



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2016; 2(8): 25-27
www.allresearchjournal.com
Received: 05-06-2016
Accepted: 06-07-2016

Dr. Anamika Nath
Post Graduate Trainee, Dept.
of Forensic Medicine and
Toxicology, Agartala
Government Medical College,
Tripura, India

Dr. Anamika Das
Post Graduate Trainee, Dept.
of Forensic Medicine and
Toxicology, Agartala
Government Medical College,
Tripura, India

Dr. Ranjit Kumar Das
Associate Professor, Dept. of
Forensic Medicine and
Toxicology, Agartala
Government Medical College,
Tripura, India

A study on knowledge regarding brain stem death among medical students and trainees of Agartala government medical college

Dr. Anamika Nath, Dr. Anamika Das, Dr. Ranjit Kumar Das

Abstract

Introduction: Removing of life support and procurement of organs for transplantation is the important implication of brainstem death. Various factors can influence this decision. The present study was conducted to investigate the knowledge about brainstem death among medical students and trainees.

Materials and Method: A cross-sectional questionnaire survey was administered to 205 undergraduate students, intern and post graduate students of Agartala Government Medical College.

Results: 88.3% of subjects knew the anatomy and functions of brainstem. Only 40% of the subjects could identify brainstem death as a different entity from persistent vegetative state. 80% of subjects knew the protocol of requirement of more than one doctor and twice testing of the patient before declaring brain stem death. 40.5% of the subjects knew the differential diagnosis of brainstem death. 65.3% of the individuals recognised EEG as an ancillary test for confirmation of brainstem death.

Conclusion: Knowledge is an important factor affecting an individual's decision concerning removal of life support therapy upon the diagnosis of brainstem death and further procuring organ for transplantation. Hence, emphasis should be made to manage this important end-of-life issue.

Keywords: Brainstem death, organ transplantation, medical students and trainees

1. Introduction

Brain stem is located between-Cerebrum and spinal cord. It consists of: a) Medulla oblongata b) Pons and c) Midbrain. The Brainstem provides pathways for tracts. Medulla contains centers that control cardio-respiratory functions. Pons is associated with the reticular activating system. Hence Brainstem is involved in Arousal and conscious awareness [1]. According to Bishop's tripod of life, death can be classified as-a) cortical death, brainstem death and whole brain death [2]. Correct diagnosis of brainstem death is the only escape from legal issues, Versalius at Madrid in the year 1594 while conducting autopsy found a beating heart. For the requirement of transplantation of human organs, brainstem dead patients are the potential donors. Also in purview of euthanasia, brainstem death certification and simultaneous decision for withdrawal of life sustaining aids is quite necessary. Brain-Stem death is defined as a stage at which all functions of the brain-stem have permanently and irreversibly ceased as stated in sub-section (6) of section 3 of Transplantation Of Human Organs Act, 1994 [3]. In this act it is recognised as the single largest source for procurement of organs for transplantation followed by cadaveric transplantation. Protocols like Philadelphia Protocol, Minnesota Criteria and Harvard Criteria for establishing Brainstem death are adopted in countries like UK, USA, France, Australia, Germany but India does not have a specific protocol. Certification of brainstem in India is to be done by a panel of four doctors-1) Registered Medical Practitioner (RMP) in charge of hospital where brain death has occurred. 2) An independent RMP – a specialist. 3) A Neurologist / Neurosurgeon. 4) RMP treating the patient [4]. Twice Testing is by individual doctor is necessary. Establishment of cause of coma is necessary. Reversible causes of coma pre-testing should be excluded. Main tests include testing of brainstem reflexes, apnoea test and ancillary test like EEG. Limited studies are conducted on gathering information regarding knowledge of doctors towards Brain stem death in India. Agartala Government Medical College is just a decade old medical school where knowledge can be intended to grow further. Knowledge surveys help us give idea of knowledge gaps, set of beliefs which may influence on behavior patterns among respondents.

Correspondence

Dr. Anamika Nath
A.D. Nagar, Road no 5,
Agartala, Tripura (west)-
799003.

2. Objectives of the Study

Primary: To access existing knowledge towards brain stem death among medical students and trainees.

