

The New HKSCCM Brain Death Guideline

Hing-yu So

MBBS MSc FHKAM(Anaesthesiology) FHKCA FHKCA(IC)
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Director of Intensive Care

Prince of Wales Hospital, Hong Kong

1952

The specialty of intensive care started in Copenhagen in 1952, when Bjørn Ibsen got a relay of doctors to manually ventilate a dying 12-year-old patient with polio.



Bjørn Ibsen



Obituary: Bjørn Ibsen. Caroline Richmond
BMJ 2007;335:674



1959

Le coma depasse

(The depassed coma)

Mollaret P, Goulon M. Le coma depasse (memoire preliminarze).
Rev Neurol 1959;101:3-15.



1957

Resuscitation techniques,
being extra-ordinary
means, could be
withdrawn before
circulatory arrest
occurred.

The precise moment of
death cannot be
deduced from any
religious or moral
principle, and is therefore
a matter for the
competence of clinicians



Pope Pius XII

Pius XII. The prolongation of life: an address of Pope Piu XII to an international congress of Anaesthesiologists
The Pope Speaks 1958; 4:393-8



HARVARD MEDICAL SCHOOL

BOSTON, MASSACHUSETTS

OFFICE OF THE DEAN

January 4, 1968

1968

Dr. Joseph Murray
Peter Bent Brigham Hospital
721 Huntington Avenue
Boston, Massachusetts 02115

Dear John:

At a recent meeting of the Standing Committee on Human Studies, Dr. Henry K. Beecher reviewed some basic material on the ethical problems created by the hopelessly unconscious man. Dr. Beecher's presentation re-emphasized to me the necessity of giving further consideration to the definition of brain death. As you are well aware, many of the ethical problems associated with transplantation and other developing areas of medicine hinge on appropriate definition.

With its pioneering interest in organ transplantation, I believe the faculty of the Harvard Medical School is better equipped to elucidate this area than any other single group. To this end I ask you to accept appointment to an ad hoc committee. Assuming your acceptance of this added responsibility for the School, the committee membership will be as follows:

Dr. Raymond D. Adams
Dr. A. Clifford Barger
Dr. William Curran
Dr. Derek Denny-Brown
Dr. Dana L. Farnsworth
Dr. Jordi Folch-pi
Professor Everett I. Mendelsohn
Dr. John P. Merrill
Dr. Joseph Murray
Dr. William Sweet
Dr. Henry Beecher, chairman

Sincerely yours,

Robert H. Ebert, M. D.,
Dean



Report of the Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death. A definition of irreversible coma. JAMA . 1968; 205: 337-340



香港急症學會

1976

DIAGNOSIS OF BRAIN DEATH

Statement issued by the Honorary Secretary of the Conference of Medical Royal Colleges and their Faculties in the United Kingdom on 11th October 1976



Diagnosis of Brain Death. Statement issued by the Honorary Secretary of the Conference of Medical Royal Colleges and their Faculties in the United Kingdom on 11th October 1976.
BMJ 1976; ii:1187-8



1981

Guidelines for the Determination of Death

Report of the Medical Consultants on the Diagnosis of Death to the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research

JAMA. 1981;246(19):2184-2186.

JAMA[®]

The Journal of the American Medical Association

Guidelines for the Determination of Death.
JAMA 1981; 246:2184-6



ABC of Brain Stem Death

1983

Christopher Pallis. London, British Medical Journal, 1983. Paperback
£5.50. USA \$16.25

Ten years ago when I lectured on brain death, the audience reaction was often hostile. Most of the criticisms were based on conceptual grounds and emotional anxieties. Over the years the audiences have become quieter and the questions fewer, until now if there are doubts, they are generally about some minor technical detail. The ethical and physiological concepts of brain death, its diagnosis and what follows are now widely accepted. The process leading up to this milestone in medical practice has been long, controversial, sometimes ill-tempered, and once even tainted with deceit. But the outcome has been worth the struggle and the final chapter has almost been written.



1994

THE HONG KONG SOCIETY OF CRITICAL CARE MEDICINE

2001

GUIDELINES ON CERTIFICATION OF BRAIN DEATH

INTRODUCTION

Brain death is established by the documentation of irreversible coma and irreversible loss of brain stem reflex responses and respiratory center function or by the demonstration of the cessation of intracranial blood flow. Despite philosophical arguments, the concept that brain death is equivalent to death is accepted legally and within the medical community in Hong Kong. Once brain death has occurred, artificial life support is inappropriate and should be withdrawn. It is good medical practice to recognize when brain death has occurred and to act accordingly, sparing relatives from further emotional trauma of futility.

