EUROPEAN COUNCIL OF LEGAL MEDICINE
ECLM

HARMONIZATION OF THE PERFORMANCE OF THE MEDICO-LEGAL AUTOPSY

§ 1 Types of Medico-legal autopsies

The reasons why medico-legal autopsies are instructed can be subdivided into three categories according to their aims and scopes:

(1) A primary suspicion of another party's involvement (deliberately or negligently)

(2) A primary aim of identification (mass disasters, human and skeletal remains, etc.)

(3) An exclusion of another party's involvement and/or establishment of the cause of death (e.g. sudden unexpected death, obvious suicide, occupational and transportation death, other accidental deaths, drowning etc.)

Autopsies may also be performed with more than one scope, and transitions between these categories can occur.

§ 2 Specialists involved

To § 1 (1): preferentially, this type of medico-legal autopsy should be carried out by **2 experts,** at least one of whom being a qualified medico-legal expert.

To § 1 (2) and (3): this type of autopsy can be performed by **one expert** only.

§ 3 Time of autopsy, storage of the body

In all instances, medico-legal autopsies should be performed without any unnecessary delay and, if a delay is unavoidable, with the body being stored appropriately and in an undisturbed state.

The body should not be embalmed. In storing and transporting bodies and during autopsy procedures, hygienic precautions are to be established to protect the staff from the risk of infectious diseases.

The appropriate legal documentation and authorization to carry out the autopsy should accompany the body and be retained with it.

§ 4 General procedures, circumstances and previous history

(1) The investigation, description, documentation and sampling during a medico-legal autopsy must primarily follow medical principles and simultaneously consider local judicial requirements and procedures

(2) Whenever possible the pathologist(s) should be precisely and comprehensively informed on the weapons and/or mechanisms that are possibly involved in the causation of death. This would include data concerning the site where the body was
found and circumstantial factors such as clothing, furniture, etc. Especially when homicide is suspected, knowledge of all such facts should be a basic and regular component of the procedure. Particularly important in the last instance is the inspection of the scene of crime and the distribution of biological stains.

(3) Examinations to estimate the time of death must be performed immediately after the finding of the body and must be fully documented.

(4) All findings and positive as well as negative information relevant to the case must be fully documented and complemented by other appropriate methods and investigations (photographs, drawings, X-ray, etc.).

(5) Identification of the deceased has to be checked carefully and documented.

§ 5 External examination

(1) The examination of the clothing is an essential part of the external examination and all findings therein are to be clearly described. This is especially important in those cases where the clothing has been damaged or soiled: each area of recent damage (tears, cuts, specifically shaped blood stains, areas soaked with blood, etc.) must be described fully and relevant findings are to be physically related to the sites of injuries on the corpse. Discrepancies in such findings are also to be described.

(2) The description of the corpse should include:

- age, sex, build, height and weight (measured); nutritional state, skin color, special charactehstics (e.g. ulcers, scars, tattoos, amputations, malformations);

- signs of death and their patterns (including details relative to rigor and livor mortis - distribution, intensity, color and reversibility - and putrefaction) and environmentally induced changes;

- the fihdings on a primary external inspection and description which, if required should include sampling of stains and other trace evidence on the body surface (faeces, blood, hairs, body fluids, etc.), and a reinspection after removal and cleaning of the body;

- inspection of the skin of the posterior surfaces of the corpse;

- description and careful investigation of the head and the facial orifices has to include: color, length, density of hair (head and beard); nasal skeleton; oral mucosa, dentition and tongue; ears, retro- auricular areas and external meati; eyes: color, regularity and width of pupils, sclerae, conjunctivae, palpebral skin (presence and absence of petechiae to be described); if fluids have been evacuated from facial orifices, their color and odor;

- neck: excessive mobility; presence and absence of abrasions, other marks and bruising (including petechiae) after checking circumferentially;

- thorax: shape and stability, breasts, their shape, nipples, pigmentations etc.

- abdomen: external bulging, pigmentation, scars, abnormalities, bruising etc.;

- the genitals and the anus;

- extremities: their shape and abnormal mobility, abnormalities; injection marks and scars; palmar surfaces; finger- and toe-nails.

