Editorial

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Practicing Forensic Pathology in the USA

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Introduction

Before I give you some perspective on what it is like to practice forensic pathology in the United States, I would like to give you an idea of my professional background and education. My career as a pathologist extends for 56 years, and as a forensic pathologist/neuropathologist, 50/48 years. I have four boards in pathology: Anatomic Pathology, Clinical Pathology, Forensic Pathology, and Neuropathology. My comments are meant to provide you with a perspective on what some of my colleagues and I have experienced in practicing forensic pathology in the United States.

Definitions

Forensic Pathologist: A board-certified forensic pathologist is a physician who has successfully completed a graduate medical education program in either anatomical or anatomical and clinical pathology; has passed the board examination in those respective disciplines; has undertaken a fellowship in forensic pathology; and has passed the board examination in that discipline.

Coroner: A coroner is a public official who investigates deaths that fall into one of the following categories: deaths of a violent nature, sudden or unexpected deaths, suspicious deaths, and deaths in which the decedent had no physician, their physician was not in attendance at the time of death, or their physician had no understanding of why they died.

The responsibilities of the coroner include determining the cause and manner of death, identifying unknown individuals, and notifying the next of kin.

Coroners are usually elected laypersons but may also be appointed. Depending on the local status, they may or may not have received medical training. However,

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they often contract with a forensic pathologist or hospital pathologist for autopsies and other medical expertise.

Medical Examiner:A medical examiner is required to be a physician who hasperformed a residency, at least in anatomic pathology, and a fellowship in forensic pathology. Their duties include determining the cause and manner of death. The deaths they investigate fall into the same categories as those of a coroner. In addition, they investigate deaths that may have been due to a contagious disease, all deaths that occur in police custody, institutional deaths (prisons), industry-related deaths, and deaths occurring within 24 hours of admission to a hospital, nursing home, assisted living facility, etc.

In the medical examiner system, an autopsy is performed by a forensic pathologist.

In the United States, autopsies are performed to determine the causes and manner of death.

Cause of death: Is the injury, disease process, or both in combination, which initiated the physiological process that culminates in death? Establishing the cause of death is an interpretive, two-step intellectual process derived from and depending upon sound evaluation of the morphological evidence of injury or of the injury and disease, as well as the results of toxicological, biochemical, and microbiological studies. The first step involves determining the structural organic changes (anatomic features) and chemical abnormalities responsible for the cessation of cardiac and respiratory activity.

The second step is to define the mechanism by which the physiological process that was induced culminates in the person's death. In essence, death is the result of the cessation of physiological functions.

M**echanism of death:** Is the physiologic disturbance or biochemical disturbanceincompatible with life, which is initiated by death? Examples of the mechanisms of death include hemorrhagic (hypovolemic) shock, metabolic disturbances (acidosis and alkalosis), cardiac asystole and ventricular fibrillation, respiratory depression, and paralysis.

M**anner of death:** This refers to the circumstances under which the cause of death arose.

If death arises from a natural disease process, such as pneumonia or cancer, the manner of death is**natural**. If death arose from the intentional actions of another, such as a gunshot wound to the head, the manner of death becomes a.**homicide.** However, if the gun was fired by the victim or by someone else without intent to do harm (I did not know the gun was loaded), the manner of death became an accident.**accident**. If the victim intentionally pulls the trigger in a purposeful act to end their own life, then the manner of death is**suicide.**If, after a thorough investigation, autopsy, toxicology, and ancillary scientific studies, it is not possible to determine the precise manner of death, it is ruled out as**undetermined.**

There is another type of death. **therapeutic misadventure,** which was used for a period of time in this country and addressed the unexpected deaths that occurred during the course of medical treatment due to omission (the failure to act to address the patient's medical condition) or commission (the medical personnel acted but did so negligently). Over time, forensic pathologists have reached a consensus that such deaths are best represented as **accidents**.

Legal System for Performance of an Autopsy

There are two types of autopsies.

Clinical/Academic Autopsy: In this type of autopsy, permission to do the autopsyis required by the family of the deceased. The purpose of this autopsy is to learn about the disease process(es) that led to the death of their loved one. What distinguishes this autopsy from a medicolegal autopsy is that the disease process(es) are known prior to the death of that person.

Medicolegal/Forensic Autopsy: This is an autopsy performed on those who die suddenly and unexpectedly, suspiciously, by apparent suicide, as a victim of a homicide, by meansof an accident, or due to death during the course of medical treatment, whether by omission or commission.

Further Clarification: Unidentified bodies are brought into the respective Coroner's/Medical Examiner's Office and remain there until they are identified. These bodies are not released until they are identified. If there are no relatives to pay for their burial, or if the relatives cannot pay or refuse to pay, there are government programs, typically at the county or state level, that will take care of the final arrangements.

