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Introductory Chapter: An Overview of Post-Mortem Examination and Autopsy

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1. Forensic medicine and death investigation

It is obvious that there is an interest in determining the causes of death of its members even in a primitive tribal society. A sudden, unexpected or unwitnessed death must have signaled a potential danger, either by its own members from within the society or by an enemy from the outside [1]. Forensic medicine mainly deals with examination and assessment of individuals who have been—or are suspected to have been—injured or killed by external influence such as trauma or intoxication. In many countries, forensic medicine represents a medical specialty within the legal system, not within the healthcare system [2]. The primary goal of death investigation is establishing the cause and manner of death. The people commonly ask, “The person is dead. Why does it matter?” Yes, the dead cannot benefit, but the value of the death investigation is to benefit the living and future generations. In a culture that values life, it is very important to explain the meaning of death in a public forum (“forensic”) [3]. In cases of sudden death, the forensic pathologist determines the cause of death, and his views in criminal cases are crucial to ensuring justice. Data obtained from investigating accidental and suicidal deaths are vital for preventive strategies [4].

2. Who is forensic pathologist?

Forensic pathology is the part of forensic medicine dealing with examination of deceased persons. A common principle is that in the investigation of a possible or suspected criminal death, a forensic pathologist is engaged through a formal request from the police or the prosecutor. The task of the forensic pathologist is then to assist in the investigation as a medical expert. This expert role continues throughout the process, including the court proceedings on request of the court and/or one of the parties [2]. When a physician cannot certify the cause of death

in deaths from natural causes and when bodily damage is the major finding, forensic pathologist has to deal mostly with the pathology of accidental (unintentional) and homicidal or suicidal (intentional) trauma. The primary role of forensic pathologist is to determine the cause of death based on a complete autopsy. The forensic medicine expert deals with the examination of the injured person or deceased to determine the cause and nature of the injuries and death in cases involving injuries. In cases of domestic violence, sexual assault, torture, and alleged medical negligence, forensic pathologist's role is very important. Forensic pathologists are like any other forensic scientist in many ways. They identify/classify things and compare them with known examples to confirm or refute hypotheses. The difference is their area of study and examination: the human body. In this sense, they learn what other medical doctors learn: how the body's systems work. Pathologists learn how these systems fail through natural causes, such as disease or accidental trauma. A forensic pathologist learns how the body's systems are forced to fail through unnatural means, such as gunshots and stabbings. Despite their apparently limited scope of education, forensic pathologists need to know a good bit about all the forensic sciences, as well as the natural and medical sciences. It can take 10 years of so to become a forensic pathologist. Although they are paid well by other forensic professionals' standards, they are typically paid far less than other medical doctors. The length of schooling, the nature of the work, and the relatively low pay mean that only truly dedicated can enter and excel in this demanding profession [4]. The task is to function as a medical expert for justice, not primarily to support one of the parties in the trial. Hence, the role of the forensic pathologist in the relation to the examined person is obviously completely different from the role of the clinical doctor in his/her relation to the patient, where the physician often becomes an advocate for the patient. The main role of the forensic pathologist is to practice and to mediate a scientific approach to the medical issues raised in a legal context involving death. It is inherent in its very nature that the forensic pathologist, irrespective of principle, strives to assist with impartial assessments, based on "science and tried and tested experience." [2].

3. Importance of death scene investigation before post-mortem examination

Medical expertise begins by examining the body and gathering evidence at the scene. The next step is history, physical examination, laboratory tests, and diagnosis. Providing objective evidence for the justice system and determining the timing, cause, and manner of death are the main objectives [5]. Cooperation between law and medicine was determined in 3000 B.C. in Egyptian culture. British coroner system was established at the end of the twelfth century [6]. It is very important for the forensic medicine specialist to participate in the examination of the place of death. The forensic medicine specialist can inform the investigating authority about the nature of the death, whether the circumstances are consistent with a natural death, or interpreting the amount of blood loss from a deceased person as being due to natural disease rather than injury. Not participating in death scene investigation is considered to be one of the most important mistakes in forensic medicine. The pathologists performing autopsies in the hospital who do not have time to attend death scenes or are not trained in attending death