(3) All injuries, including abrasions, bruises and also other marks (including tattoos) are to be described by shape, exact measurement, direction, edges, angles and location relative to anatomical landmarks. Signs of vital reaction around wounds, foreign particles inside wounds and in their surroundings (e.g. powder particles), and secondary reactions such as discolorations, healing, infections are also to be included. The description of cutaneous/subcutaneous bruising necessitates local skin incision. Where appropriate specimens from wounds are to be removed for further investigations (e.g. histochemistry, immunohistochemistry).

(4) All signs of recent or old medical and surgical intervention and resuscitation are to be described (e.g. surgical wounds, drainage marks, intravenous catheters, pacemakers, etc.).

(5) A decision is to be made at this stage as to the preferential strategies of investigation and the necessity of documentation by X-ray and other imaging procedures. The investigations should be performed prior to dissection.

(6) Before commencing the dissection ensure when relevant that all body orifices are approphately swabbed.

§ 6 Internal investigation

A.GENERAL

All relevant artefacts which would be produced by the invasive investigative procedures (such as incisions) are to be documented.

(2) Body walls and cavities

- All three body cavities - head, thorax and abdomen - are to be opened layer by layer. In addition the vertebral canal and/or joint cavities are to be examined in relevant situations;

- Examination and description of the body cavities are to include: an examination for the presence of gas, measurement of volumes of fluids and blood;

appearance of internal surfaces; intactness of anatomical boundaries; external appearance of organs and their location; adhesions and cavity obliterations; injuries and haemorrhages;

- The 'in situ' demonstration and dissection of the soft tissues and musculature of the neck is a routine component of all medico-legal autopsies;

(3) Internal organs

- All organs are to be examined and sliced following established guidelines of pathological anatomy. If injuries are present the dissection procedure may have to vary from the one in routine usage: this must be appropriately described and documented.

- All lesions and injuries must be precisely described by size and location and similarly injury tracks, to include the direction of the latter relative to the organ anatomy. The weight of organs should be listed.

B. DETAILED

(1) Head

- Before opening the skull, scrape off the periosteum to undoubtedly prove the presence of any fractures/fissures; the head examination procedure must allow the inspection and description of the scalp, extemal and internal surfaces of the skullbones and of the temporal muscles. The thickness and appearances of the skull bones and sutures, the appearances of the meninges, the cerebrospinal fluid (CSF), the wall structure and contents of cerebral arteries and sinuses are also to be described. The description of the bones should also include an examination of their intactness, including the connection between the skull and the first two vertebrae;

- In selected cases (e.g. if a detailed examination is required or if autolysis is present) fixation of the whole brain is strongly recommended before its dissection;

- The nasal sinuses and middle ears to be opened regularly according to standard procedure;

- The soft tissues and skeleton of the face should be dissected in relevant cases only and by applying a cosmetically considerate and acceptable technique.

(2) Thorax

- The opening/preparation of the thorax has to be performed using a technique which allows the inspection of all its walls including the postero-lateral regions.

(3) Abdomen

- The opening/preparation procedure of the abdomen must allow an accurate examination of all layers of the walls, including the postero-lateral regions.

§ 7 Skeleton

- The examination of the thoracic cage, the spine and the pelvis is part of the routine procedure.

- Traumatic deaths necessitate a precise dissection of the extremities, possibly complemented by X-ray examination.

§ 8 Special procedures

- If there is suspicion that pressure has been applied to the neck, the thoracic organs are to be removed prior to the dissection of the neck and after removal of the brains, to enable the neck dissection to take place in a bloodless field.

- If there is a suspicion of air embolism, radiology should be considered. At autopsy the first step in such cases must be a careful partial opening of the thorax and dislocating the lower three-quarters of the sternum with the subsequent opening of the heart under water, allowing the measurement and sampling of exiting air/gas.

