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ORGAN DONATION

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Intensive Care Medicine

Educational outcome :

- identify potential organ donor
- understand what si the definition of neurological death
- understand what are the prerequisites before testing
- know what tests are used to confirm neurological death

Introduction :

- Organ transplantation is a recognised treatment for end organ damage
- It is an altruistic act of beneficence resulting in the gift of life

- transplantation is life-enhancing for pancreatic and renal diseases
- transplantation is life- saving for end stage heart, lung and liver diseases

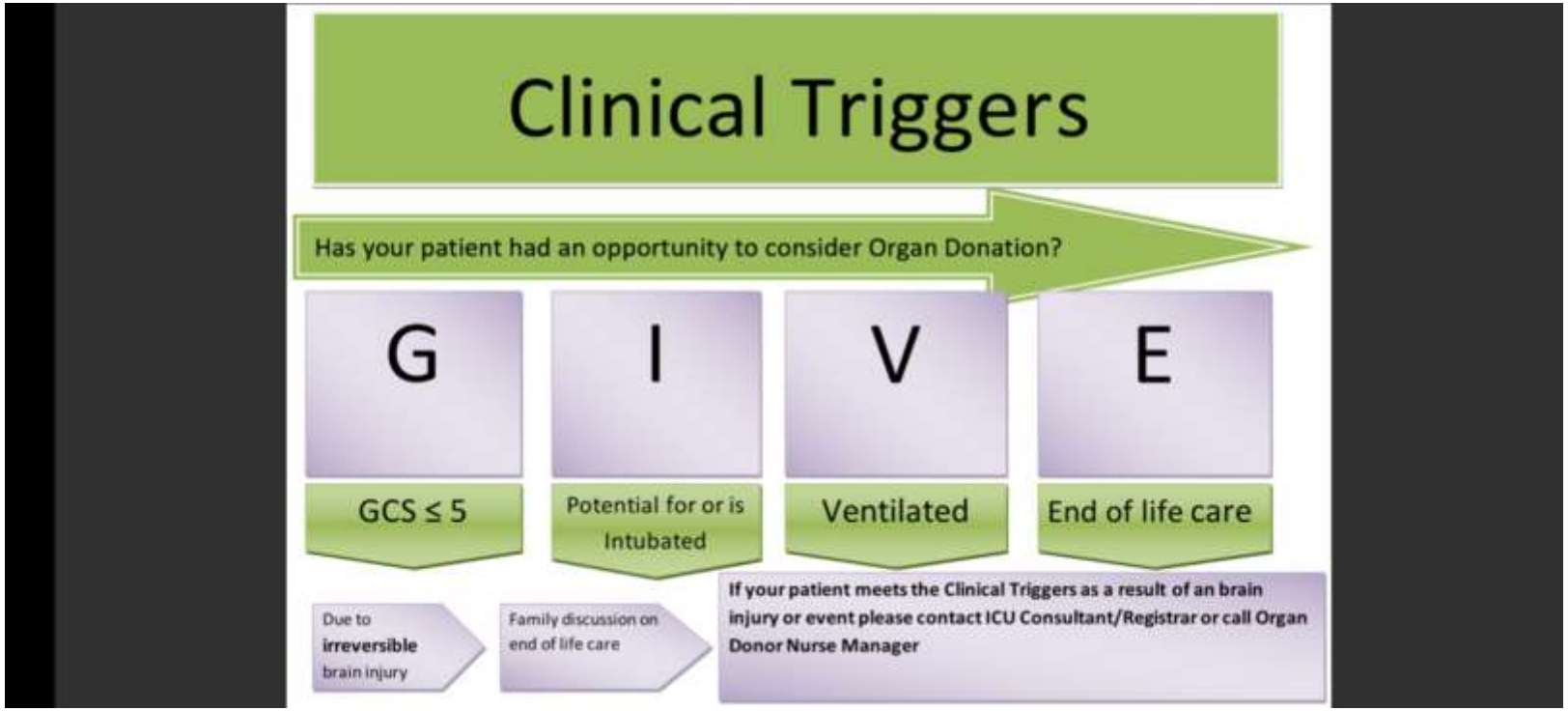
Donor identification :

- Defined clinical trigger factors in patients who have had a catastrophic brain injury.
- The absence of one or more cranial nerve reflexes and a Glasgow Coma Score of 5 or less, which is not explained by confounders.