HONG KONG SOCIETY OF CRITICAL CARE MEDICINE Ltd.

GUIDELINES ON CERTIFICATION OF DEATH FOLLOWING THE IRREVERSIBLE CESSATION OF BRAINSTEM FUNCTION

2009

INTRODUCTION

The irreversible cessation of brainstem function (“brainstem death”) is established by the documentation of irreversible coma and irreversible loss of brain stem reflex responses and respiratory center function or by the demonstration of the cessation of intracranial blood flow. Despite philosophical arguments, the concept that brainstem death is equivalent to death is accepted legally and within the medical community in Hong Kong. Once brainstem death has occurred, artificial life support is inappropriate and should be withdrawn. It is good medical practice to recognize when brainstem death has occurred and to act accordingly, sparing relatives from further emotional trauma of futility.

The purposes of this document are:

1. To provide recommendations for qualified medical practitioners (*vide infra*) in relation to certification of death following the irreversible cessation of brainstem function for patients **who are 2 year of age or older;** and
2. To provide a reference for the Hong Kong community to reassure them that certification of death following the irreversible cessation of brainstem function is performed with diligence and in accordance with prevailing medical evidence and opinion.

The diagnostic criteria presented for certification of death following the irreversible cessation of brainstem function are based on the following documents:

The Statement issued by the Honorary Secretary of the Conference of Medical Royal Colleges and their Faculties in the United Kingdom on 11 October 1976
British Medical Journal 1976; ii:1187-1188.

Criteria for the diagnosis of brain stem death. Review by a working group convened by the Royal College of Physicians and endorsed by the Conference



Issues to Discuss

- Purpose and Scope
- Brain stem death vs Whole brain death
- Preconditions
- Details of brain stem reflex tests
- Observation time
- Investigation
- Documentation
- Qualification
- Ethical issues
 - Conflict of interest
 - Preemptive ventilation
 - Confidentiality
- Transplant Coordinator

Guidelines on Certification of Death Following the Irreversible Cessation of Brainstem Function

A Code of Practice for the Diagnosis and Confirmation of Death.
Academy of Royal Colleges, UK, 2008



Brain death

Brain stem death

Whole brain death



Pallis C. From brain death to brain stem death. BMJ 1982; 285:1487



It is agreed that
permanent functional
death of the brainstem
constitutes brain
death ...



Diagnosis of Brain Death. Statement issued by the Honorary Secretary of the Conference of Medical Royal Colleges and their Faculties in the United Kingdom on 11th October 1976.
BMJ 1976; ii:1187-8



death of the brain stem was the necessary and sufficient component of whole brain death.

If we accept the concept of brain stem death it might be wise to change the words we use and no longer speak of “brain death” when we mean “brain stem death.”



