Opinion regarding medical and scientific experimentation on clinically brain dead subjects. Report.

N°12 - November 7, 1988

Contents

Opinion

The expression " brain death" is to be preferred to " irreversible coma" to avoid confusion with prolonged comas.

Brain death means the irreversible ending of all brain activity (hemispheres and brainstem). It is a state in which all brain cells are destroyed. The brain is dead, but other organs of the body function because they are irrigated by blood maintained at physiological levels of oxygen and carbon dioxide by artificial ventilation. Such a state is possible only through the use of modern resuscitation techniques. It can only be maintained for a few days.

A diagnostic of brain death can be made only with the utmost care. Brain death, in the present state of medical knowledge, is recognised as a convergence of symptoms:

- total absence of consciousness and spontaneous activity
- total disappearance of spontaneous breathing even in hypercapnia(1)
- fixed, dilated pupils (mydriasis), absence of reflexes and no eye movement
- absence of all brainstem reflexes
- flat (" null") electro-encephalogram confirmed by two readings in a period of no less than 6 hours.

The circumstances of the onset of coma must imperatively be taken into account, as, in a toxically induced coma (or one possibly aggravated by the use of sedatives), a coma induced by profound primary hyperthermia, or a coma arising from massive endocrine failure, the observation period should be extended.

The interpretation of symptoms of brain death is also difficult in the case of children under 3 years old, and the observation period in such cases should be 48 hours.

When the above listed symptoms are *all* present for a sufficient time period, brain death is confirmed.

Brain death is the death of the individual. A death certificate should be issued as soon as it is observed. In conformity with the decree of March 31st 1978, relating to removal of organs, death is confirmed by two hospital doctors including one department head or substitute. When removal of organs for transplantation is planned, the two doctors signing the death certificate cannot be part of the transplant team.

Measures used to artificially maintain breathing and circulation can legitimately be discontinued when brain death has been confirmed. If organs are to be removed for transplantation, the apparatus is switched off only after the organs have been removed.

The removal of organs is authorised under the conditions described by the law dated December 22nd 1976 and the decree of March 21st 1978. The subject must not have indicated his opposition to such removal while alive.

The tacit agreement between the physician and the patient does not allow for scientific experimentation by the physician on his patient. The interest of scientific medical experimentation is to be taken into account, but we must give a higher priority to the respect due to the person and to the corpse, the faithful execution of the will of the deceased and the family, and trust which cannot be betrayed. One cannot ignore the distress of relatives and loved-ones faced with the paradoxical and painful fact of a parent or friend who, although dead, retains signs of life.

The moral conditions demanded to allow experimentation on patients (i.e. consent of the individual and a direct benefit to the individual resulting from the experiment), are obviously inapplicable to the case of brain death. We do not feel that presumed consent by the subject, allowed in law for organ transplants, can be applied to scientific experimentation. There is a difference between an organ transplant which can save a human life in the immediate future, and experiments for which the benefits are not predictable. The law dated December 22nd 1978, which includes the expression " therapeutic and scientific objectives", applies only to organ removal.

In conclusion, the National Consultative Ethics Committee is of the opinion that a practitioner cannot carry out experiments on a brain dead subject, unless the individual, while alive, has given written consent to " donate his body to science" or to " scientific experimentation" .

Report on medical and scientific experimentation on brain dead patients

Definition of brain death

The expression " brain death" is to be preferred to that of " irreversible coma" , although it is very explicit, to avoid confusion with prolonged comas. Brain death means the irreversible ending of all brain activity (hemispheres and brainstem). It is a state in which all brain cells are destroyed. The brain is dead, other organs of the body continue to function as a result of artificial ventilation.

Such a state is possible only through the use of modern resuscitation techniques. It can only be maintained for a few days.

Brain death, in the present state of medical knowledge, is recognized as a convergence of symptoms, five in total:

- total absence of consciousness and spontaneous activity

- total disappearance of spontaneous breathing even in hypercapnia

- fixed, dilated pupils (mydriasis), absence of reflexes and no eye movement

- absence of all brainstem reflexes

- flat (" null") electro-encephalogram confirmed by two readings in a period of no less than 6 hours.

It is also important to note that:

1. the observation period in the case of *a child under 3 years of age* is extended to 48 hours (immature brain)

2. the circumstances of *the onset of coma* must imperatively be taken into account, as the symptoms of brain death, particularly a flat electro-encephalogram, are not entirely significant if the subject was in a toxically induced coma or one possibly aggravated by the use of sedatives; or a coma induced by profound primary hyperthermia, or else one arising from massive endocrine failure. In these three cases *, a longer observation period is required* .

When the five above listed symptoms are *all* present for a sufficient time period, brain death is confirmed.

It is not imperative, to confirm the diagnosis, to test for brainstem evoked potentials, which might be highly significant but which at present require very specialised and sensitive technology, nor to use angiography which would show that blood circulation in the brain had ceased.

Brain death is the death of the individual. A death certificate is issued as soon as it is observed. In conformity with the decree of March 31st 1978, relating to removal of organs, death is confirmed by two hospital doctors including one department head or substitute. When removal of organs for transplantation is planned, the two doctors signing the death certificate cannot be part of the transplant team.

The consequences of a diagnosis of brain death

1 **. When brain death has been confirmed** , measures used to artificially maintain ventilation and circulation in the body can legitimately be discontinued. (If organs are to be removed for transplantation, the apparatus will be switched off only after removal).