- GIVE score
- AE, ICU, neurology/stroke units

Donor identification :

- A consistent clinical indicator used for the early identification of potential organ and tissue donors



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Criteria for organ donation :

- the process of organ donation places a huge importance on the balance of risk and benefit to the recipient

- potential organ donor (family) /potential organ recipient
- primary team /ICU / neurology/ surgeons/ organ donation coordinator.....

- suboptimal transplant outcomes :graft dysfunction , disease transmission, recipientś death

Criteria for organ donation :

- **absolute contraindications** :

- no consent from next of kin
- no consent from coroner (IRL/UK) – cause of death
- family dissent/conflict about donation
- advanced-stage disease (colon stage > T3 or breast > T1c)

Criteria for organ donation :

- **relative contraindications to donation** :

- sepsis, HIV positive, systemic viral infection , herpetic meningoencephalitis, neoplasms (lymphoma, malignant melanoma,...), lung cancer, glioblastoma, ...

- early stage disease cancers (bowel and breast) can be acceptable for organ donation depending on staging and the disease- free interval

Neurological death
DBD (donation after brain death) :

- definition :

- the irreversible loss of consciousness due to a known cause
- loss of brain reflexes
- apnoea in the presence of respiratory acidemia

Neurological death :

- aetiology :
- cerebral haemorrhage, cerebrovascular embolism, hypoxic brain injury, , traumatic brain injury, meningitis, brain tumour, epilepsy, brain abscess, hydrocephalus,..

- tests :brain stem test

  apnoea test
- ancillary tests – *radiology, audiometry,EEG, transcranial Doppler*

Neurological death – prerequisites :

- known cause of death
- drug free state – no sedatives, no muscle relaxants, no anesthetic agents, alcohol, opiods,....

- normothermia > 36 °C
- avoid electrolyte imbalance , Na 130-155mmol/L, normal blood glucose levels, ...

- no endocrine imbalance

Brainstem tests, apnoea test :

Table 2 Brainstem death tests

Brainstem reflex tests

Test	Cranial nerve		Test details (brainstem level)	Response in brainstem death
	Sensory	Motor		
Pupillary response	II	III	A bright light is shone into each eye in turn. Direct and consensual reflexes should be sought (mid brain)	Absence of pupillary constriction
Corneal reflexes	V	VII	The cornea is brushed lightly with a swab (pons)	No blinking
Oculo-vestibular reflexes	VIII	III, IV, VI	50 ml of ice cold saline is instilled into the external auditory meatus over 1 min. The tympanic membrane should be visualized by otoscopy before testing. Both sides should be tested, though inability to perform the test on one side does not invalidate the test (pons)	No eye movement
Response to painful stimulus	V	VII	Painful stimulus is applied to the supra-orbital ridge (pons), and also to the limbs and trunk	No motor response in the cranial distribution
Gag reflex	IX	X	The pharynx is stimulated with a spatula or similar device (medulla)	No gag or pharyngeal contractions
Cough reflex	X	X	A bronchial catheter is passed to the carina (medulla)	No cough

Apnoea test

The apnoea test should only be performed once the absence of brainstem reflex activity has been confirmed. The aim is to produce an acidaemic respiratory stimulus (pH<7.4) without inducing hypoxia or cardiovascular instability. This applies to those with chronic respiratory disease, though the Pa_{CO_2} required to achieve this may be higher