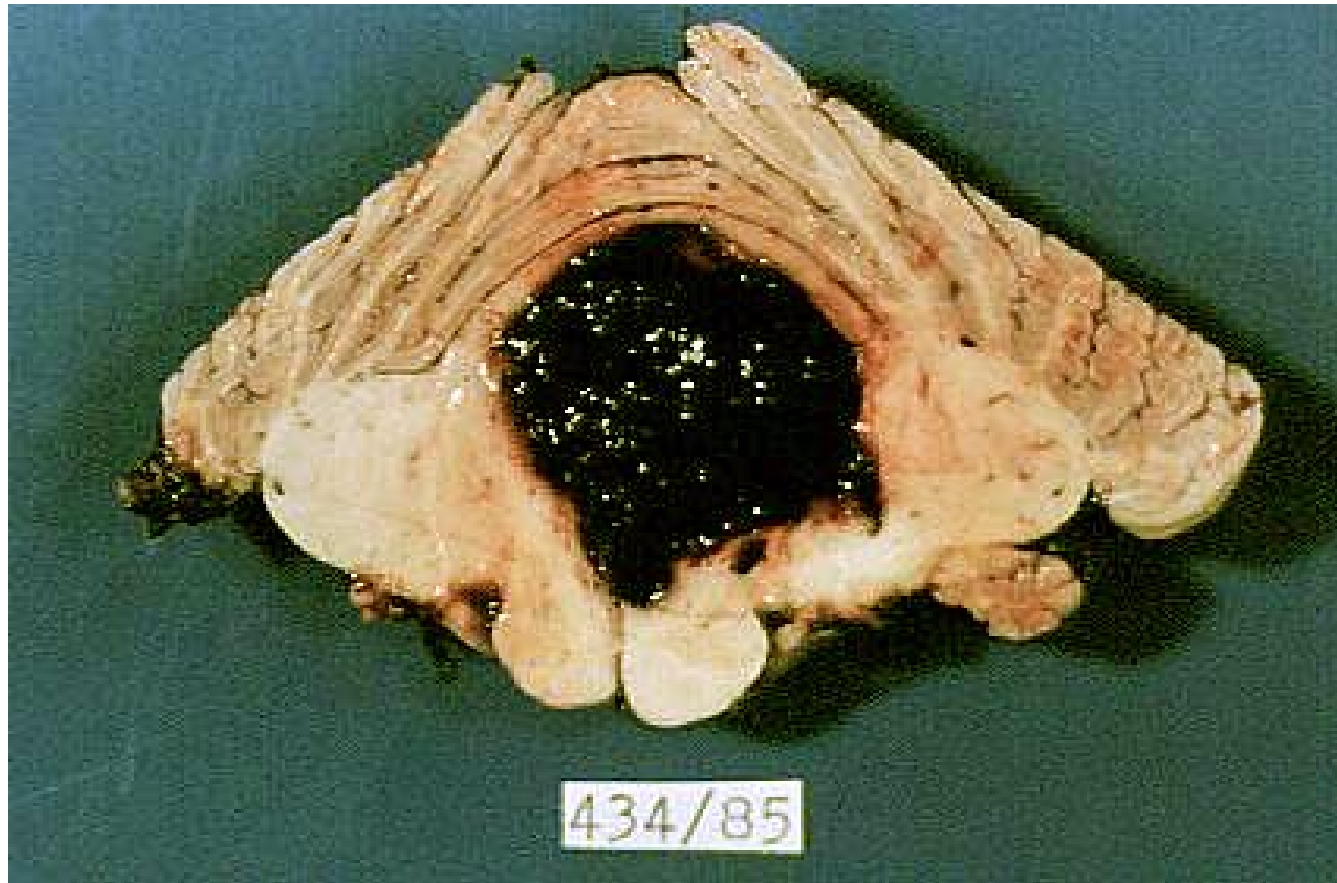
Pallis C. From brain death to brain stem death. BMJ 1982; 285:1487



2. Diagnosis and Confirmation of Death.....

2.1 Death following the irreversible cessation of brain-stem function.

2.2 Death following cessation of cardiorespiratory function.....



Brain death **cannot** be determined when the condition causing coma and loss of all brain-stem function has affected only the brain-stem, and there is still blood flow to the supratentorial part of the brain.

Australian Law

Death be defined as:

- a) **irreversible cessation of all function of the brain** of the person;
or
- b) irreversible cessation of circulation of blood in the body of the person.

Australian Law Reform Commission, *ALRC 7. Report of the Law Reform Commission on Human Tissue Transplants*. Canberra: Australian Government Publishing Service, 1977.



The concept that **brainstem death** is equivalent to death is accepted legally and within the medical community in Hong Kong.



To provide recommendations for qualified medical practitioners in relation to certification of death following irreversible cessation of brainstem function for patients who are **2 years of age or older.**

Preconditions

- Diagnosis of severe brain injury which is consistent with progression to brain death
- Apnoeic patient on a ventilator
- Exclusion of potentially reversible causes of coma

