

DIAGNOSIS OF BRAIN DEATH AND DONOR MANAGEMENT

Pages with reference to book, From 57 To 58

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Despite a widespread acceptance of organ transplant the world over, there is still a lack of conceptual clarity about brain death in severely injured cases. The use of terminology “brain death instead of death creates confusion in the mind of few people that it is only the brain and not the patient that is dead. Health professionals have personal concepts of death that vary widely. In one of the studies conducted in USA amongst physicians and nurses most likely to become involved in the identification and management of organ donors, only 63% respondents answered the correct definition of brain death i.e., irreversible loss of all brain functions; and only 35% knew the whole brain criterion of death and could correctly apply it to the patients in question¹. To clear the confusion and create a better definition of brain death, a new criterion for determining death has been established, viz., the irreversible loss of all brain functions². This new criterion has been accepted because of three reasons: (a) the diagnosis of loss of all brain functions is clinically practical and reliable³, (b) the course of these patients is predictable, they never regain consciousness and always develop cardiovascular collapse shortly^{2,4,5} and (c) they are an excellent source for organ transplant. The clinical tests of brain death determination are cerebral unresponsiveness, no spontaneous motor activity, absent pupillary, cornea! and oculocephalic/oculo-vestibular reflexes, absent cough reflex, no increase in heart rate after IV atropine (2mg), no respiratory efforts on apnoea testing (PaCo₂ more than 60mm Hg) and a silent EEG⁶. If death is secondary to overdose of barbiturates, metabolic encephalopathies or in newborns, then the brain death should be confirmed by contrast angiography or radionuclide studies that demonstrate absence of cerebral blood flow^{3,7}. In USA, the donor pool required to meet current transplant needs varies between 10,000-15,000/year^{8,9}. Despite such an adequate donor pool only 15-20% potential donors actually become donors^{10,11} because of inadequate donor management in the ICU prior to organ retrieval¹⁰. Early recognition, rapid and correct diagnosis of brain death, physiological maintenance and coordination between donor and recipient agency are a few other factors that can add to the donor pool¹². Studies have shown that almost 98% of all organ donors originate in ICU¹¹ following admission for severe head injury (56-77%)¹³⁻¹⁶ and the rest due to subarachnoid haemorrhage and brain tumors. A very small percentage die of cardiopulmonary arrest, anoxia and drug overdose. Although a large majority of potential donors are recognised within 24 hrs of admission, but the diagnosis is delayed beyond 24hrs in about 25% cases. ¹⁷ Of the total 20% die within 6 hrs of admission and 50% within 24 hrs¹³. . Therefore, early recognition of these potential donors is essential in order to improve donor pool.

EXCLUSION/INCLUSION OF DONORS

Candidates dying of drowning or severe burns are excluded straightaway because of a high risk of infection and its allied complications^{18,19}. Infections, untreated septicemia, AIDS, viral hepatitis, viral encephalitis, Guillain-Barre syndrome, current IV drug abuse, active knoxes and malignancy elsewhere except primary in the brain are the general exclusion criteria for organ donation¹². Although patients under 60 years of age are generally considered as organ donors, but recent data suggests that it is the present function and status of the organ than the age which should be used as the deciding factor for

organ retrieval²⁰⁻²³. Donors with a history or evidence of coronary or valvular heart diseases are excluded as heart donors or heart-lung donors as pathologic cardiac murmurs do not become apparent unless the volume has been replenished²⁴. A 12 lead ECG is required to exclude infarction. Presence of pathological Q waves contraindicates the use of heart as a donor organ^{14,23-25}. A normal ECG associated with mild abnormalities like septal hypokinesis, mitral valve prolapse without regurgitation or small pericardial effusion can be considered as donors²⁶. Cardiac isoenzymes have low specificity and sensitivity in victims of trauma and are therefore of little value in evaluating heart donation²⁷. History of chronic lung disease, heavy smoking, severe parenchymal damage and aspiration excludes lung-heart donations. Similarly a high alveolar-arterial O₂ gradient, colonization of trachea with fungus or numerous polymorphs in sputum²¹, atelectasis resistant to lung expansion techniques and pneumonia should be excluded from lung donations.

GENERAL MANAGEMENT OF DONORS

They include frequent posture change to avoid decubitus ulcers, lubrication and protective closure of eyes, frequent airway suction followed by manual lung inflation to prevent atelectasis and pneumonia. Nasogastric aspiration, prevention of hypothermia²⁴ and aseptic insertion of all catheters and IV lines. After replacement of volume deficit, maintain IV volume by hypotonic saline at a rate of 50ml/hrs or adjusted according to CVP. Dextrose should also be infused intermittently to supply adequate calories¹⁹. Electrolytes should be replenished as and when required. Destruction of hypothalamic-pituitary axis results in reduction in ADH hormone, with resultant diabetes insipidus. Desmopressin (vasopressin) 0.5-2mg IV every 8-12 hrs is preferred to other vasopressin in such cases²⁸. Pitressin as continuous IV infusion at a rate of 0.5-1 IU/hrs is the second drug of choice. Try to maintain urine output to more than 100ml/hrs but less than 250ml/hr^{29,30}. Correct Ca, Mg and phosphate levels, which are often low. Maintain minute ventilation and tidal volume to maintain an arterial PH of 7.4. If severe metabolic acidosis is present, a high minute ventilation is required to maintain PH, otherwise use bicarbonate³¹⁻³³. The use of prophylactic antibiotics is controversial, but no current data suggests their efficacy in reducing infections. Look for a site and cause of infection and treat it accordingly. Avoid nephrotoxic drugs. Approximately 10% of all donors will experience a cardiopulmonary arrest²⁵. Atropine is ineffective in the treatment of bradycardia in brain death cases. The antagonists like epinephrine is preferred but avoid intracardiac injection as it is liable to exclude heart as a potential donation¹². Request laws now exist all over USA through which the hospital notifies the nearest organ procurement agency, when brain death is diagnosed in individuals who have willed their organs in advance or from the family when the deceased has not made an advance directive. The local agency which is linked to the nationwide agency by a computer sends all the demographic data of the donor which could be matched to an organ recipient thereby making a rapid organ matching.

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