

# TO DIE AND LET LIVE: THAT IS THE QUESTION

DANIEL BORG

M.D. (MALTA), D.A.

*Consultant Anaesthetist,  
Harari Central Hospital,  
Salisbury, Rhodesia.*

Death is my arch enemy not only as a living creature but also as an anaesthetist. My professional duties are to keep people alive during operations and to snatch them from the jaws of death by resuscitation and organised intensive care in the routine hospital service. The reader will quickly notice that the title of my paper is a variation on a popular catchphrase with half a line from "Hamlet" tagged on. My subjects are the modern controversy about resuscitation, the moment of death and transplantation of human vital organs: nowadays a person may, after death, still render a great ser-

vice to his fellow men on whom his viable organ/s could be grafted to improve their precarious health and to prolong their lives.

## **Organ transplantation**

During the last few years, in many medical centres throughout the world, transplantation of human organs (mostly kidneys) from living people and from recently dead patients has been carried out with a reasonable degree of success. My colleague and friend, Professor Henning Poulsen, visiting the Artificial Kidney Unit

at Harari Central Hospital in Salisbury last year, told me that in his hospital in Denmark kidney transplantations have been achieved on well over a hundred patients.

Towards the end of last year, a most remarkable medical achievement — the first successful human heart transplantation — was registered in the famous Groote Schuur Hospital, Cape Town. Amid the universal rejoicing and applause to Professor Chris Barnard and his clever team, some people wondered why South Africa, of all nations, should “win the gold medal”: little did these people know that up to last year Cape Town in particular, enjoyed a very high percentage of success in open heart surgery and that their research programme was second to none. The Washkansky transplant inevitably precipitated discussion about the legality and ethics of such operation. The cardinal question in this matter concerns the donor, namely that person from whom one or more vital organs are removed and transplanted into another person (the recipient). Doctors, lawyers, moralists and other responsible people would like to feel assured that, before removal of the vital organ/s, the donor has actually died and that he or she had not been denied the resuscitative measures possible before death finally occurred.

The precise moment of death has assumed a new importance: its determination would satisfy the ethical and legal aspects of the transplant operation as well as the necessary requirement that the homograft be removed within minutes of the death of the donor.

### **Resuscitation and death**

At the 46th South African Medical Congress in Durban last year, I heard Dr. Keith Simpson, Professor of Forensic Medicine in the University of London at Guy's Hospital, reading his paper “Moment of death” in which he stated: “For centuries, the cessation of heart beat, of respiration, of reflexes, of reaction to stimuli so vividly portrayed by the novelist and playwright — so obviously the end — have been the

criteria of death: the dropped jaw, the glassy stare, the mirror that lies unchanged before the mouth, all have justified the drawing of a sheet over the face, the sign of the cross, the undertaker and interment..... And now the remarkable advances in methods of resuscitation, the increased effectiveness of analeptic and tensive drugs; and more, the technical procedures by which surgeons and anaesthetists can shrink a man's metabolic needs by hypothermia, maintain a heart's vitality by coronary perfusion or restore its rhythm by defibrillation or pacemaker and sustain a respiratory excursion by pulmoflator have created new problems in deciding the moment of death.”

The use of modern resuscitative measures has introduced a complex variable into the equation linking life and death. Despite this development, the law in every country still insists that the fact and the time of death should be certified by a qualified medical practitioner. The latter, more often than not, refreshes his knowledge by reviewing from time to time the deliberations of prominent medical and legal experts.

### **Definition of death**

The Oxford English Dictionary defines death as “the final cessation of vital functions.” Keith Simpson (1965) elaborates on this by saying that there is still life “so long as a circulation of oxygenated blood is being maintained to live vital centres.” The most vital organs of the body are the brain, the heart, the lungs, the liver and the kidneys. These organs are called vital because without any one or more of them the individual cannot exist independently; they are well interrelated in function to make life possible: the liver fortifies the blood with energy from food, the kidneys remove effete matter from the blood, the lungs oxygenate the blood while the heart pumps it to all parts of the body especially to the brain, whose vital centres regulate the other organs according to the needs of the body.

