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THE MEDICO-LEGAL AUTOPSY

The purposes and administrative aspects of death investigation are dealt with in the lecture notes on [Death Investigation](#). Here, the practical aspects will be considered.

The aims of death investigation are to answer the following questions:

1. **Who died?** (identification of the deceased)
2. **Where?** (place of death)
3. **When?** (time of death)
4. **Why?** (cause of death)
5. **How?** (manner & mechanism of death)

Autopsy is only one part of death investigation. Body, History and Scene are equally important (diagnostic triangle).

Each of the three aspects of the death investigation process are equally important (like a three legged stool, which will fall over if one leg is removed or even shortened!)

1. Scene:

- Attendance by police officers, CID, family doctor, police surgeon, forensic pathologist, forensic scientists.
- The aim is to collect the maximum of information with the minimum of disturbance.
- Potential for professional conflicts.
- Photography, videos, trace evidence.

2. History:

- Social - from relatives, friends, police.
- Medical - from GP, hospital notes. Often indicates the likely cause of death
- Psychiatric - from GP, hospital notes. May indicate possibility of suicide.

3. The medico-legal autopsy:

The medico-legal autopsy differs from the hospital autopsy in two major respects:

- Purpose:- What happened? to Who, When, Where, Why, and How.
- Technique:- The external examination assumes much greater importance, special dissection techniques and examinations, evidential materials, report formulation or commentary.

Instruction/consent for autopsy is derived from a law officer having jurisdiction, i.e. the Coroner or Procurator Fiscal.

Authority for autopsy is permanently recorded: how received, from whom, and when:

1. Two doctor case if legal proceedings likely (homicide, road accident).
2. One doctor examination in most non-suspicious cases (accident, suicide).
3. Autopsy **or** external examination only (death obviously natural) at the discretion of the pathologist.
4. External examination ("View & Grant" Preferred) if Fiscal considers an autopsy is not necessary

IDENTIFICATION OF DECEDENT

The body must be identified to the Pathologist as the decedent for whom autopsy authority has been given. Identification in 2 doctor autopsies is performed in front of the 2 doctors performing the autopsy.

Initial (provisional) identification may be:

- Visual (relatives),
- Circumstantial (address, car, papers, cards, keys, clothes),
- Medical (scars, teeth, x-rays, DNA).

Permanent record is made of the method of formal identification:

- personal (name, title, address),
- body tag (record all details),
- accompanying documentation.

PERSONAL EFFECTS AND CLOTHING

By contrast with the hospital autopsy, the examination of personal effects and clothing is an integral part of the medico-legal autopsy providing information on life style, events leading to death, and often the actual cause of death.

List of **jewellery, valuables, and personal effects.**

Listed description of the **clothing**:- type of garment, colour, fabric type, location, if disarranged, wet/moist/dry, stains (blood, vomit, faeces, urine, semen, dirt, oil, soot, etc.), damage (holes, cuts, tears).

Clothing findings are correlated with historical and scene information, e.g. appropriateness of clothing, source of stains, trace materials. Clothing findings must also be correlated with other autopsy data, e.g. injuries, source of blood stains.

EXTERNAL EXAMINATION

This is a detailed head to toe examination of the naked body, documenting stains and soiling, general and specific individualising characteristics, post-mortem changes (temperature, lividity, rigor mortis, putrefaction).

The location, extent and type of **staining or soiling** of the body are described e.g. dual flow pattern of blood from a wound, high velocity impact blood spatter from gunshot wound, coffee grounds vomitus and melaena (upper gastrointestinal haemorrhage), antiseptic from medical intervention.

General body characteristics are recorded, namely:- racial group, height, weight, head hair (colour, dyed, length, style, balding), eyes (colour, pupil size, conjunctival congestion or petechial haemorrhages, jaundice, prosthesis), nose and ear canals (blood, pus), earlobes (piercing, earlobe creases), face (hirsute woman, clean shaven, beard, moustache), mouth (vomit, blood, tablet debris, teeth, dentures), breasts (normally developed, atrophic, hirsute), genitalia (pubic hair pattern, circumcised, palpable testes), feet (general hygiene, bunions, ingrowing nails).

More **specific identifying characteristics** are described fully: tattoos (location, design, colour, names), scars (surgical and non-surgical, needle tracks, striae), skin lesions (naevi, senile keratoses, other skin diseases), prosthesis, pacemaker.