1. Increase $F_{I_{O_2}}$ to 1.0
2. Perform arterial blood gas analysis to calibrate E'_{CO_2} and Sp_{O_2}
3. Reduce minute ventilation until E'_{CO_2} reaches 6.0 kPa and pH is 7.4. Sp_{O_2} should be greater than 95%
4. Maintain apnoeic oxygenation by either instilling 5 litre min^{-1} O_2 into the lungs with a suction catheter or with CPAP
5. Observe for respiratory activity for 5 min
6. Confirm an increase in Pa_{CO_2} of more than 0.5 kPa using blood gas analysis

After completion of the apnoea test, the ventilator should be reconnected. Acid–base status should be normalized before second set of tests

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ICU managment of potential organ donor :

- ICU principles :
- maintain euvoleamia
- optimise cardiac output
- lung protective ventilation

- diabetes insipidus- Na/UO/
- prevent hypothermia
- glyceamia control, (thyroid hormones, glucocortikoids, ...)

Donation after circulatory death (DCD) :

- DCD – refers to the retrieval of organs for the purpose of transplantation from patients whose death is diagnosed and confirmed using <u>cardio-respiratory criteria</u>

- controlled /uncontrolled
  expected /unexpected
- ICU, stroke unit /emergency department, out of hospital
- UK, Australia /France, Spain .
  both Netherlands

Perioperative management :

- maintain clinical targets as in „normal“ patient
- no need for opiods
- muscle relaxants usually needed
- low dose of sevoflurane (inhalational anesthetics) improves outcome

Family approach :

- principles
- Care of the dying patient is of paramount importance!!!
- Measures to maintain the comfort and dignity of the patient must not be compromised for organ donation

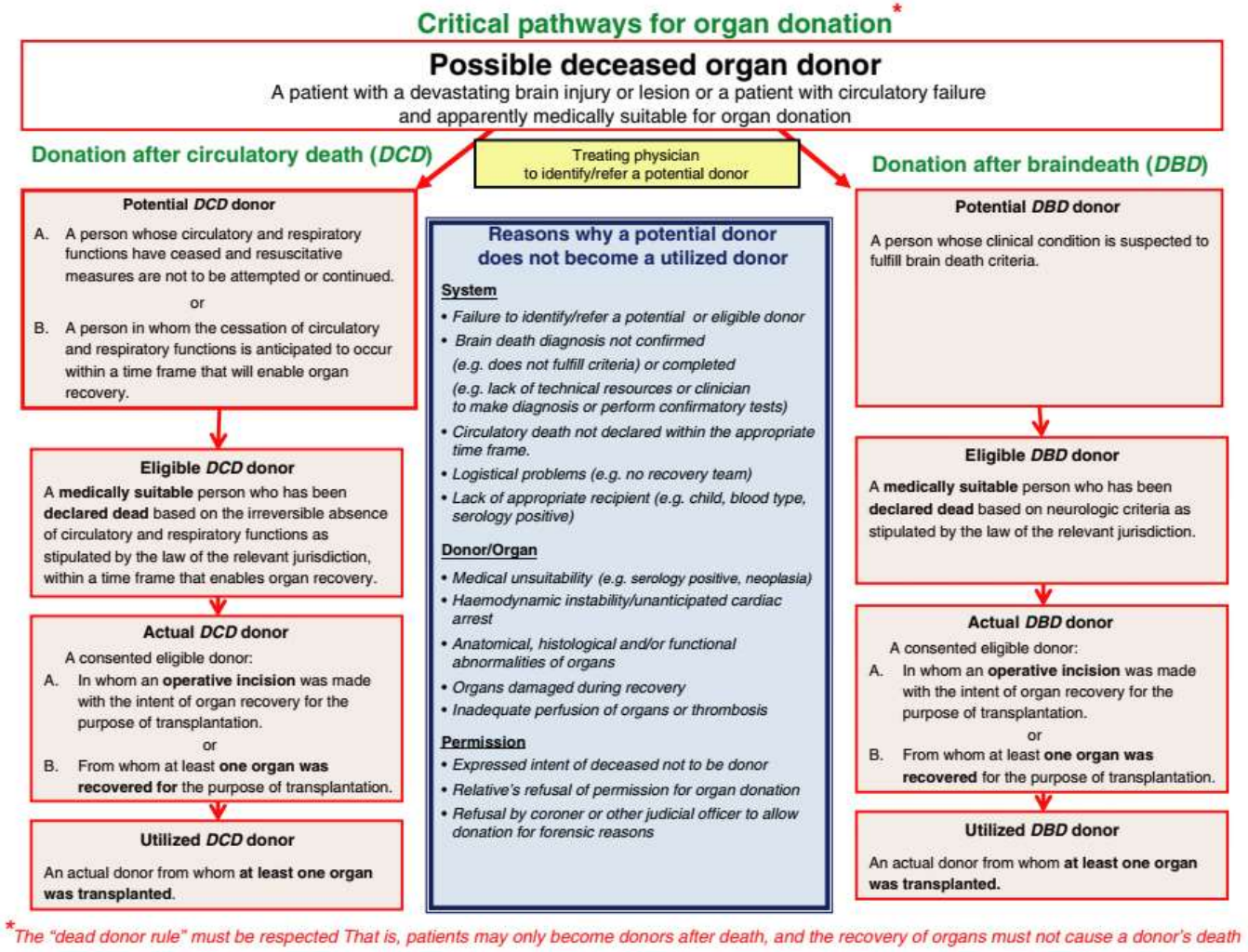
Family approach :

