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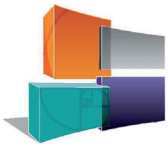
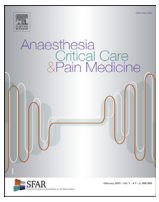


SFAR
Société Française d'Anesthésie et de Réanimation



Letter to the Editor

Adherence to the law in brain death diagnosis: A national survey

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In France, the diagnosis of brain death (BD) is based on a clinical assessment with a confirmatory testing since a decree in 1996 [1]. BD diagnosis has been reported in recommendations from the French Society of Anaesthesia and Intensive Care Medicine (SFAR). In the absence of confounding condition, 3 clinical criterions must be present: a complete unresponsiveness, the disappearance of brain stem reflexes and the abolition of spontaneous breathing confirmed by a positive apnoea test. Once these criterions are met, an ancillary test is mandatory to confirm BD [2]. There are few data available about the adherence of physicians to the decree. We conducted a national survey to evaluate practices in French intensive care units (ICU). A questionnaire was sent between January 7th 2014 and May 19th 2014 to every physician working in an ICU where at least one brain death had been declared in 2012. Because there was 3301 BD declared in 300 ICUs in 2012, physicians involved in more than 10 BD diagnoses per year were considered to have a practice of BD diagnosis slightly above average and, considered more experienced. Comparisons between experimented and less-experimented physicians were performed. A total of 2082 physicians were identified and 763 (37%) questionnaires were analysed.

1. Clinical evaluation

Confounding conditions are systematically searched by 733 (96%) physicians prior to brain death diagnosis. Indeed, sedative drugs intoxication is the main confounding condition as their elimination of sedative drugs is prolonged in critically ill patients [3]. Almost every physician (97%) declare to look for it but sedative drugs assays are performed by only 59% of physicians (Table 1). Complete disappearance of brain stem reflexes is assessed by 477 (63%) physicians. The oculocardiac reflex (OCR) is classically described as the last brain stem reflex to disappear and has therefore a central place in BD diagnosis. OCR is sought by 96% of experimented physicians and in 87% of less experimented. Apnoea test is systematically run in stable patients by 90% of physicians (Table 1).

2. Transcranial Doppler

Transcranial Doppler (TCD) is not an authorised confirmatory test for BD diagnosis. However, cessation of cerebral blood flow

Table 1
Criterion for brain death diagnosis depending on physicians' experience.

	All $n=763$	Experimented $n=294$	Less experimented $n=469$	*P*
Clinical diagnosis				
Confounding condition				
Drug intoxication	737 (97%)	286 (97%)	451 (96%)	0.53
Hypothermia	741 (97%)	291 (99%)	450 (96%)	0.41
Drug assay	451 (59%)	172 (59%)	279 (59%)	0.79
Brain stem reflexes				
Complete assessment	477 (63%)	196 (67%)	281 (60%)	0.07
Partial assessment	285 (37%)	97 (33%)	188 (40%)	0.06
OCR	687 (90%)	281 (96%)	406 (87%)	<0.01
Apnea test	688 (90%)	280 (95%)	408 (87%)	<0.01
Use of TCD	627 (82%)	258 (88%)	369 (79%)	<0.01
Brain death confirmation				
CTA	422 (55%)	193 (66%)	229 (49%)	<0.01
Angiography	12 (2%)	3 (1%)	9 (2%)	0.50
EEG	97 (13%)	31 (11%)	66 (14%)	0.19
CTA and EEG	232 (30%)	67 (23%)	165 (35%)	<0.01
Time to brain death confirmation				
Guiding ancillary test	233 (31%)	98 (33%)	135 (29%)	0.09
>6 h	263 (34%)	109 (37%)	154 (33%)	0.26
<6 h	248 (33%)	83 (28%)	165 (35%)	0.06

OCR: Occulo-cardiac reflex; TCD: Transcranial doppler; CTA: Computed tomodensitometry angiography; EEG: Electroencephalogram.

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(CBF) assessed by TCD has been described as a reliable technique for optimising time to BD confirmation [4]. TCD is used by 627 (82%) physicians as help in BD diagnosis and experimented physicians are a higher proportion to use TCD (Table 1). Guiding ancillary tests are used by 31% of physicians to determine the time of BD confirmation. TCD is the almost exclusively used (94%) guiding test. In other patients, recommendation issued from the French radiological society, advised on a 6 h interval between clinical diagnosis and BD confirmation [5]. Among physicians that do not use ancillary tests to guide BD confirmation, 248 wait less than 6 h after clinical diagnoses, possibly resulting in under-diagnosed BD or increased cost due to tests repetition.

3. Confirmatory test

Confirmatory tests for BD diagnosis should show the cessation of CBF or the absence of electrical activity. Unlike electroencephalographic evaluation, tests assessing cerebral blood flow cessation are not influenced by residual sedation. All physicians perform a test approved by law for BD confirmation. As shown in Table 1, most physicians (85%) use computed tomographic angiography (CTA) for brain death confirmation. Cerebral angiography is rarely performed (2% of physicians). EEG is used by 43% of physicians. Some physicians (30%) use both imaging and EEG to confirm BD. Experimented physicians are more incline to use CTA alone (Table 1). Despite a possible interaction of residual sedation on brain electrical activity, among physicians using only EEG, 43 physicians do not perform sedatives drugs assay.

4. Conclusion

Despite a globally good adherence to the 1996 decree, some physicians are not following the law. In clinical diagnosis, 4% of the physicians do not systematically look for confounding conditions. Complete disappearance of brain stem reflexes is assessed by 63% of physicians and 10% do not systematically perform the apnoea test. Experimented physicians seem to conduct more complete clinical examinations. Regarding confirmatory tests, every physician practice a confirmatory test approved by law. However, confirmation of BD by EEG without ruling out residual sedation might lead to false positive diagnosis. Experimented physicians have a higher focus on evaluation of cerebral blood flow, thus limiting the influence of an eventual residual sedation on BD diagnosis.

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Disclosure of interest

The authors declare that they have no competing interest.

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