Following cardiac arrest or circulatory obstruction by a blood clot or haemor-

rhage in their vicinity, the cerebral vital centres, on account of the failure of oxygenated blood to reach them, within a few minutes cease to function and the body dies. The function of the vital organs can be maintained by artificial means for an indefinite period, and even the survival time of the cerebral centres themselves can be prolonged by controlled hypothermia. Depression of the cerebral centres by trauma or disease of the body can be reversed by administering stimulants, but, once they irreversibly fail, there is nothing our human endeavours can do except pronounce the person dead.

In some countries like the U.S.A. they differentiate between "clinical death", "biological death" and "social death". Clinical death ensues when there is cardiopulmonary arrest with suspension of the activity of the cerebral cortex. When the cerebral cortex is electrically irreversibly inactive, while the circulation and respiration are maintained spontaneously or artificially — this death is labelled biological. Social death occurs when a person is actually "alive" biologically but is, due to irreversible stupor or coma, in a vegetative state. The Czechoslovakian Society of Anaesthesiologists, for example, prefer to use "cardiopulmonary arrest" instead of "clinical death" and just "death" instead of "biological death".

For the purpose of organ removal for transplantation in Belgium, the donor is considered dead subject to these conditions: (1) complete bilateral dilatation of the pupils; (2) complete absence of reflexes, both natural and in response to profound pain; (3) complete absence of spontaneous respiration 5 minutes after mechanical respiration has been stopped; (4) falling blood pressure, necessitating increasing amounts of vasopressor drugs; and (5) a flat electroencephalogram (E.E.G.).

It is worthwhile mentioning the French point of view, which seems to be accepted by some countries in Eastern Europe. In Marseilles the symposium "*Colloque sur les états frontières entre la vie et la mort*" was attended by doctors, lawyers and even by theologians and philosophers. The outcome of their delibera-

tions is condensed in the following (1965): "In consequence of recent advances in medicine, new medical situations have arisen which make it necessary to define two conditions (or states): *coma prolongé* and *coma dépassé*, Prolonged coma is a state in which the vegetative functions appear to be still preserved. This condition may progress to an irreversible state (*coma dépassé*) or, on the contrary, prove to be reversible. *Coma dépassé* (irreversible coma) is a state in which all cerebral functions have ceased due to central nervous system death, the vegetative functions being artificially maintained (by artificial respiration and so on). The diagnosis should be confirmed by clinical and laboratory investigations which should show that death of the central nervous system has really taken place. This investigation should be done repeatedly and found unchanged in the course of at least 48 hours. If the diagnosis is confirmed, the patient may be declared dead and organs may be removed for transplantation purposes". To doctors in other countries used to the 2-hour period after death before organs could be removed, the French 48-hour period seems rather drastic, but in these times of indecision the French feel strongly the responsibility of safeguarding the interests of potential donors.

#### **Resuscitation: medical, moral, ethical and legal aspects**

Failure of the functions of the liver and kidneys usually does not present an immediate danger to the patient's life as failure of the respiration and/or of the circulation would definitely do. The danger is not connected with the intrinsic damage to the organs themselves but rather with the consequence of oxygenated blood not reaching the brain in time; also, if the brain itself is extensively damaged, it cannot survive however good is the supply of oxygenated blood.

The aim of resuscitation is to revive the apparently dead person by restoring the failing functions of the vital organ/s to normal. In fact, in a modern hospital certain very sick patients, requiring a 24-

hour suspension and coverage for resuscitation, are nursed in the Intensive Care Ward or Unit. I was very impressed with the Intensive Care Units at Danderyds Sjukhus (Hospital) in Stockholm and at the Children's Hospital in Tokyo — two of the most modern hospitals I visited 2 years ago.

