ORGAN DONATION Donation after brainstem death

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Brainstem death occurs after severe brain injury as a result of either trauma or a cerebrovascular accident. Potential DBD donors are in an apnoeic coma that requires mechanical ventilation on the intensive care unit (ICU). There must be a known cause of irreversible brain damage demonstrated by a computerised tomography (CT) scan. Brainstem death is defined as the permanent loss of the capacity for consciousness and spontaneous breathing. These two essential functions are controlled by the brainstem. The reticular activating formation controls consciousness and is di ff use throughout the brainstem; the respiratory centre is in the medulla oblongata. In this situation the circulation can be maintained for a period of time after death and DBD donors were formerly called heart-beating donors. In most countries it is accepted that brainstem death equates in medical, legal and religious ter ms to the death of the patient. Before brainstem death testing can be considered, all reversible causes of coma must be excluded. These include: hypothermia, muscle relaxants, drugs with central nervous system depressive e ff ects, alcohol intoxication, hypothyroid - - ism, uraemic encephalopathy , hepatic encephalopathy , hypo - glycaemia and hyponatraemia. When these preconditions are met then formal brainstem death testing can be undertaken (Table 88.1). The UK guidelines state that the tests should be perf ormed twice by two clinicians who are independent of the transplant team. One of them should be a consultant and the other must have been registered with the General Medical Council for at least 5 years.

The main indications for organ transplantation • The surgical principles of organ transplantation • The expected outcomes after transplantation • The potential future developments in transplantation • TABLE 88.1 Clinical testing for brainstem death. Cranial nerve 1. Pupillary re /f_l ex (cranial nerves II and III) re /f_l exes 2. Corneal re /f_l ex (cranial nerves V and VII) 1 3. Oculocephalic (doll’s eyes movements – cranial nerves III, IV and VI) 4. Vestibulo-ocular (cranial nerves VIII, III and VI) 5. Cough/gag re /f_l ex (cranial nerves IX and X) 6. It is not possible to test cranial nerves I and XII in unconscious individuals Absence of cranial nerve motor response to Motor supraorbital pressure (cranial nerves V and VII) response and absence of motor response in the cranial nerve distribution to adequate stimulation of any somatic area (commonly nail-bed pressure) After preoxygenation with 100% oxygen the Apnoea test patient is disconnected from the ventilator for >5 minutes in order to achieve a PaCO 2 ≥ 6.0 /uni00A0 kPa (and pH<7.4). If there are no respiratory movements in response to the progressive hypercarbia then the test con /f_i rms that the brainstem respiratory centre has been destroyed. To prevent hypoxia during the apnoeic period, O (6 /uni00A0 L/min) is delivered via an 2 endotracheal catheter , partial pressure of carbon dioxide. PaCO 2

oxygenated blood during the procurement surgery . The thor acic and abdominal organs are accessed through a median sternotomy and a midline laparotomy incision and their inflow vessels

are cannulated. The organs to be recovered are usually dissected and mobilised with the heart beating. Ice-cold cardio plegia solution is then perfused into the coronary arteries via a cannula in the ascending aorta to stop the heart. At the same time the abdominal organs are perfused with ice-cold preser vation solution via cannulae in the abdominal aorta and the portal vein. Each organ is removed and stored in fresh preser va tion solution and then packed in crushed ice for transport.

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