2 **. The removal of organs** from the body of the deceased is authorised under the conditions prescribed by the law dated December 22nd 1976 and the decree of March 31st 1978. The subject must not have indicated his opposition to such removal while alive. Family consent is not required in law, but intensive care personnel feel that it is their duty to talk to relatives of the deceased and to try to obtain their consent.

3 **. Scientific experimentation on brain dead subjects** .

It has been suggested in some quarters, with the added comment that: " it is preferable to experiments on voluntary healthy or sick subjects" . However, a brain dead subject is perhaps not in a condition suitable for a satisfactory scientific experiment.

The law of 1976 uses the expression: organ removal " for therapeutic or scientific purposes" . However it should be noted that the law is titled " Law concerning organ removal" , and that it is concerned with organ removal and not with experimentation. It cannot be denied that there is a difference between a transplant which can save a human life in the immediate future and experimentation for which the benefits are unpredictable.

A brain dead body is a person for whom death is certain but whose organs - excluding the brain - are still alive, artificially maintained. It is still in the care of medical personnel.

The tacit agreement formed between the physician and the patient does not allow for experimentation by the physician on the patient. The interest of medical scientific research should be taken into account, but also the respect due to the person and to the corpse, the faithful execution of the will of the deceased and the family, and the trust which must not be betrayed. The doctor does not own the body of the person being treated.

Many ethical texts have been written concerning medical experimentation since the Nuremberg Code in 1947. These documents have not been concerned with brain death, unknown at the time or of which too little was known. All stress the importance of the *free consent* of the subject, and insist that the experiment should be of *direct benefit* to the individual on whom it is carried out.

In the case of brain death, direct benefit to the individual is meaningless. It is also out of the question to obtain consent. We do not feel that consent can be presumed in the case of scientific experimentation, as it is under the law for organ transplants.

It would be necessary for the patient, wishing, if possible, to be still of use to humanity, to have indisputably declared while alive that he wanted to " donate his body to science or to scientific research" . The possibility exists, and will most likely become less and less rare because the idea of human solidarity, of participation in the common good, in scientific progress, is advancing.

In the absence of consent by the subject, it has been proposed to obtain the *consent of the family* , and approval by a local committee of ethics.

Consent of the family is important. As mentioned above, intensive care personnel feel morally obliged to obtain this consent in the case of organ transplants.

The intervention of a committee of ethics brings to mind a few comments. If such approval were to be made compulsory, it could only be applauded, and would at least make it possible to advise against experimentation which is useless or scientifically unsound. However, it should not be used by us as an excuse to avoid giving an answer in principle to the question that has been put to us: what is it permissible to do to a brain dead subject?

However, such a clause would be difficult to apply in practice. As the state of brain death lasts only a few days, it would be impractical to urgently convene a committee of cthics for each case. One can imagine then that the committee of cthics could be consulted in advance on a project for a certain type of experimentation which could be undertaken when a brain dead subject became available. The committee could certainly make a judgement in advance on the scientific merit of the experimentation, but how would it evaluate; the conditions under which the brain death diagnosis would be made? the conditions under which the family would be informed and would give its consent?

It could also be feared that disparate opinions given by various local ethics committees would create some confusion and heterogeneous case law which would soon become intolerable.

Thus the intervention of a committee of ethics is not a solution to all problems.

4. **The same reasoning applies to the use of brain dead bodies for educational purposes for training in various techniques.**

Two conclusions can be considered:

1. A physician cannot decide to use a brain dead subject for experimentation, unless the person had declared while alive that he wished to donate his body to science.

2. The doctor cannot use a brain dead subject for experimentation without the (written?) consent of the deceased's family (or if the family has not made it known that it was opposed to such experimentation) and with the approval of a committee of ethics.

After discussion, the Committee declares itself in favour of the first proposal.

Report: Can experimentation be allowed on a subject in a "chronic vegetative state" ?

The National Consultative Ethics Committee has already published an Opinion on this question on February 24th 1986. It had observed that, considering the respect due to the human being, a patient " cannot be the subject of therapeutic tests unrelated to the treatment of his illness" .

It is indeed necessary to distinguish between therapeutic tests which can eventually benefit the subject, and which therefore are legitimate, and scientific experimentation unrelated to the subjects pathology, which is to be condemned.

The expression " chronic vegetative state" describes a clinical case which can be observed as a result of a serious coma.

After a few weeks or days of deep coma, the subject comes out of the coma. He opens his eyes, exhibits eye movement, has alternative periods of sleep and wakefulness, spontaneous breathing is not absent, shows some reactivity. However, it is not possible to communicate with him, nor can one tell if he has any perception, if there remains a degree of consciousness, if pain is felt. The encephalogram is irregular but not flat.

Such a state indicates serious damage to the brain hemispheres, while the brainstem is partially undamaged.

A chronic vegetative state can last for months or years, providing perfect treatment is administered (feeding by gastric intubation, monitoring of biological equilibriums and correction of any disequilibrium, prevention of sores and infection, etc....).

A recovery is not impossible during the first few months. After a year or more recovery is almost unheard of.

Subjects in such a state are still human beings, they are patients. Their brain is not dead. There are no longer in coma. They may be conscious of something, they may feel some pain.

We feel that the Opinion of the National Consultative Ethics Committee in 1986 should not be modified. A practitioner may not use a subject in a chronic vegetative state for experimentation other than that which might be of benefit to the patient himself.

Notes

1. Hypercapnia : an excess of carbon dioxide in the blood