- For the demonstration of particular injury patterns, deviations from the normal procedure of dissection and preparation are acceptable (e.g. dorsal or dorsolateral opening of a cavity) - such procedures should be specifically mentioned in the written protocol;

- The dissection in practically all traumatic deaths must include a full exposure of the soft tissues and musculature on the back of the body. The same procedure is to be applied to the upper extremities (so- called "peel off' procedure), especially in all homicides, and to the lower extremities, especially in all traffic accidents;

- In suspected or overt sexual assaults, the sexual organs are to be removed "en bloc" together with the external genitalia, rectum and anus, before they are dissected. Relevant swabs of orifices and cavities should be taken prior to this procedure.

§ 9 Sampling

The scope of the sampling procedure is very much case-dependent. Strict guidelines in this respect are difficult to produce and these might have to be changed in the light of future developments. The following is a framework:

- the basic sampling scheme should include: specimens from the main organs for histology and peripheral blood sampling (e.g. alcohol, drugs, serology);

- if the cause of death cannot be established with any certainty, sampling should include specimens and fluid(s) for toxicology;

- if death is related to physical violence (gunshot-injury, wounding, blunt violence), sampling should include the injuries, e.g. to determine the age of the wound and any foreign materials in the wounds.

- if reconstructions are desirable, the removal of bones and osseous compartments may become necessary;

- if identification is the predominant aim, the removal of jaws and/or other bones may be necessary;

- if strangulation or the application of physical force to the neck is suspected or diagnosed, the entire block of neck structures, musculature and neurovascular bundles of this block should be preserved for possible histology. The hyoid bone and the laryngeal cartilages are to be dissected with great care;

- if intoxication is suspected see addendum, no. 10.

§ 10 Layout of the Autopsy Protocol Report

(1) Preamble to include administrational features

(2) Identification procedures;

(3) External examination (dressed, undressed, uncleaned, cleaned etc.);

(4) Intemal examination (head, thoracic and abdominal cavities, soft tissues of the neck, thoracic and neck organs, abdominal organs, skeleton and soft tissues, organ weights);

(5) Preliminary expertise:

(5.1) Previous history, police report, death certificate information, scene findings;

(5.2) Autopsy diagnosis and cause of death;

(5.3) Evaluation of all relevant findings;

(5.4) Advice and authorization for further investigations;

(5.5) Sampling list

(5.6) Possible objections to cremation

Addendum

Specific strategies (selected examples)

(1) Strangulation (hanging, ligature strangulation, throttling)

- The examination of the scene where the body was found is extremely important e.g. presence of a chair or similar platform; fastening of the strangulation implement; technique of tying of the knot; there may be a need for taping of hands and implements.

- Strangulation marks: depth, width, intermediate rings, direction, suspension point, blisters, raised ridges of skin, zones of hyperaemia, presence of duplicate strangulation marks

- Further specific neck injuries: dried excoriations due to slippage of the implement, marks due to textile weave pattern and structure

- Distribution of petechiae in the skin, bruising, scratch marks.

- Exsanguinations from facial orifices.

- Differences in widths of the pupils

- Localization of livor mortis, presence and distribution of the congestion.

- Injuries due to convulsions, defensive injuries, injuries due to being held forcibly.

- Preparation/dissection technique: demonstration and documentation of the soft tissues, of the musculature and of the organs of the neck are predominant (see § 8).

(2) Drowning / Water death

- Note carefully the following findings: foam at the mouth, cutis anserina; washerwoman's hands, mud and algae, lesions due to water animals, injuries due to surroundings (e.g. rocks and ships); loss of nails, skin; localization of livor mortis.

- Technique: e.g. sampling of gastric contents, precise description of the lungs (weight, measurement, extent of emphysema), sampling for the possible demonstration of diatoms.

- lf required, sampling of drowning medium.

(3) Sexually motivated murder

- The inspection and documentation of the scene of crime e.g. relative to the injury pattern, is especially important. All injuries should be photographed together with a scale. lf possible, the body surfaces should be investigated under UV light and taped. Special emphasis is to be applied to the search for (foreign) pubic hairs. 'En bloc' dissection of the genital organs is strongly recommended, also the careful removal and sampling of (material under the) fingernails. Remove control hairs.

(4) Death from child abuse and neglect

- State of nutrition and general care, thorough description and documentation of external injuries and scars, thorough examination for bone fractures (X-ray).

