

The medical aspects of death

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- All doctors encounter death, and the dying, at some time in their medical career, and must have an understanding of the medical and legal aspects of these phenomena.

Definition of death

- it is a process in which cellular metabolic processes in different tissues and organs cease to function at different rates.

- **Cellular death**

- Cellular death means the cessation of respiration
- (the utilization of oxygen) and the normal metabolic activity in the body tissues and cells. Cessation of respiration is soon followed by autolysis and decay, which, if it affects the whole body, is indisputable evidence of true death.

- Skin and bone will remain metabolically active
- and thus ‘alive’ for many hours and these cells can be successfully cultured days after somatic death. White blood cells are capable of movement for up to 12 hours after cardiac arrest – a fact that makes the concept of microscopic identification of a ‘vital reaction’ to injury of doubtful reliability.

- The cortical neuron, on the other hand, will die after only 3–7 minutes of complete oxygen deprivation. A body dies cell by cell and the complete process may take many hours.

- **Somatic death**
- Somatic death means that the individual will never again communicate or interact with the environment. The individual is irreversibly unconscious and unaware of both the world and their own existence.

- **Vegetative state**
- In some individuals, resuscitation is successful in
- that brain-stem function is retained in the absence of cortical function, resulting in a so-called ‘vegetative state (VS)’ – wakefulness without awareness – from which they may recover, or alternatively may enter a ‘minimally conscious state’ (MCS).

- If the VS persists for 12 months following traumatic brain injury or 6 months after another cause, the VS is judged to be ‘permanent’ under Royal College of Physicians guidelines (2003). In such circumstances, the withdrawal of hydration and assisted nutrition can be considered in the ‘best interests’ of the patient.

- It is another matter when brain death spreads below the tentorium. When the brainstem (specifically the midbrain, pons and upper medulla) suffers neuronal damage, the loss
- of the 'vital centres' that control respiration, and of the ascending reticular activating system that sustains consciousness, cause the victim not only to be irreversibly comatose, but also to be incapable of spontaneous breathing. Without
- medical intervention, hypoxic cardiac arrest inevitably follows within minutes and then the usual progression of 'cellular death' ensues.

■ Homologous transplantation

- Tissue is moved between sites on the same body. For example, skin grafts may be taken from the thigh to place on a burn site or bone chips from the pelvis may be taken to assist in the healing of a fracture of a long bone. Homologous blood transfusion can be
- used where there is a religious objection to the use of anonymously donated blood.

- **Live donation**
- In this process, tissue is taken from a living donor whose tissues have been matched to, or are compatible with, those of the recipient. The most common example is blood transfusion but marrow transplantation is now also very common.

■ Cadaveric donation

- In many countries, cadaveric donation is the major source of all tissues for transplantation. The surgical techniques to harvest the organs are improving, as are the storage and transportation techniques, but the best results are still obtained if the organs are obtained while circulation is present or immediately after cessation of the circulation.

- **Xenografts**
- Grafting of animal tissue into humans has always seemed tempting and clinical trials have been performed with limited success.

Cause of death determination and certification

- The format for certifying the cause of death is
- now defined by the World Health Organization
- (WHO) and is an international standard that is used in most countries. The system divides the cause of death into two parts: the first part (Part I) describes the condition(s) that led directly to death; Part II is for other conditions, not related to those listed in Part I, that have also contributed to death.

Cause of Death

- Cause of death means : the underlying cause which is a disease or injury that initiate a sequence of physiological derangement leading to death.

Manner of Death

It explain how the cause of death came about it can be :

- Natural.
- Unnatural : accidental, homicide, suicide.
- Undetermined or unclassified.