To be successful resuscitation requires that the vital organs should be intact and that the physician should have the necessary knowledge and technical means for resuscitation, which must be applied within a certain critical time after the heart and respiration have stopped. The time factor is so essential that ambulance attendants and trained in the care of the unconscious patient and in cardiopulmonary resuscitation; better still there is a universal campaign to train the general public in such basic techniques as the kiss-of-life and artificial ventilation. It is gratifying to read in the Press that the life of an electrocuted father was saved by his own young son. Thus the doctor (or anybody else for that matter) in "maintaining the utmost respect for human life" must undertake resuscitation immediately and on the spot.

Cerebral anoxia of 3 minutes-or-more duration is liable to cause permanent or transient damage. While there is no hope for the former, there is a good chance of survival in patients with transient damage. Some patients that were revived by cardiac massage for a heart arrest, showed a marked deterioration in mental ability, were confused and disorientated and had to be fed. In my clinical experience patients may recover their full mental faculties if the damage is made good within the fourth day after the accident; if not, the prognosis would be bad since they tend to deteriorate both mentally and physically.

An iso-electric (flat) E.E.G. does not necessarily imply the death of the brain. This may come as a surprise to those who would rely on an electric test like the E.E.G. as final evidence of life and death. The famous Swedish neurophysiologist, Dr. David H. Ingvar (1968) informs us: "Cerebral anoxia — lasting for a limited period and not leading to death of the

brain — induces a decrease of the cerebral oxidative mechanism. The E.E.G. may become iso-electric for a period of varying length. It usually reappears with a slow-wave pattern which only in certain cases gradually returns to a perfectly normal pattern". The brain has in store many compensatory mechanisms and, in this instance, Dr. Ingvar mentions the "luxury perfusion syndrome" (Lassen, 1966) in which, following the marked decrease of the cerebrovascular resistance, the rate of blood flow is increased above the post-anoxically lowered metabolic demands.

Dr. Jon Lundervall, Head of the Institute of Forensic Medicine, of the University of Oslo, writing about the legal and ethical aspects of resuscitation, had this to say (1968). "In practice, however, doctors will consider what can be attained by resuscitation attempts. For instance, no one would hesitate to try to save the life of a patient whose heart stops during surgical anaesthesia or after a sudden unexpected heart attack. But when the patient has advanced cancer or bronchopneumonia, most doctors will be reluctant to restart the arrested heart. In some cases, it is obvious that the situation is hopeless, and to restrain death would be merciless".

The late Pope Pius XII considered these problems at the International Congress of Anaesthesiologists in 1957. His opinions, according to Dr. Lundervall (1966), were as follows:

The anaesthetist ordinarily has the right, but not the obligation, to use special technical measures for resuscitation, even in hopeless cases. However, he has no right to act without the patient's direct or indirect consent, and if the relatives of an unconscious patient are opposed to the application of resuscitative means, the doctor may not apply them. Re-animation is not in itself immoral, but the physician is not morally obliged to employ extraordinary means for resuscitation.

Pope Pius XII further stated that a respirator may be switched off before the blood circulation stops, provided that the soul has definitely and permanently left the patient's body.

If circulation and respiration are maintained only by artificial means in an unconscious patient, and if the patient's condition is not improved after several days, the Catholic Church cannot state authoritatively whether the patient is to be considered alive or dead. It must be up to the physician's judgement to decide the question. The Pope said, however, that life continues as long as the vital functions, including the spiritual functions, go on. The difficult thing is to determine whether they do or not.

The enlightened opinions of Pope Pius XII epitomize the main ethical, moral and legal aspects of resuscitation; they reflect a penetrative and exhaustive study of the subject although some people, including experts, may disagree. To comment briefly about the Pontiff's opinions is perhaps another way of defending them.

The vital brain centres constitute the "dividing line" between life and death. They hold the key to the mystery of life and therefore are the "vesture" or embodiment of the spiritual functions. Such is the complexity of human nature that, while one man dies following a trivial fall, another will survive the terrible ordeal of immersion in the sea without food and fresh water for 4 days.