- Consider the removal of a variety of tissue: e.g. all injuries, regional lymph nodes; (in mainutrition) endocrine organs, immuno-competent tissues, specimens from different parts of the intestine.

(5) Infanticide / still-birth

- Special techniques of dissection are necessary to expose the falx cerebri and the tentorium cerebelli; describe the site of caput succedaneum; remove all fractures 'en bloc'; investigate all centers of ossification (size and presence) in bone. Special care is to be applied to the thoracic organs: degree of inflation of the lungs, flotation test 'en bloc' and 'en detail'. All malformations to be described. Abdominal organs, gas content of the intestine. The umbilical cord and placenta should be described.

(6) Sudden death

A subdivision into 3 main categories relative to the further strategy after gross examination is useful:

(1) findings obviously explain the sudden occurrence of death (e.g. recent myocardial infarction);

(2) findings that could explain the death but not its sudden occurrence (e.g. stenosing coronary atherosclerosis);

(3) findings are either nil/minimal or do not explain the occurrence of death.

Cases belonging to category (1) can be regarded as sufficiently solved, category (2) necessitates the exclusion of e.g. poisoning and possibly histological proof of recent or chronic alterations relative to the cause of death. Category (3) will usually require extensive further investigations. This is especially so with sudden infant death cases. In such cases a more comprehensive investigative scheme is essential.

(7) Shooting fatalities

Specific examinations, prerequisites and sampling procedures are:

- extensive knowledge of the crime scene, of weapons involved, of types of bullets, of sites of 'environmental' damage and of cartridge cases, of relative positions of persons involved;

- thorough examination of the clothing and documentation of relevant damage, its careful sampling;

- thorough investigation and documentation of any blood (splash) stains on the body surfaces (including clothing and hands);

- precise documentation of bullet entry and exit wounds relative to anatomical landmarks and distances from the soles of the feet;

- documentation of any impression marks of the muzzle;

- excision of (uncleaned) skin specimens surrounding entry and exit wounds;

- X-ray before and/or during autopsy (where necessary);

- determination of bullet tracks and their direction(s);

- final determination of direction(s) of fire, of the succession of shots, of intra-vital occurrence, of the victim's position.

(8) Sharp force injuries

- examination of the weapons that are possibly involved (especially their dimensions);

- extensive examination and inspection of clothing (including damage, stains);

- careful dissection and description of all tracks (layer by layer) including their dimensions and weapon-related traces, look for signs of vitality;

- final evaluation of direction(s), physical force(s), mode of occurrence etc..

(9) Fire Deaths

- remains of clothing, specific types and shapes of burns on the skin and mucosae;

- heat-related alterations and peculiarities;

- demonstration of /exclusion of fire accelerants;

- signs of vitality:.CO & HCN in blood, soot inhalation, skin lesions.

(10) Intoxications (General Outlines)

(10. 1) In all medico-legai autopsies: blood is to be collected from the femoral veins.

(10.2) In primarily unelucidated causes of death: blood, specimens from liver and kidney and if possible urine and additional specific samples.

(10.3) In specific suspicion of intoxication:

- hypnotics, sedatives, psycho-active drugs, cardiac drugs and analgesics, insecticides: as aforementioned under (10.2).

- drugs of abuse: as aforementioned under (10.2) and additionally cerebrospinal fluid, brain tissue, injection marks, scalp hairs.

- volatile fat-soluble substances such as fire accelerants and solvents: as aforementioned under (10.2) and in addition: blood from left ventricle, brain tissue, subcutaneous fat tissue, lung tissue, clothing.

- nutritional intoxication: as aforementioned under (10.2) and in addition: intestinal contents, if possible taken from 3 different sites;

- suspicion of chronic intoxication (heavy metals, drugs, insecticides etc: as aforementioned under (10.2) and in addition hairs (tufts), bones, fat tissue, intestinal contents.

(11) Decomposed bodies

The presence of decomposition does not remove the need of a full autopsy.

- Identification in such instances may cause major problems.

- Radiological examination will exclude bony injury, the presence of foreign bodies e. g bullets, prostheses.

- A systematic dissection of body cavities has to be carried out.

- Toxicological studies (particularly estimation of alcohol concentrations) should be carried out but interpreted with great caution.

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