شهادة طبية شرعية بسبب الوفاة
MEDICOLEGAL CERTIFICATE OF CAUSE OF DEATH

جهة التكليف :

بلاغ وفاة رقم :

اسم المتوفى : الجنس / Name of deceased

تاريخ الوفاة كما ذكر لي : العمر كما ذكر لي / Date of death as stated to me :

مكان الوفاة : الجنسية / Place of death :

+ Cause of death was a scertained after detailed a utopsy

+ Detailed a utopsy excluded criminal causes but cause of

death will not be acertained until lab . invest . is over.

+ تم التوصل لمعرفة سبب الوفاة بعد الفحص الداخلى والخارجى للجنة .

+ لم يدل الفحص الكامل للجنة داخليا وخارجيا على أى اشتباه جنائى .

وستصح سبب الوفاة بعد استكمال الفحوص المخبرية للعينات المأخوذة .

(1) Disease of condition directly leading to death **

سبب الوفاة CAUSE OF DEATH

(1) المرض أو الحالة التى أدت إلى الوفاة مباشرة **

a) (أ)
due to (as consequence of) b) نتيجة لـ (ب)
due to (as consequence of) c) نتيجة لـ (ج)

2) Other significant conditions contributing to death

but not related to the disease of condition causing it.

(2) أمراض أو حالات أخرى ذات أهمية ، ساهمت فى الوفاة ،

ولكن ليس لها علاقة مباشرة بالمرض أو بالحالة المسببة للوفاة .

Thereby certify that I have performed the post - martem
on the above named deceased and the information above are true.

أشهد بأننى أجريت الفحص الطبى الخارجى والداخلى عنى المتوفى لمعرفة
سبب الوفاة والبيانات التى أوردتها أعلاه صحيحة حسب معرفتى العلمية .

Date التاريخ

المؤهلات Qualifications

الاسم والتوقيع

Name Sig

* Put an (x) infront of appropriate sentence

* ضع علامة (X) أمام العبارة المناسبة

** This does not mean mode of dying such as heart failure or asphyxia etc

** هذا لا يعنى طريقة أو ميكانيكية الوفاة مثل هبوط القلب أو الاختناق ... الخ

It means the disease . injury of complication which caused death

ولكن يعنى المرض أو الإصابة أو المضاعفات التى أدت إلى الوفاة

It is wrong to put (Cardio - respiratory failure)

وبالتالى لا تقبل عبارة (هبوط دورى تنفسى) وما شابهها كسبب للوفاة .

بنغازى فى :

الطبيب الشرعى :

Case oriented Example

A 15 year old boy falls from a horse, sustains a head injury but survives with post-traumatic epilepsy, for which he is treated with drugs but nevertheless dies from an epileptic seizure 10 years later at the age of 25

what is the cause of death?

what is the manner of death?

Answer

The cause of death on the death certificate should be written as follows:

1a: epileptic seizure

1b: post-traumatic epilepsy

1c: fall from a horse

Manner of death: accidental

The underlying cause of death which is of relevance to the courts is Fall from a horse . It is an accidental un-natural death

Cause of Death

I- (a) Cerebral hemorrhage

Due to:

(b) Hypertension

Due to:

(c) Chronic nephritis

II- Chronic Bronchitis

Cause of Death

I- (a) Pulmonary metastases

Due to:

(b) Carcinoma of bladder

Due to:

(c) _____

II- _____

Cause of Death

I- (a) Mesothelioma

due to:

(b) Asbestosis (15 years)

due to:

(c) _____

II- _____

Cause of Death

I- (a) Renal Failure (3 months)

due to:

(b) Ch. Pyelonephritis (3 years)

due to:

(c) Paraplegia (gunshot wound 25 yrs)

II- _____

Cause of Death

I- (a) Cerebral metastases (3 weeks)

due to:

(b) Primary bronchial carcinoma (2 years)

due to:

(c) _____

II- _____

Cause of Death

I- (a) Severe Ketoacidosis

due to:

(b) Diabetes Mellitus

due to:

(c) _____

II- _____

Cause of Death

I- (a) Disseminated Hodgkin's disease

due to:

(b) _____

due to:

(c) _____

II- Diabetes Mellitus

Cause of Death

I- (a) Peritonitis

due to:

(b) perforation of D.U. (operation)

due to:

(c) Peptic ulcer of the duodenum

II- _____

Cause of Death

I- (a) Intestinal obstruction

died during operation (mention anesthetic agent)

due to:

(b) Carcinoma of the rectum

due to:

(c) _____

II- Chronic bronchitis and emphysema

Cause of Death

I- (a) Inhalation of smoke and fire gases
due to:

(b) House fire

due to:

(c) _____

II- _____

Cause of Death

I- (a) Cerebral vascular lesion
due to:

(b) _____

due to:

(c) _____

II- Hypertension and hypertensive heart
disease

Cause of Death

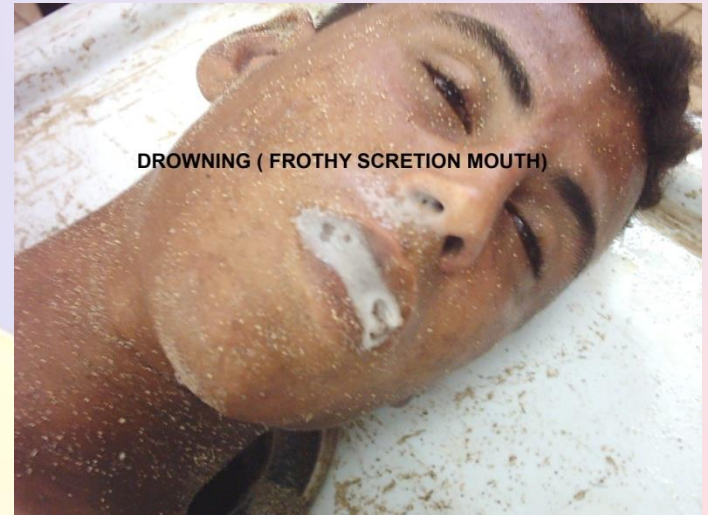
I- (a) Drowning

due to:

(b) _____

due to:

(c) _____



II- Alcohol in blood (160 mg/100 ml)

Cause of Death

I- (a) Multiple injuries to the body
due to:

(b) fall from a height (industrial accident)
due to:

(c) _____

II- _____

- **The autopsy**
- The words autopsy, necropsy and post-mortem examination are synonymous, although postmortem examination can have a broader meaning encompassing any examination made after death, including a simple external examination. In general terms, autopsies can be performed for two reasons: clinical interest and medico-legal purposes.



Modern forensic autopsy facilities, including directional overhead lighting – with inbuilt video projection and recording capability – to facilitate optimal forensic pathological examinations.

- The medico-legal autopsy is performed on behalf of the state. The aims of these examinations are much broader than those of the clinical autopsy;
- they aim to:
 - identify the body;
 - estimate the time of death;
 - identify and document the nature and number of injuries;



Operating microscopy in the forensic autopsy suite facilitates detailed examination and documentation of pathological findings.

- interpret the significance and effect of the injuries;
- ■ identify the presence of any natural disease;
- ■ interpret the significance and effect of the natural disease present;
- ■ identify the presence of poisons; and
- ■ interpret the effect of any medical or surgical treatment.



Post-mortem radiology is important in many cases in forensic pathology. Note the body is enclosed in a body bag to prevent contamination of the body and loss of 'trace evidence' from the surface of the body, prior to autopsy. Hands (and usually feet) are similarly protected by paper or plastic bags before recovery of a body from a scene.

■ Exhumation

- It is rare for a body to be removed from its grave for further examination; the most common reasons for exhumation are personal, for example if a family chooses to move the body or if a cemetery is to be
- closed or altered.



Removal of the coffin lid following an exhumation. Liquid mud covers the upper body following leakage of the coffin lid.

The Minnesota protocol

- A model autopsy protocol has been produced by the United Nations within the context of the investigation of human rights abuses