The anaesthetist, the Pontiff emphasized, is within his rights as a doctor trained in resuscitation, to use ordinary means in trying to save the patient's life but morally he is not obliged to employ extraordinary means. On this topic Mr. Crawford Morris, a distinguished lawyer and medico-legal expert from Cleveland, pointed out that the law only calls for ordinary care, which is determined in view of what is ordinary care in the community. If artificial ventilation is used merely to tide someone over a certain period, it is ordinary but, if it is the sole method to keep someone "alive" then it is considered extraordinary. Professor Crafoord of Stockholm called for legislation to discourage physicians from maintaining life artificially when the brain has ceased functioning; in other words Crafoord advocated that the law should permit the physician to discontinue extraordinary means

of sustaining life. "Thou shalt not kill but need not strive officiously to keep alive."

This can be interpreted as "do not commit euthanasia nor use extraordinary means of resuscitation". While the doctor has a right to forbid a patient's relative from committing mercy-killing on the patient, so conversely, the relatives have the right to restrain the over-enthusiastic doctor from using extraordinary means of resuscitation.

My Catholic friend, Mr. Alexander J. P. Graham, a well-known cardio-thoracic surgeon in Salisbury, writing recently in the *Central African Journal of Medicine* (1968) on the subject "Should the doctor play God?", had this to say about this point: "They (the family) are bound to request the use of ordinary but not of extraordinary means of resuscitation. Hence, the responsibility is theirs, and if they believe that the burden of continued care of the artificially maintained life is one that in conscience cannot be imposed on them, they can insist that the doctor cease his efforts..... How far are we justified in sacrificing the facilities — human and machine — that would be available to treat 99 per cent of the sick by ordinary means, in order to treat 1 per cent by extraordinary means?" Even so the cost on a national scale would be prohibitive.

Regarding the switching off of the respirator before circulation stops, Professor Calne, a Cambridge surgeon, frankly admitted (1965): "It is common for a patient with cardiac arrest occurring in hospital to have the heart beat restored by cardiac massage. If there is evidence of severe brain damage, then it is customary not to attempt further cardiac massage should another cardiac arrest occur; and if there is no evidence after a given period of time of brain recovery, it is customary to disconnect the machine and allow the patient to die."

In organ transplantation, donor patients are kept biologically alive until the required organ has been removed and then the respirators are switched off. This was the procedure adopted in Cape Town in the recent heart transplants. The Pope's remark "before circulation stops" is an

indirect implication that such a clinically dead person could well be used as a source of donor material.

The physician must be, as he or she has always been, the sole arbiter in deciding authoritatively whether the patient is alive or dead. Surely he or she could, and is expected to, enlist the aid of any chemical or electrical means available in reaching and confirming his decision.

### **Resuscitation versus Resurrection**

It is worth emphasizing that the best means and technique of resuscitation affords the best chance of reviving failing vital organs; once the cerebral vital centres are dead, nothing humanly possible can be done to resurrect the patient. Many anaesthetists, mostly those that deal with extremely shocked patients, may remember a case or two when the patient, apparently dead clinically, had been revived to normal —mental and physical — health even after a long and difficult operation. I cannot forget the case of a young parturient African woman who on examination showed all signs of clinical death, except for a tiny twitch on her lips. It was a momentous decision whether to proceed with the operation and sacrifice a lot of transfused blood and other costly fluids and drugs which could well have been used on other patients. Perceiving that the absence of the signs of life was probably due to the patient's heart being in ventricular fibrillation, I promptly started the resuscitation while the surgeon gynaecologist opened the abdomen with the purpose of arresting the profuse bleeding from the suspected ruptured gravid uterus. To our surprise the uterus was intact, except for dead twins inside it, but there was extensive gangrene of the intestines: about 18 feet of intestines were resected. The first flicker of a pulse was detected midway through the operation which lasted about 4 hours. The patient was well awake 10 minutes after the end of the operation. In moments like these, the inspired words of the much quoted Pope Pius XII "that the soul has definitely and permanently left the patient's body" could be better appre-

ciated even by our sceptical scientific minds.