Secondary: a) to access the existing knowledge towards brain stem death among medical students and trainees of Agartala Government Medical College. b) To generate awareness about brainstem death among doctors of Tripura and its importance in purview of organ transplantation.

3. Materials and Method

The Study design was Cross-sectional. The Study area was Agartala Government Medical College. The Study population were the Undergraduate students, Internees and Post Graduate students. The Sampling procedure was Convenient. The Sample size was 205. Data is collected through a structured questionnaire containing 12 questions consisting of multiple choice questions, positive statements and negative statements. The data collected from the study of Knowledge among medical students and trainees of Agartala Government Medical College towards Brainstem death was analyzed by SPSS 15.0 and Excel.

4. Results

Following are the findings: 88.29% of the study population knew the Anatomy and Physiology of brain stem. 40% of the subjects recognised Brainstem death as a different entity from persistent vegetative state. 65.36% knew that the patient will not have any feelings. 52.68% knew that a functioning heart may be found in a patient of brainstem death. 66.34% of the study population knew that a panel of doctors is requiring for certification of brainstem death. 60.97% of the subjects knew that twice testing is required before declaring brain stem death. 60% of the subjects knew establishment of cause of coma is necessary. 65.36% of the subjects knew that brainstem reflexes will be absent in brainstem death. 57.56% knew that some toxins, poisons and drugs may mimic brainstem death. 58.53% knew that Conditions like Hypothyroidism, Hepatic failure and Adrenal dysfunction may mimic brain stem death. 52.19% knew that 100% oxygen should be supplied prior to disconnecting patient from ventilator to check for spontaneous respiration. 63.41% knew that EEG is the ancillary confirmatory test.

5. Discussion

In the year 1959 Moularet P, Goudon M first came up with the idea of coma ^[5]. In the year 1968, the concept of brain death was put forth by the Ad Hoc Committee of Harvard Medical School. In 1976 UK Royal Medical Colleges defined brain death as complete irreversible loss of brainstem function and specified clinical criteria to certify brain death. USA Presidents Commission published Guidelines in 1981 and recommended a period of 24 hours observation for patients with anoxic brain damage. In the year 1988, Irish Medical Journal published a Memorandum on Brain Death from an ad-hoc Irish Working Party ^[6]. Australian publication of Guidelines on clinical confirmation of brain death was done in 1995. In the year 2003 Malaysian Council published their own guidelines ^[7]. In the year 2006 The Canadian Council for Donation and Transplantation published national Guidelines for determination of brain death.

THOA (Transplantation of Human Organ Act) was passed in the Indian Parliament in June 1994. By July 8, 1994,

President of India gave his assent and by Feb 4, 1995- Came in force by a gazette notification. It regulates the removal of organ from living as well as the death. The principal matters covered are- a) Authority for the removal of human organ b) Regulation of hospitals c) Registration of hospitals d) Offences and penalties for illegal procurement and transplantation. Near relative-spouse, parents, siblings, and children are encouraged and other live donors who are not near relatives but are willing to donate organs due to attachment or any other reasons are permitted to do so. Approval of the Authorization Committee, established under the Act (joint application). This Act also aims at putting a stop to live unrelated transplant.