Post-mortem changes are documented, namely:- body temperature to touch (alternatively state if the body has been refrigerated), rigor mortis (extent and degree), hypostatic lividity (distribution, dual pattern, colour, contact pallor), putrefactive changes.

INJURIES (EVIDENCE OF INJURY)

All injuries are described systematically either by grouping them according to anatomical location, e.g. right arm, anterior chest, left leg (as in multiple injuries in vehicular collisions), or in numerical order (e.g. where the number of injuries is few or where each and every injury is particularly important as in multiple stab wounds). If numbered, it is stated that the order of numbering does not imply sequence of infliction or degree of severity.

Injuries are described as to their type, e.g. bruise, abrasion, laceration, incised wound, puncture or stab wound, gunshot wound, burn, fracture.

Injuries should be described with regard to their location, size, shape and colour.

The location of the wound is given by general description (e.g. on the left side of the face, or over the rib cage, immediately below the left breast) and by precise location in relation to fixed anatomical landmarks (analogous to latitude and longitude). Suitable vertical landmarks are the heel, superior margin of the pubic symphysis, superior anterior iliac crest, supra-sternal notch, orbital ridge, and crown. Suitable horizontal landmarks are any midline structures, e.g. umbilicus, midline of the sternum and glabella.

The size of an injury is measured in two dimensions. The shape can be related to a geometric shape or common object, often supplemented with drawings, sketches or by tracing patterned injuries onto acetate sheets.

Internal injuries are described in continuity with the related externally apparent injuries, e.g. the bruising and abrasion to the chest, then the fractured ribs, then the lacerated lung and haemothorax. This organisation of the final report frequently does not correspond with the order of dissection and dictation of findings.

In the final report remote injuries are segregated from recent injuries under separate subheadings.

SIGNS OF MEDICAL INTERVENTION

Medical intervention is described under a separate heading. This includes all medical equipment attached to, or accompanying, the body, e.g. urinary catheter, endotracheal tube, oral airway, rods for external fixation of fractures, arterial and intravenous lines, intravenous solutions or blood (with details of contents).

External surgical incisions are described in continuity with the internal evidence of surgery.

INTERNAL EXAMINATION

The internal examination is systematic description of natural disease and does not include recent injuries, all of which have been previously described under the appropriate heading. Negative observations are included, e.g. no pulmonary thrombo-emboli, no significant coronary artery atherosclerosis, no skull fracture, etc.

OTHER EXAMINATIONS

Any special dissections, e.g. neck dissection, or further examination of organs e.g. brain after formalin fixation, together with microscopic, biochemical, and toxicological studies should be described at this point.

Cause of death: the disease process or injury responsible for initiating the train of events, brief or prolonged, which produces the fatal end result.

Mechanism of death: the physiological or biochemical derangement produced by the above cause, which is incompatible with life; i.e. how the disease or injury leads to death

Manner of death: the fashion in which the cause of death came into being; i.e. whether natural, accident, suicide, homicide, unclassified (alcohol/drug deaths) or undetermined

Cause	Mechanism	Manner
Atherosclerotic coronary artery disease	Electrical arrhythmia or heart failure	Natural
Stab wounds	Internal or external blood loss	Homicide, Suicide or Accident
Hanging	Asphyxia	Suicide
Strangulation	Asphyxia	Homicide

OPINION (CONCLUSION OR COMMENTARY)

This section is interpretative and subjective, representing the opinion of the author. It includes the cause of death as appearing on the death certificate. The commentary is in simple English and brings together all the relevant information obtained from examination of the body, the scene of death and the history of the decedent. Information obtained second-hand (hearsay) may be included e.g. from police reports, medical records, fire investigation reports. The relevant issues are addresses i.e. what happened, to who, when, where, why and how. It may be as brief or as detailed as the need dictates. It is directed to the law officer investigating the death and any other legally interested parties who may obtain access to the report subsequently.

The commentary is analogous summary of a hospital autopsy which brings together the pathological autopsy findings with the clinical findings and subsequent progress.

SIGNATURE

All medico-legal reports require the original signature of the author. Relevant degrees and other qualifications are given. Occupational titles, e.g. Lecturer in Pathology, may be included.