Exclusions

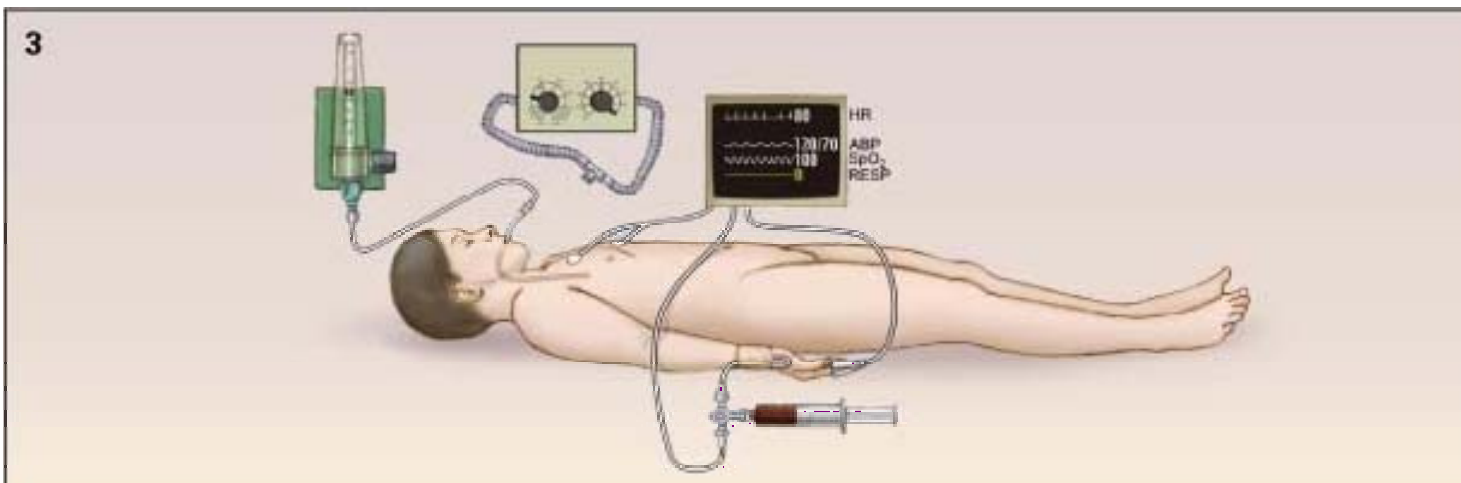
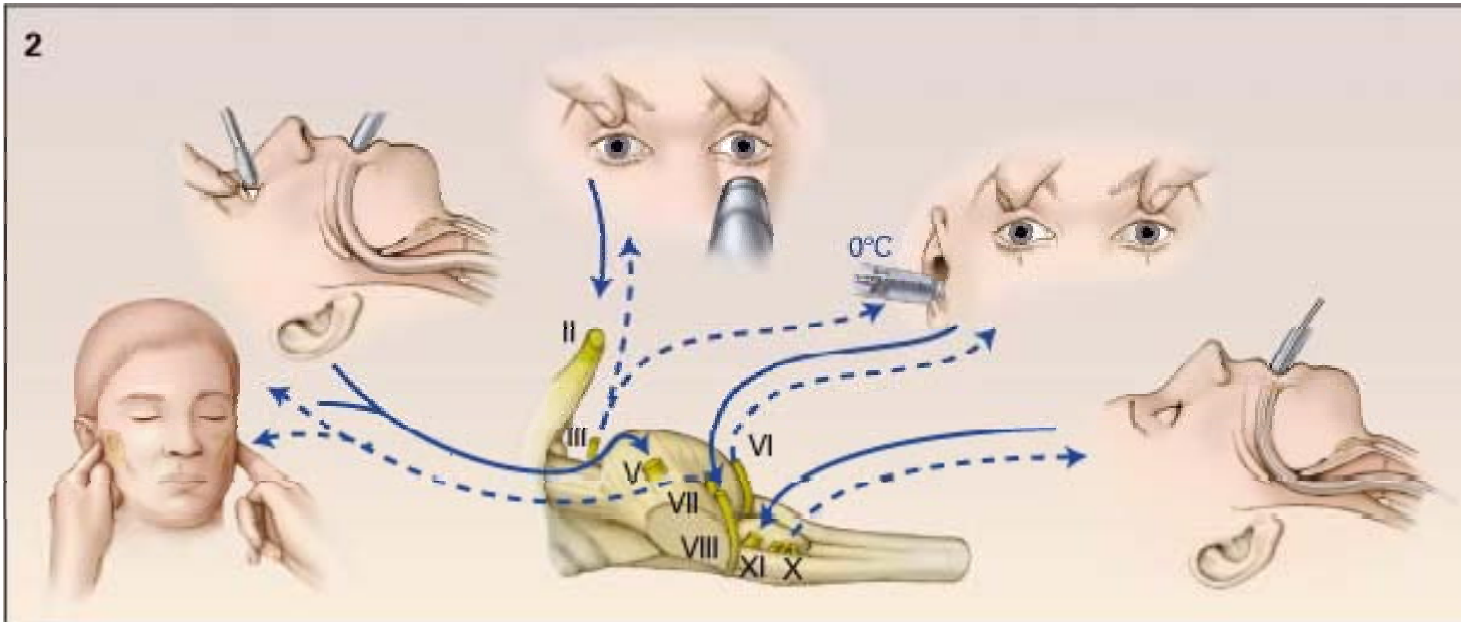
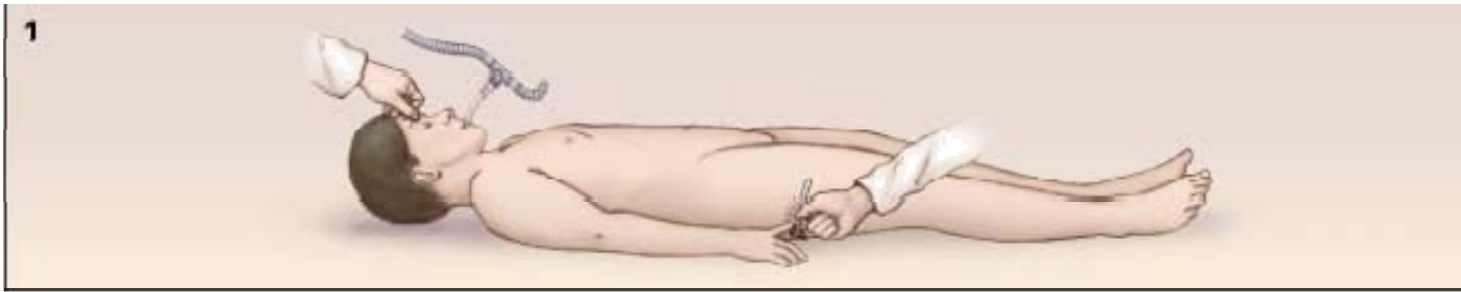
- Depressant drugs or poisons
 - **Peripheral nerve stimulator should always be used** to confirm intact neuromuscular conduction
- Primary hypothermia
- Metabolic and endocrine disturbances
- Arterial hypotension