Cardiac ventricular fibrillation is functionally akin to arrest. Just how could a woman, in a prolonged state of ventricular fibrillation, recover her senses so quickly and so completely? It borders on the miraculous. We may wonder what miracles God, in His infinite mercy, will permit to happen so that conscientious doctors may be encouraged from time to time in their efforts to save more lives.

### **Recommendations**

Some weeks ago in Bratislava, delay in obtaining the consent from the donor's relative to remove the heart, resulted in the death of the recipient soon after operation. In Cape Town they arranged this ethical and legal matter so prudently that success inevitably followed.

It has always been the professional conduct of the doctor, in therapeutic charge of a patient that died under his/her care to certify death and to request the consent of the relatives if, say, an autopsy was required. The impact of resuscitation and organ transplantation should not disturb our judgement unduly.

### **Organised Resuscitation**

Places in which resuscitation is expected to be conducted promptly and efficiently should be easily accessible to patients in a hospital, to workers in a factory and to pupils in a school. In the hospital we are familiar with a post-operative Recovery Room (R.R.) and the Intensive Care Unit (I.C.U.) which should be furnished at least with the essential basic requirements like self-inflating bag-valve-mask units, constant supply of oxygen, laryngoscope, airways, stimulant drugs, special fluids for infusion, syringes and needles, sphygmomanometers etc. The I.C.U. should be staffed with specially trained nurses and physicians experienced in acute medicine. The nurse on duty should know which doctor to call if a doctor is needed in a hurry. The responsible personnel in the I.C.U. should often

check that the machinery is in working order, that instruments are not missing, misplaced or defective, that used drugs are replaced. Failure to observe this warning could be considered negligence and might result in unnecessary loss of life.

### The Responsible Doctor

The physician in charge of a patient's life should be guided by his own clinical judgement and experience; if necessary it is recommendable that he should consult more experienced and expert colleagues to confirm his decision.

In the rapid sequence of action in emergency resuscitation, the anaesthetist should make every effort to save the patient, regardless of the patient's life expectancy and whether resuscitation will be complete or not. A later assessment of the situation might, for example, leave no doubt that the hypoxic episode has produced cerebral death.

It should be ethically and morally proper if the physician certifying the death of a potential donor, should not be medically responsible in any way for the likely recipient.

### Time of death

It is correct to state that, following the first arrest of a vital function, resuscitation has revived many patients, while on few other patients resuscitation was abandoned because no progress was being made and the candle of life was extinguished. Therefore the certified time of death ought to be that corresponding to the "finally accepted end of all hope and effort" (Keith Simpson)".

### Patient's relatives and organ transplantation

The doctor, treating a patient for some incurable or serious disease, or actually engaged in resuscitating a patient on emergency, is not obliged to discuss his professional conduct with anybody except perhaps with those that could help him to improve the condition of the patient. The relatives, however, should be informed whenever there is a very bad prognosis or impending death of the patient: they may request either consultation with another physician of their choice or more usually they will show their appreciation of the doctor's efforts to use all the ordinary means of resuscitation possible until the bitter end. At this opportune moment the doctor in charge of the dying patient might discreetly request from the relatives the required consent to remove any vital organ/s that could be used to save the life of another person or persons.

### References

- CALNE, R.J., (1965). *Brit. med. Bull.*, 21, 166.  
 GRAHAM, A.J.P., (1968). *Cent. Af. J. med.*, June, 44.  
 INGVAR, D., (1968). *Proceedings 2nd. International Symposium on emergency resuscitation, Oslo, May-June 1967*, p. 47.  
 LASSEN, N.A., (1966). *Lancet*, ii, 1113.  
 LUNDERVALL, J., (1968). *Proceedings 2nd International Symposium on emergency resuscitation, Oslo, May-June 1967*, p. 357.  
 LUNDERVALL, J., (1966). *Ethics in medical progress, Ciba Foundation Symposium, Churchill, London. Marseilles Symposium (1965). Marseilles Chirurgicale*, 18, 1.  
 SIMPSON, K., (1965) in *Taylor's Principles and practice of Medical Jurisprudence 12th Edition*.