scenes should be informed about where, when, by whom, and under what circumstances the body is found. In some deaths, such as metastatic breast carcinoma, environmental factors do not contribute to death. The environment plays a role although it does not cause death in other cases: for example, a person who has significant coronary atherosclerosis dies because of dysrhythmia while shoveling snow. The findings at death scene and the photographs of the scene are critical for positional asphyxia as very few findings may be determined at the autopsy. It is very hard to determine the manner and cause of death in a 30-year-old man with a negative history and toxicology and autopsy findings of visceral congestion. But the cause and manner of death may be determined if a screwdriver is next to an electrical outlet at the decedent's house, which is in the renewal phase [7]. The investigation of the death place and then collecting the evidence material need special talent, knowledge, and ability. The manner in which a murder investigation is performed can be an important factor to determine the success of an investigation. A comprehensive examination of the site of death requires a disciplined and systematic approach to gathering observations and evidences. This should be combined with the analysis of the various observations and the relationship of the potential evidences [8]. The scene of the death should be visited in homicide, suspected homicide, and other suspicious or obscure cases, before the body is removed. Any doctor who claims to be a forensic medicine expert should accompany the police at the place of death. This duty is often formalized for forensic medicine experts who are either full-time or substantially involved in assisting the police [9]. In some cases, the scene investigation may become more important than the autopsy. A comprehensive on-scene review helps identify the cause and manner of death in a correct way [10, 11].

4. Post-mortem examination and autopsy

The key role of forensic pathologist is the examination of a corpse. "Autopsy" word is derived from the words *auto* meaning "self" and *opsy* meaning "to look at." It means "to look at one's self" or sometimes "seeing with one's own eyes." "Post mortem examination" is another alternative term for a dead body examination [4]. The earliest known forensic dissection was in Italy, at the University of Bologna in the middle of the thirteenth century. One was recorded by William of Saliceto (1210–1277) [12]. The purpose of a medicolegal autopsy is to determine the cause of death, to identify the identity of the deceased person, to estimate the post-mortem interval, and to collect evidence around the death. A medicolegal autopsy answers basic questions about "who," "what," "when," and "why" of suspicious, sudden and unnatural deaths. The identity of the deceased is usually determined by deceased's relatives. Examination of any accidental or congenital abnormality may help identify the deceased person. In situations where visual identification is difficult in mutilated or charred cases, DNA profiling and dental examination are often used to confirm the identity of the unknown person. There are some additional analyses such as post-mortem toxicology, histology, post-mortem biochemistry, immunohistochemistry, and methods of imaging (X-rays, computed tomography, magnetic resonance imaging) in modern autopsy work [4]. Though legal systems and medical conventions vary considerably from country to country, there are generally two types of autopsy: The

academic autopsy or *clinical* is one in which the medical attendants seek to learn the extent of the disease, with the consent of relatives. The *forensic* or *medicolegal autopsy* is performed according to the instructions of the legal authority responsible for the investigation of criminal, litigious, unnatural, suspicious, or sudden deaths. The system varies from country to country, but the legal authority may be a judge, a procurator fiscal, a medical examiner, a coroner, a magistrate, or the police [9]. The formal organization of forensic medicine and the experts in forensic medicine are somewhat different in different countries. In central Europe, e.g., the medicolegal experts are recruited from a university since this has been believed to guarantee a scientific basis, independence, and impartiality. In Sweden and Finland, a national governmental authority is responsible for the administration of services in forensic medicine, whereas in the US, Canada, and several other Anglo-Saxon countries, a variety of systems are applied under the umbrella terms “coroner system” and “medical examiner system,” systems that are not always easy to differentiate [2].

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