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Medical Section

Expert commission Quality Management and Autopsy

Guidelines for Preserving Autopsy Material for Forensic-Toxicological Analyses

1. Introductory regulations

These guidelines subserve quality assurance in collecting samples in post-mortem examinations, especially when performing autopsies, in view of possible forensic-toxicological analyses. They do not hold for other types of examinations, but they are analogously applicable.

Definitions:
- Sample: Examination material with associated container
- Sampling: the appropriate removal and further handling of samples

As a rule, sampling begins at the corpse and ends with the handing over of the samples to the proper laboratory. A sample handling that deviates from these rules is possible, but it has to be clearly regulated.

The sampling procedures are spelled out in such a way that no false sample can be taken and that a confusion of samples or exchange of these is not possible.

The person performing the autopsy is responsible for the appropriate and correct sampling.

The quality-relevant steps of the sampling, the transfer and possibly the storage as well as the handing over to the laboratory should be documented.

2. Sample types and amounts / additions / sample containers

In general sampling belongs to each autopsy. The person performing the autopsy decides in each case on the type and extent of the sampling in accordance with the concrete problem being investigated.

Depending on the circumstances, the sample size should be arranged in such a way that the required analyses can be carried out and sufficient material is left over for additional examinations and/or a repetition of the analyses. Even small amounts should be preserved.

The sample should be chosen in such a way that it can be considered as a reference for entirety of the sample material.

Where it is meaningful, the volume of the entire sample material is to be determined (e.g. stomach content).

As a rule the sample is preserved without additives. If any additives are given to the sample (e.g. fluoride, EDTA, Heparin, etc.), this has to be recorded.

Note:
It is advisable to stabilize a l blood sample from the peripheral blood vessel system with potassium fluoride; this is essential for establishing the presence of cocaine.

Inert, thick, clean shatterproof glass or plastic containers are to be used for collecting fluid or solid samples. For gas samples gas syringes or headspace tubes are suitable. The utilization of other types of containers is to be documented. For special problems cotton swabs are suitable (e.g. collecting drugs from nasal mucosa).

Note:
It is advisable to prepare a list of possible examination materials - with the associated sample sizes and containers – and any further information.

3. Technical aspects for sampling

Fluids (e.g. blood, urine) should be collected with a one-way syringe or with a one-way pipette. Each syringe or pipette should only be used once.

The scoop (or large spoon) can be used for the removal of larger amounts of fluids from the corpse. They are not suitable for taking samples due to the risk of contamination. Very viscous materials (e.g. stomach content) are an exception. In such cases it must be assured that the instrument is washed with clean water and then dried.

3.1 Blood sample from the heart

Opening the pericardium and removing the fluid contents, then obtaining blood by puncturing with a needle or after incision of the cardiac cavities using a pipette or syringe.

3.2 Blood sample from peripheral vessels

Puncture of a blood vessel (e.g. in the inguinal region) transcutaneously or after preparational display, or

Aspiration of blood with a syringe (or pipette) from blood vessels of the extremities (arms, legs).

3.3 Urine sample

Before the autopsy: Transcutaneous supra- or infrapubic puncture of the bladder with a syringe or directly from a urinary catheter.

During autopsy: Direct puncturing of the bladder or incision and subsequent sampling with a pipette.

Note:
A transcutaneous puncturing of the bladder bears the risk that some other fluid (e.g. ascites) will be obtained. In cases of any doubt, a substance typical for urine (e.g. creatinine) should be examined.

3.4 Stomach content sample

Sampling in situ after opening the stomach or after removing the ligatured stomach.

Entire content or only a portion, depending on the problem being investigated.

Note:
It can be useful to separate the sample into solid (particles) and fluid portions using an appropriate procedure. A portion in which residues of tablets and other toxicologically relevant particles are suspected can be collected separately with a pipette or a clean spoon.

3.5 Gall bladder contents

Sampling of the entire bile by puncturing in situ or removal of the gall bladder together with the liver and subsequent puncturing or direct collection following incision.

3.6 Tissue samples

Collection of tissue samples during or immediately after preparation of the particular organ (e.g. liver, kidney, lungs, brain etc.). For the liver, the sample has to be taken from a stomach-distant region.

Tissue samples must be kept separated in individual containers.

3.7 Cerebrospinal fluid

Preferably with the syringe via a suboccipital or lumbar puncture, or with a syringe or pipette from the subarachnoid spaces or cerebral lateral ventricles or after the removal of the brain.

3.8 Eye chamber fluid (aqueous humour) or corpus vitreum (vitreous humour)

The aqueous humour is the fluid in the anterior chamber of the eye.

Puncture of the anterior chamber of the eye. The fluid can be collected by lateral punction of the anterior chamber with the tip of a fine needle, either at the base of the cornea or, alternatively, dorsally through the sclera and pupil.

The vitreous humour is the gelatinous substance in the eye bulb.

The removed fluid should be replaced by a physiologic NaCl solution.

3.9 Hair sample

Sample of the longest hair possible (normally from the head; , depending on the haircut, body or pubic hair is although acceptable).

Bind an approximately 3-5mm thick bundle of hair together (e.g., using binding thread) and then cut it away directly at the skin level with scissors or knife. Mark the location and direction of growth appropriately.

3.10 Gas sample

In cases of suspected gas embolism, aspirate the gaseous contents using a special gas syringe. Use the gas syringe as the transport container or transfer the aspirate into a headspace tube.

Note:
In case of cardiac gas embolism collect the gas sample from the right cardiac cavity.

3.11 Bone sample

When investigating special problems (e.g. suspicion of heavy metal poisoning) collect a vertebral body and a probe of compact bone (about 5 cm long piece from the middle part of the shaft).

4. Chain of custody / examination order

Each sample that is obtained (fluid, tissue etc.) must be placed in the appropriate container without delay. Close the sample container immediately and then label it with at least the following information:

- control number or autopsy number,
- the persons names (if known) or an analogous unique designation,
- type and origin of sample material,
- collection date.

During the autopsy the samples thus obtained must be stored as close to the examined corpse as possible; a switching of the samples with those of another corpse lying nearby must be avoided.

Note:
The use of a sample tube stand or a box is recommended for this reason.

The samples are to be stored as a unit (e.g. in a sample stand or box) in a refrigerated facility that is not accessible by unauthorized persons. The temperature must be below 5°C.

Note:
The further steps and procedures with the samples are to be documented.

These guidelines correspond to the analogous document from 12.10.2002. They were revised and modified by the expert commission "Quality Management and Autopsy" of the Medical Section of the Swiss Society for Legal Medicine (SSLM) - namely by S. Burkhardt (IUML Geneva), K. Gerlach (IRM Basel), B. Horisberger (IUML Lausanne), R. Laharpe (IUML Geneva), Ch. Markwalder (IRM St. Gallen), Th. Plattner (IRM Bern), T. Rohner (IRM Zurich), B. Schrag (IUML Lausanne),Th. Sigrist (IRM St.Gallen), M. Thali (IRM Bern), B. Vonlanthen (IRM Zurich) und D. Wyler (IRM Basel / Chairman) - assisted by St. Bolliger and approved on the **20.04.2007** by the Medical Section of the SSLM.