Observation

- Minimum of 4 hours
 - 24 hours after cardiorespiratory arrest
- **2nd examination can be performed any time after the 1st**

Clinical Tests

Pupils
 $\geq 4\text{mm}$



Apnoea Test

- Perform last
- $\text{PaCO}_2 > 8.0 \text{ kPa}$, $\text{pH} < 7.3$
- Disconnect when PaCO_2 close to normal
- Prevent hypoxaemia

Observations Compatible with Brainstem Death

- Movement of limbs in response to a stimulus outside distribution of cranial nerves
- Sweating, blushing, tachycardia
- Normal BP without pharmacological support
- Absence of DI
- Deep tendon reflexes
- Extensor plantar reflex

Observations Incompatible with Brainstem Death

- Decerebrate or decorticate posturing
- Seizures

Confirmatory Investigations

- No clear cause of coma
- Possible metabolic or drug effect
- Cranial nerves cannot be adequately tested
- Cervical vertebral or cord injury
- Cardiovascular instability precluding apnoea test
- Severe hypoxaemic respiratory failure precluding apnoea test

Confirmatory Investigations

- 4 vessel radio-contrast angiography by digital subtraction
- Radionuclide examination
 - ^{99m}Tc -HMPAO or ^{99m}Tc -ECD
 - SPECT
- 4 hour period of observation and brainstem reflexes which can be tested should **precede** investigation

Time of Death =
2nd Set test or Investigation
completed

Who can certify brain death?

Knowledge & skill
Conflict of interest

Intensivist, critical care
physician, neurologist, or
neurosurgeon

Registry

The intensivist caring for an intensive care patient who is a potential recipient of organ from the potential donor **should not discuss donation** with the family of the potential donor.

 醫院管理局 HOSPITAL AUTHORITY BRAIN DEATH CERTIFICATION FORM (for patients who are 2 years of age or older)	Patient's Label Please DOUBLE CHECK patient's identity <table style="width: 100%;"> <tr> <td>Name(Eng):</td> <td>Sex:</td> </tr> <tr> <td>(Chi):</td> <td>D.O.B.:</td> </tr> <tr> <td>I D No:</td> <td>Ward/Bed:</td> </tr> <tr> <td>HN:</td> <td>Dept.:</td> </tr> </table>	Name(Eng):	Sex:	(Chi):	D.O.B.:	I D No:	Ward/Bed:	HN:	Dept.:																
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INSTRUCTIONS Diagnosis is to be made by the separate examination of two doctors: (a) One of the medical practitioners must be a specialist recognized by the appropriate College as having demonstrated skill and knowledge in the performance of brain death certification. This should usually be an intensivist, critical care physician, neurologist or neurosurgeon. (b) The other medical practitioner should preferably be of the same qualification as described in (a) but should be at least 6 years after registration and possess the skill and knowledge in the performance of brain death certification. (c) The person authorizing removal of tissues and the person removing tissues MUST NOT be responsible for determining brain death. The intensivist caring for an intensive care patient (e.g. with acute liver failure who is listed for urgent transplantation) who is a potential recipient of organs from the potential donor should not discuss donation with the family of the potential donor. (d) Each of the two practitioners must independently perform one of the examinations.																									
DIAGNOSIS (Specify the nature of the irremediable structural brain damage.)																									
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BRAIN DEATH CERTIFICATION FORM

HA 0090/MR



**Hong Kong Society of
Critical Care Medicine**



**Hong Kong Association
of Critical Care Nurse**

Evening Symposium

BRAIN DEATH AND ORGAN DONATION