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Medical criminalistics

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Dedicated to Prof. Dr. h.c. mult. Otto Prokop on the occasion of his 85th birthday

Abstract

Medical criminalistics is an essential part of legal/forensic medicine. It includes the clinical examination of surviving victims and suspects, the inspection of the scene in suspicious deaths with subsequent performance of medico-legal autopsies, the assessment of (biological) traces and the reconstruction of criminal events under medical aspects. Just as the circumstances of life and the manifestations of crime are changing with time, there is a permanent alteration regarding the issues of medical criminalistics. Legal/forensic medicine is a university subject in most countries and therefore, research work is one of the main tasks also in medical criminalistics. In contrast to clinical medicine and basic research, some common study designs are not suitable for the special needs of medical criminalistics, whereas other types are more appropriate like epidemiological evaluations, cross-sectional studies and (retrospective) observation studies. Moreover, experimental model tests and case reports also rate high in medical criminalistics.

Keywords: Medical criminalistics; Legal medicine; Clinical forensic medicine; Medico-legal research

1. Introduction

Criminalistics is regarded as a speciality within the field of forensic sciences. According to a definition by the California Association of Criminalists, criminalistics is the profession and scientific discipline directed toward the recognition, identification, individualization and evaluation of physical evidence by application of the natural sciences to law-science matters [13].

Traditionally, legal medicine also covers many fields of activities belonging to forensic sciences. Apart from its academic tasks as a university subject in most countries, legal medicine deals with ''the application of medical knowledge in the administration of justice'' [24]. Legal medicine and criminalistics are closely related because both are oriented towards forensic needs. Therefore, it is not surprising that the responsibilities of both disciplines differ from country to country.

Even in one and the same legal system, the relationship between legal/forensic medicine and criminalistics is subjected to time-related changes [33]. In Germany after World War I, Kockel [23] was of the opinion that forensic chemistry and criminalistic technology should be integrated into legal/forensic medicine. For some time, the university institutes carried the double name ''Forensic Medicine *and* Criminalistics'', although objections were raised at that time already – and rightly so – against the ''encyclopaedic'' claim of a comprehensive competence of the medico-legal expert [41].

As Schwerd [45] and Berg [1] correctly stated, *medical* criminalistics is a natural part of legal medicine. It includes the examination of victims and suspects and the investigation of traces to reconstruct the course of events and legally relevant facts under medical aspects, especially interpretation of findings in suspicious deaths, inspection of the scene and assessment of biological stains. To make students familiar with criminalistic thinking and working methods is an important objective of academic teaching and post-graduate training of specialists in legal medicine.

No matter how the scope of practical medico-legal work is defined, the *reconstruction* of events has always been a specific feature and domain of legal medicine. Contrary to pathology, which concentrates on the diagnosis of diseases and causes of death, legal medicine uses the diagnosis as a starting point to

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reconstruct what happened. For example, the main purpose of forensic autopsies is not so much to determine the cause of death as such, but to clarify legally relevant circumstances and contexts (determination of the approximate time of death, differentiation between self-inflicted injuries and lesions caused by another person, analysis of wound findings with regard to the object used, recognition and interpretation of trace material, etc.). The evaluation of gunshot wounds as to number and localization of hits, line of fire, firing range, weapon and ammunition used, self-infliction or involvement of another party, effect on the capability to act, etc. is an example how the purpose of an investigation goes beyond purely medical findings to criminalistic and juridic questions of evidence.

2. Study designs and methods

As far as medico-legal institutes are affiliated with a university, they belong to the medical faculty in most cases and are often integrated into a university hospital. In that environment, clinical research is the predominant field, which is focussed either on basic research or on the study of diseases and patients, respectively. Most of the methods used for these activities are applicable to legal medicine in general and medical criminalistics, in particular, on a rather limited scale only [27].

Neither the basic research using biological systems and animal models nor the clinical trials prescribed for the registration of new drugs are consistent with the needs of medical criminalistics. Some study designs, which play an important role in medical and therapeutic research (controlled, randomised clinical studies, cohort studies, case–control studies), are not suitable for medical criminalistics because the forensic material is completely different.

Other study types are better suited for the specific circumstances in forensic medicine, for example, prospective cross-sectional studies, retrospective observation studies and case reports. For certain subsections of the field (e.g. thanatology, determination of wound age), longitudinal studies are also necessary to describe and quantify time-related changes in the findings [28]. In those areas in which laboratory techniques are to be established for the recording of new parameters or the optimization of existing procedures, validation of the methods is of special significance.

For medical criminalistics, which is the main topic of this article, the *comparative phenomenology* of exactly defined study groups is essential. The evaluation of current case series gives an authentic picture of the criminalistic phenomena in homicides and bodily harm. The development and statistical confirmation of morphological criteria help to characterise typical patterns of findings. Thus, it is possible, for example, to supply evidence-based evaluation tools for differentiation between self-inflicted injuries and injuries caused by another person.

The important role played by case reports in the field of medical criminalistics will be described in greater detail below. Nevertheless, forensic research must go beyond the description of unusual individual observations [48]. Many questions cannot be answered by experience alone, but require experimental research. Experiments performed on appropriate test models to clarify the biomechanical basis of injury formation are such an example.

3. Questions to be answered

Medico-legal research draws an essential part of its ideas and questions from practical forensic work. Moreover, the findings and data collected for expert opinions constitute the basis for an empirical approach to research. Without the study material of medico-legal routine work, no new findings could be obtained in many forensically relevant areas. On the other hand, the close relation to university medicine ensures a high scientific standard and independence. Without proper research activities, legal medicine and thus, medical criminalistics would rapidly fall behind the general scientific progress.

From the multitude of research subjects, only a few can be dealt with in this context. The collection of epidemiological data, which is possible only on the basis of medico-legal practice, is of importance for the society and legal policy in general. This applies, for instance, to the frequency of certain crimes, such as infanticide [47] or to the number of drug victims depending on different offers of therapy.

The results of such investigations also help to elucidate health risks. For example, a medico-legal multicenter study on the HIV prevalence in drug victims demonstrated that the intravenous drug consumption is one of the main causes of HIV infections in Germany. In the course of the observation period (1985–1994), the prevalence level declined from 29% to about 7% [26]. The medico-legal monitoring, thus impressively demonstrates the success of educational campaigns and the importance of prophylactic measures to prevent an infection by sharing unsterile needles.

Systematic research of sudden infant death was and still is also essentially conducted by the institutes of legal medicine [12], as in most of these cases both the manner and cause of death are unclear, so that infanticide cannot be ruled out from the very beginning [2,8]. Dettmeyer et al. [7] and other authors have dealt with this topic in greater detail.

An important aspect of medico-legal publications is to direct the attention of criminalists to diagnostic problems. Serial killings in hospitals and geriatric care may serve as an example. Knowing the relevant methods, which do not necessarily leave any external injuries on the often multimorbid patients, is an important prerequisite to become suspicious and to induce the performance of an autopsy [30].

The old question, how many homicides are not recognized, was tried to be answered by a joint study of 23 institutes of legal medicine [5]. Among 13,000 autopsies of the study material, 92 ‘‘discoveries by chance’’ were reported where a natural death was given on the death certificate. These cases comprised 49 fatal accidents, 10 homicides and 19 deaths from medical complications. On the basis of this multicenter study, it was estimated that there are at least 1200 homicide cases per year which do not appear in Germany’s official statistics, as they are classified as natural deaths.