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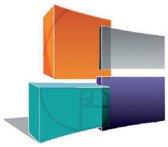

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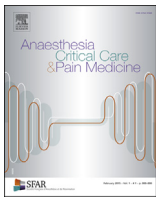

Editorial

Diagnosis of brain death, back to medical diagnosis!

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Brain dead donors are the most common source of organs. The diagnosis of brain death is a very important step in organ donation. ICU physicians must know how to make a correct diagnosis.

The concept of brain death (BD) is different between countries. The concept of "whole brain death" characterised by irreversible cessation of hemispheric neurological functions and brain stem is the most common. "Brainstem death" is defined only by a complete and irreversible loss of brainstem function. This concept is used, for example, in Portugal and the United Kingdom. These differences may explain why the way BD is diagnosed may differ from one country to another, but not only. Laws, recommendations and expert opinions may also differ from country to country [1].

In this issue of the journal, Dr. Chambade et al. report the results of a national survey on the diagnosis of BD in France where the concept is the "global brain death". The way in which DB is diagnosed is defined by law [2].

The authors sent questionnaires to ICU physicians on how to diagnose BD. Experienced physicians were defined as physicians working in an ICU where more than 10 brain-dead donors are identified per year. A total of 2082 physicians working in 300 ICUs were identified and 763 questionnaires were analysed (37%).

The results show that ICU physicians do not strictly follow the law. Only 59% of physicians report doing a drug assay and only 63% of physicians perform a complete brainstem test. The apnoea test is performed in only 90% of stable donors. The use of transcranial Doppler (TCD - not mandatory in diagnosis) is frequent (82%). To confirm the clinical diagnosis of BD, all donors undergo a complementary test, an angio-CT is performed in 85% of cases.

Experienced physicians report more often than inexperienced physicians testing the oculocardiac reflex, or spontaneous breathing test, than do inexperienced physicians. They use more frequently a TDC and angio-CT.

This survey is very interesting but this work has several limitations and biases. First, only 37% of physicians responded. This is a selected population of "motivated" people, which means that the results could be different in real life. Similarly, the results are purely declarative and may therefore be different. Second, there are some things that can help the doctor improve the way BD is diagnosed. In France, in most hospitals, transplant coordinators (nurses or doctors) come to the ICU to help the team in the donation process. The impact of the transplant coordinator on the diagnosis of BD is not discussed. In addition, many ICU have developed procedures and checklists for the diagnosis of BD. It is important to know if they have the documents available. Thirdly, the criteria for identifying the "experienced doctor" are questionable. Experience, educational programs followed, number of donors diagnosed are criteria that could be more relevant.

Nevertheless, this work raises the issue of the diagnosis of BD. It seems that doctors do not diagnose BD in a correct way and as required by law.

With regard to the different laws and recommendations between countries, it is important that the diagnosis of BD remains a medical diagnosis. It may be different from the legal diagnosis. It is the role of the physician to make a correct diagnosis by checking pre-existing conditions, performing a complete clinical examination for a clinical diagnosis and performing a complementary test is necessary (Fig. 1).

The absence of a cause of death is an absolute contraindication to donation. Before conducting a clinical examination, the presence of sedative in the patient's blood at a concentration that could alter the examination should be excluded. Similarly, severe hypotension, electrolyte disorder, or hypothermia ($< 35\ ^{\circ}C$) should be corrected.

For the clinical diagnosis, three mandatory clinical signs must be present:

- The clinical exam must show a coma with a Glasgow Score at 3, unresponsive to supraorbital region stimulation. Spinal reflexes can be seen in around 30% of cases [3];
- Brain stem reflex must test all cranial nerves:
  - o Pupillary light reflex,
  - o Corneal reflex,
  - o Oculocephalic reflex, oculovestibular reflex,
  - o Gag and cough reflex,
  - o Oculocardiac reflex;
- The total destruction of the brain stem must be attested by the apnoea test (for details see the European Guide for Quality and safety [4]).

In countries using the "whole brain death" concept, a complementary test is needed to confirm the irreversible destruction of the brain. In France, 2 EEGs or an angiography

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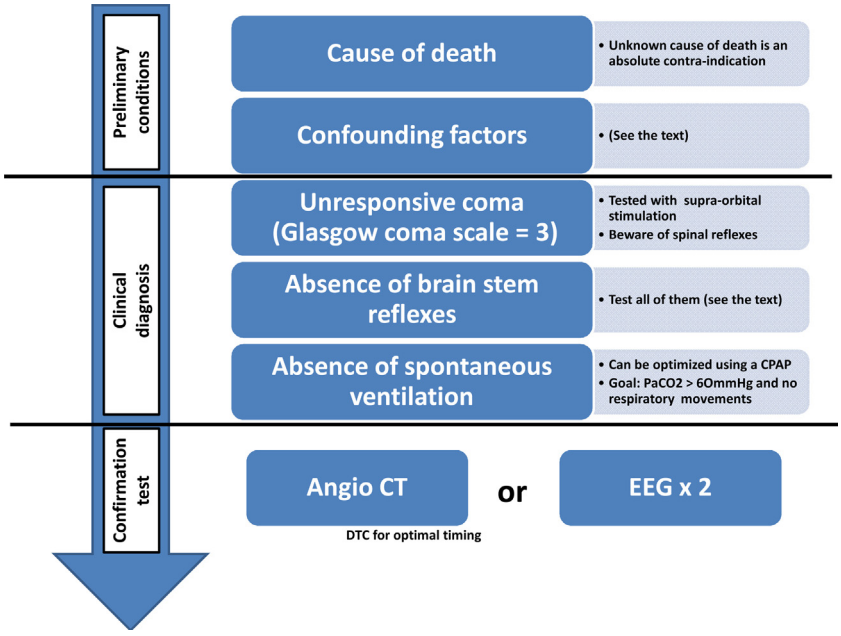

Fig. 1. Pathway for brain death diagnosis in France.

(mainly angio-CT) are accepted. Transcranial Doppler can help the doctor decide when to perform the angio-CT.

Once the clinical diagnosis has been made correctly, the physician must verify that the elements of the diagnosis comply or miss with regulatory requirements.

In this survey, the difference between the legal request and practice is difficult to explain but deserves to be explored further. What is real life practice in front of a potential donor, with a transplant coordinator, with a local recommendation, checklists and a legal document to be signed by the doctor? This may be the next step in assessing compliance with good clinical practices and then with the law.

Undoubtedly, the increase in the number of educational programs on pathophysiology of BD could help physicians improve the quality of their medical diagnosis, and avoid dramatic medical journal headlines [5]!

Disclosure of interest

The author declares that he has no competing interest.

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