You can try out death investigation exercises (mostly natural deaths) at [The Virtual Autopsy Website](http://www.le.ac.uk/pathology/teach/VA/titlpag1.html) (<http://www.le.ac.uk/pathology/teach/VA/titlpag1.html>)

ANAESTHETIC AND POST-OPERATIVE DEATHS

1 in 166 patients submitted to surgery die within 6 days but only 1 in 10,000 are actually due to the effects of the anaesthetic alone.

Difficulties with such cases:

- 1) Autopsy may be technically difficult, due to the effects of surgery and anaesthesia being superimposed on pre-existing natural disease or trauma.
- 2) Naked eye changes may be minimal or absent at autopsy.
- 3) An understanding of the possible mechanisms of death in such cases often requires specialist knowledge outside pathologist's normal experience.
- 4) Even unspoken inference of possible medical impropriety makes relationships between pathologists, anaesthetists or surgeons very sensitive.

To overcome these difficulties:

- 1) Autopsy is performed with minimal delay. Medical intervention should be left intact by medical & nursing staff.
- 2) Clinical casenotes, x-rays, laboratory results are studied prior to autopsy.
- 3) Polite and professional first hand discussions with anaesthetist and surgeon involved are encouraged. They should be invited to attend autopsy and to discuss the findings.
- 4) Specimens should be retained for further investigations, where appropriate, e.g. toxicology, biochemistry, microbiology and histology.

In considering the cause of death, the physical status of the patient prior to surgery must be considered. The question "would death have occurred when it did if the operation had not been performed ?" is often impossible to answer.

The American Society of Anaesthesiologists have devised a classification system to grade the pre-operative condition of the patient:

ASA1: those with no pre-existing serious disease and have a minor, localised condition requiring surgery, e.g. fit man with inguinal hernia.

ASA2: those with a serious disease but have no limitation of their activities (the condition may be pre-existing or the result of the condition requiring surgery), e.g. mild angina, mild hypertension, chronic bronchitis.

ASA3: those with a serious disease causing some limitation of their activities, e.g. moderate angina, previous myocardial infarction (heart attack), severe chronic bronchitis.

ASA4: those with a serious disease that limits their activities and is already a threat to life, e.g. severe angina at rest, acute myocarditis, chronic bronchitis with respiratory failure, perforated peptic ulcer.

ASA5: Moribund patient with little chance of survival, submitted to surgery as a last resort, e.g. ruptured aortic aneurysm, severe trauma, massive pulmonary embolism, severe peritonitis due to perforated colon.

Suffix (E): indicates the need for emergency surgery and indicates the patient's condition is worse than for

one undergoing planned surgery, e.g. fit man whose hernia becomes strangulated (IE).

Class 1 - 3 requires full medicological investigation.

Class 4 and 5, where death is anticipated, there is less need for full investigation.

The cause of death after surgery/anaesthetic may be:

- a) *The result of the disease or injury for which the anaesthetic/operation were being carried out.*
 - Was there any delay in treatment?
 - Was the timing of operation appropriate?

- b) *The result of some other disease or abnormality.*
 - Should this have been diagnosed prior to surgery?
 - Where all measures taken to reduce any known preexisting risks?

- c) *The result of a surgical mishap.*
 - Accident (slipped ligature or clamp)
 - Unusual difficulties (adhesions due to previous surgery, anatomical variants)
 - Error by surgeon (? negligence)

- d) *The result of anaesthetic mishap.*
 - Cardiac arrest (nerve stimulation by instrumentation)
 - Excess anaesthetic agent given (overdose)
 - Airway obstruction (position of patient, inhalation of false teeth, blood, vomit)
 - Faulty equipment (anaesthetic machine empty, disconnected or blocked, electrical fault)
 - Malignant hyperpyrexia (a rare inherited muscle disease causing excessive fatal heat production by muscle in response to some anaesthetic agents)

NEGLIGENCE

Definition "the breach of a duty to use reasonable care as a result of which there is damage to another".

Proof requires three elements to be established

1. Legal duty of care must be owed
2. Breach of that duty,
 - by **omission** (something they did not do but should have) OR
 - by **commission** (something they did but should not have).Behaviour has fallen short of the required standard and it is reasonably foreseeable that such careless behaviour could damage the patient.
3. A casual link between careless behaviour and damage to the patient is proved. The standard of care required by a doctor is the standard of a reasonably skilled and experienced doctor working in that field. Judged by peer review.

