has studied death since his graduation in 1975, when death was the total death of the whole individual and the present concept of brain death was not evolved. Clinically, death was diagnosed by establishing cardiovascular failure and failure to revive. The author has found that in primary disorders of lungs, the respiration stops first followed by cardiac arrest in a few minutes and if the cardiac arrest is due to the cardiovascular disorders, the heart stops first followed by the stoppage of breathing

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in a few minutes. This is due to the reason that the heart and lungs act as one unit and hence, if heart stops beating, the lungs stop breathing and vice versa. Hence, the revival of heart and lungs is done simultaneously to save the life of critically ill patient. Before death, the Author observed the following about respiration: the respiration becomes abnormal, ie, slow and shallow, sometimes deep and slow or rapid and shallow; sometimes, the last respiration may be one deep inspiration followed by long and loud expiration, which is often described that the patient breathed his last respiration, which started as first breath after birth<sup>3</sup>. Before death, there may be tachycardia followed by bradycardia and cardiac asystole or bradycardia followed by cardiac arrest.

### *Author' Research and his Views About Death :*

Death results if head and neck are separated by cutting through neck, but does not happen after bilateral forequarter and hind quarter amputations, while infected penetrating injuries of head, neck, chest and abdomen resulted in death. (Homicide was practised by the above methods from times immemorial). Hence, complete integrity is vital for preservation of life. The Author's best example of life is the glowing electric bulb, where the integrity of the physical bulb and the flow of electric energy are important to make the bulb glow. Similarly, the physical integrity of body, is vital to sustain life and its absence leads to death. Usually pain is caused by trauma and by all the diseases except the neurological disease affecting the sensory system. Coma precedes death, making death painless. Hence, the painful death is a myth.

(1) Diagnosis of death and its declaration at primary health centre, community health centre, or private doctor at or below the taluq level (primary care hospitals), where the facilities available are different from those of district and state headquarters: The diagnosis of irreversible cardio-respiratory failure is made by recording the complete cessation of respiration and cardiac arrest, the pupils are fully dilated and not reacting to light. Patient is in deep coma (total unconsciousness) without response to the deep painful stimuli. All the four limbs (upper and lower) are cold and clammy without any movements and lifted up and allowed to fall, they suddenly drop to the bed with a thud being lifeless, which is different in a living person. The cardio-respiratory resuscitation consisting of mouth to mouth breathing, external cardiac massage, dopamine drip, parenteral or intra cardiac administration of adrenaline are tried to save the patient from the impending death. These measures to revive the patient are tried periodically, say, every 15 minutes, feeling carotid pulse, auscultating the heart, assessing the level of consciousness by the deep painful stimuli and noting the size of pupils for full dilatation and testing the reaction to light (pupillary re-

flex). All the attendants of the patient should be informed about the critical illness and impending death and doctor's attempts to revive the patient. Observations are made every 15 minutes and recorded in the case sheet along with the treatment given. This is continued for one to three hours or even more time, as the diagnosis of death, after declaration, cannot be reversed. The diagnosis of death is only clinical at this level of primary care hospitals, as there are no investigations like ECG or EEG for the confirmation of clinical diagnosis of death. If the death is non medico-legal, the body of the patient can be handed over to the relatives, without autopsy and if it is medico-legal, information should be given to the police by phone and in writing and the body is kept in the mortuary. If the doctor diagnosing the death is not the head of the medical institution, he should inform the head of the medical institution. If the relatives have taken away the body before the medico-legal post mortem examination, the same should be informed to the police immediately by phone and in writing, as failure to do so, attracts criminal action against the doctor declaring death after diagnosis. If the doctor has correctly diagnosed death, before declaration and the patient did not become alive after declaration of death, no doctor, accused of negligence of diagnosis is punished by the courts. But unfortunately, if the patient comes back to life, after the declaration of death, the doctor declaring death is in trouble and must settle the problem outside the court by paying compensation before litigation begins, as he cannot prove his innocence and his negligence in diagnosis will be proved and punished by the courts by fine or imprisonment or both. He will also lose his licence and job.

(2) The diagnosis at area hospital, (divisional level), district hospital (district level) in Government and private hospital (secondary care hospitals):

All the clinical features described above under the primary care hospitals, should be followed and the diagnosis of death can be confirmed by taking an ECG, demonstrating absence of electrical activity of heart.

(3) Diagnosis and declaration of death in the teaching and nonteaching general hospitals and other state level corporate private hospitals (tertiary care hospitals): All the clinical features and the ECG investigation are the same as described under the secondary care hospitals. The additional test for the confirmation of the diagnosis is the EEG and the absence of electrical activity of the brain indicates brain death of the patient and declaration of death can be done after ECG and EEG, which are isoelectric.

(4) Diagnosis of brain (stem) death in the hospitals permitted by government for organ harvesting for organ transplantation: When Brain (stem) functions stop due to trauma or other disorders, it is called Brain (stem) death. In a few minutes after brain death, the respiration stops with car-

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diac asystole. The reflexes that should be absent in brain death are: (a) Pupillary reflex (b) The corneal reflex (c) Pain response in the distribution of 5 th cranial nerve. (d) The occulocephalic reflex (e) The vestibuloocular reflex (f) The gag response and cough reflex. (g) Rebreathing test: this is performed using 100% oxygen given through the endotracheal tube to maintain satisfactory oxygenation to the patient, which cause a rise in pCo<sub>2</sub>, which would normally act as a stimulus for respiration. Failure of this indicates brain (stem) death<sup>4</sup>.

Confirmation Tests of Brain Death : They are:

- (1) Cerebral Angiography,
- (2) Electroencephalography
- (3) Transcranial Doppler Ultrasonography
- (4) Cerebral Scintigraphy

All the above tests are conducted by trained personnel and interpreted by the experienced specialist doctors. The general medical officers have no role in the conduct or interpretation of the above tests.

The diagnosis of brain (stem) death is made by an experienced neurophysician or neurosurgeon and neuroanesthesiologist experienced in neurocritical care, examining separately, at least on two occasions and who are not part of the organ transplantation team for the obvious reasons of selfish pre declaration of Brain (stem) death in the vested interest of procuring the precious organs which are in great demand for the waiting transplantation individuals. Hence, "No Death-No Donation" rule should be followed, ie, organ harvesting should be done only after the occurrence of the actual death followed by organ donation<sup>5</sup>.

From legal and ethical aspects, it is always better for

the honest specialist doctors diagnosing and declaring brain death belong to a separate hospital and the harvested organs are transported to the other hospital, where organ transplantation is undertaken. Where ever possible, the informed and written permission (consent) of the prospective brain death donor should be taken during the state of full consciousness of the patient. When the patient is unconscious, say after a major accident, the written and explicit consent of the immediate relatives must be taken without making any monetary incentives by the honest doctors and the organ donation must be voluntary and free of monetary considerations. The transplantation act<sup>6</sup> with amendments and transplantation of human organ rules<sup>7</sup> must be followed in India. Brain dead individuals are the potential donors of multiple organs for transplantation, ie, two eyes, two lungs, two kidneys, a heart and a liver. Brain is spared as the successful technique of brain transplantation is currently not possible. There should not be racketeer harvesting the multiple organs for the transplantation<sup>8</sup>.

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