- **use clear language**

- obtain the patient’s clinical history
- identify key family members
- identify key family issues, including the need for family support
- identify relevant cultural and religious issues

- all religions support the ethos of organ donation

Donor identification summary :



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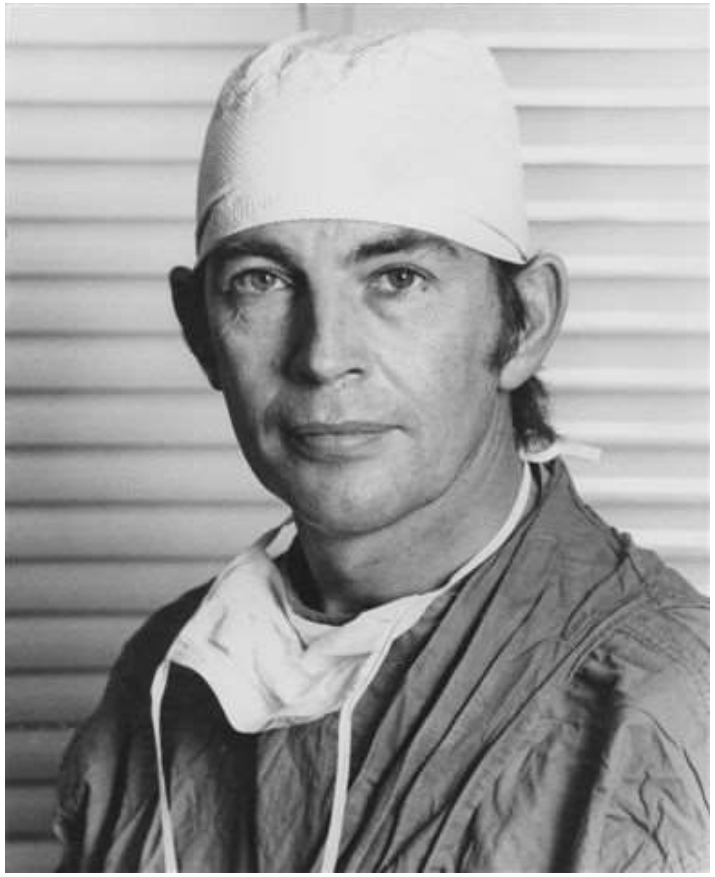
Take home message :

- existence of organ donation program
- organ donation program is a multidisciplinary task
- dealing with a family is very delicate matter

thank you



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Lékařská fakulta Masarykovy univerzity
2021