The patient must be examined by team of doctors at least twice with a reasonable gap of time in between (at least 6 hours). Clinical Evaluation (Prerequisites) to be done are: establishing known irreversible cause of coma and exclusion of potentially reversible conditions. There after it is followed by Clinical Evaluation (Neuro assessment) which includes-establishing coma, establishing absence of brainstem reflexes, establishing apnoea and absence of respiration drive. It must be remembered that Brainstem death is not the only cause of loss of brainstem reflexes for e.g. Brainstem encephalitis also cause loss of reflexes. Head injury ^[8], toxins, poisons, sedative drugs may mimic brainstem death hence drug history should be taken and toxicology screen done. Hypothermia is to be excluded. Core body temperature should be above 35°C. Some metabolic and/ or endocrine causes are to be excluded. These are Hypothyroidism, Panhypopituitarism, Adrenal dysfunction, Uraemia Hepatic failure. Also disorders of sodium, phosphate, magnesium and glucose to be excluded. Blood pressure >90mmHg systolic and (MAP > 60mmHg) should be maintained for brain stem tests. If necessary, infusion of fluid and vaso-active drugs should be given. Normal PaCO₂ (35-45 mm Hg) should be maintained. Pre-Oxygenation i.e 100% Oxygen via Tracheal cannula should be administered for 5 mins, to achieve PaO₂ of 200 mm Hg. Then patient is to be disconnected from ventilator and the reservoir bag and the movement of the abdomen and chest is to be observed. Resulting acidemia and hypercarbia will induce spontaneous respiration in the patient. If, despite hypercarbia and acidaemia, there is no attempt at spontaneous respiration, the test is positive. Body movements, secondary to spinal cord reflexes, have been observed after death. These may persist until all circulation has ceased. These movements represent only spinal cord activity ^[9]. So in such cases confirmation by an iso-electric electroencephalogram is done. Other ancillary tests are Cerebral Angiography, PET, Glucose Metabolic Studies, Dynamic Nuclear Scan and Somato-Sensory Evoked Potential.

6. Conclusion

Based on the result of the survey, the knowledge of the respondents was found to be not satisfactory. Knowledge and understanding of brainstem death is responsible for a positive attitude towards organ donation and thereafter transplantation. More emphasis should be placed in the medical curriculum on brainstem death and organ transplantation. Trainings, workshops and CMEs should be held to create awareness. It would help physicians to gain access to viable organs during the crucial window period.

7. Questionnaire

1. A) Brainstem consists of-
 - a) Midbrain, Spinal cord, Pons
 - b) Midbrain, Medulla oblongata, Pons
 - c) Spinal cord, Medulla oblongata, Pons
- B) Functions of brainstem are-
 - i) Arousal ii) Conscious awareness ii) Cardio Respiratory functions iv) Equilibrium
- a) i), ii), iv) b) ii), iii), iv) c) i), ii), iii)
2. Is Brainstem death equivalent to persistent vegetative state? (yes/no)
3. Does the patient have feelings? (yes/no)
4. Can the patient's heart be functioning? (yes/no)
5. Can a single doctor declare brain stem death? (yes/no)
6. Twice testing is required before declaring brain stem death. (yes/no)
7. Is establishment of coma necessary? (yes/no)
- 8: Brainstem reflexes may be present (yes/no)
- 9: Some toxins, poisons and drugs may mimic brainstem death (yes/no)
- 10: Following conditions may mimic brain stem death
 - i) Hyperthermia ii), hypothyroidism, iii) hepatic failure iv) adrenal dysfunction
- a) i),ii) iii) b) ii) iii) iv) c) i) ii) iv)
11. Percentage of oxygen should be supplied prior to disconnecting patient from ventilator to check for spontaneous respiration is
 - a)100% b)90% c)75%
- 12: Ancillary confirmatory test is EEG/ECG

8. References

1. Agur Anne MR. Dalley II AF Grants Atlas of Anatomy. 13th edition. Lippincott Williams & Wilkins, Philadelphia, 2012, 260-262.
2. Reddy KSN, Murty OP. The Essentials of Forensic Medicine and Toxicology.33rd edition. Jaypee publishers., New Delhi, 2014, 134-136.
3. Government of India. Transplantation of Human Organs Act, 1994. Available at: [http://www. mohfw. nic.in/](http://www.mohfw.nic.in/)accessed on 1.07.16.
4. Modi JPA. Textbook of Medical Jurisprudence and Toxicology.24th Edition. Lexis Nexis, Gurgaon, 2012, 207-208.
5. Eynon CA. Brain death and brainstem testing. Care of the Critically Ill. 2005; 21(5):147-150.
6. Irish Working Party on Brain Death. Memorandum on Brain Death. Irish Medical Journal. 1988; 81:42-5.
7. Consensus Statement on Brain Death, Ministry of Health, Academy of Medicine Malaysia, 2003.
8. Pallis C. Handbook of Clinical Neurology. Elsevier Science Publication, Amstradem. 1990; 57:441-95.
9. Wijdicks EF. Determining brain death in adults. Neurology. 1995; 45:1003-101.