In medicolegal/forensic autopsies, permission from the family is not required. This is due to the fact that a family member could obstruct a death investigation due to their involvement in the death of that person. Second, most jurisdictions legally require a forensic autopsy in suspicious or frankly criminal deaths, manslaughter, infanticide, deaths that occur within 24 hours of admission to a hospital or nursing care facility, deaths that occur while in the custody of law enforcement, etc.

In both clinical/academic autopsy and medicolegal autopsy, the family of the decedent does not pay for the performance of the autopsy. In the clinical/academic setting, the hospital will bear the cost of autopsies. In medicolegal autopsies, the taxpayer bears the cost of performing autopsies at forensic science facilities.

Private autopsies are paid for by the deceased's family. However, such autopsies can be expensive. Typically, the forensic or hospital pathologist doing the case will charge between$3,000 and $5,000. The funeral home where these autopsies are done will charge a fee for transporting the body to and from their facility; in addition, they will charge a fee for doing the autopsy at their facility, which may cost $600 or more. Viewing a decedent at their facility can cost $400 or more. When you add all the fees associated with a private autopsy, the total can reach approximately $6,000.

Transportation of the deceased to the Forensic Science Facility

Scene removal: In non-suspicious deaths, expected deaths occurring outside the hospital setting, the investigator for the Coroner's/Medical Examiner's Office is called to the scene. The investigator examines the scene, the deceased, and the circumstances of death, talks to the family/those present at the time of death, and, if necessary, the deceased's doctor. If they have no concerns about the cause and manner of death, the body is released to the funeral home of the deceased's family.

If the family does not choose a funeral home, the deceased will be transported to the Coroner's/Medical Examiner's Office and will remain there until the family chooses a funeral home.

If the investigator has any concerns about the circumstances of death, they contact the forensic pathologist on call and discuss the case. The forensic pathologist on call will decide whether to make the case a Coroner's/Medical Examiner's case.

Hospital and Institutional removals: Removals from hospitals and other institutions should be handled according to the guidelines and policies of the releasing facility.

Personal effects and clothing with no medicolegal significance should not be taken from hospitals or institutions. Only if the decedent is a victim of homicide, suicide, or of a suspicious nature should clothes be taken from the hospital or institution.

If possible, hospital or institutional records and any biological samples necessary for the determination of the cause of death should be transported along with the decedent to the Forensic Science Facility. If records or biological samples are not immediately available, they should be acquired as soon as possible.

Autopsy Procedures

Complete Autopsies: A complete autopsy is defined as a detailed external examination of the body and an internal examination to include the removal and dissection of all thoracic, abdominal, pelvic, and neck organs, with the opening of the head and removal of the brain. If the brain or spinal cord shows evidence of a traumatic injury or if there is a history of a neurological disease process, the brain or spinal cord should be placed in formaldehyde for later examination, preferably by a neuropathologist. During the course of the autopsy, the following samples should be taken for toxicological examination: blood (if possible, peripheral blood, such as that from the femoral artery), bile, urine, stomach contents, liver, and vitreous. Do not take heart blood unless it is available. If you take heart blood, note that on the toxicology form and in the autopsy report. In decomposing bodies, one may only be able to find bloody, decomposing fluid in the chest cavity. In such cases, the fluid and sections of the liver should be obtained. In this country, all cases in which the Coroner's Office/Medical Examiner's Office takes jurisdiction and brings the body in for examination, whether that is a complete autopsy, partial autopsy, or an external examination, toxicology is performed.

In some Coroner's/Medical Examiner's Offices, microscopic examination of representative sections of the organs of the chest, abdomen, pelvis, neck, and brain is not required for their definition of a complete autopsy. However, from a classical pathological perspective as to what constitutes a complete autopsy, all organs should have tissue samples taken for microscopic examination if necessary. Microscopic sections should be taken of the lungs, heart, liver, kidneys, and brain for an autopsy to be considered complete. Many Coroner's/Medical Examiner's Offices are under pressure to keep costs in mind when autopsies aredone. One of the ways they try to do that is by not taking microscopic sections; hence, the modification by Coroner's/Medical Examiner's Offices regarding what constitutes a complete autopsy.

Partial Autopsies: This autopsy, in which only the area of noted trauma is examined, such as the neck in the case of suicide by hanging or, in the case of a natural death, only the area of medical interest—that is, the brain in dementia—has its critics. However, not all forensic pathologists agree with this concept. If an autopsy is

to be performed, the decedent's family deserves to know what pathological disease processes their loved one had at the time of their death. There can be significant findings that the family should be aware of, such as the finding of aneurysms involving the cerebral vasculature, which has genetic implications the family needs to be aware of. Similarly, many heart conditions can also be inherited.

External examinations: This is defined as a detailed description of the decedent's remains, including scars, surgical incisions, medical devices, and tattoos. There is no internal examination or removal of organs. The forensic pathologist will perform an external examination following a review of the patient's medical records and the investigator's report. At that point, the forensic pathologist determines the cause and manner of death.

Cases signed out on records: In some cases, the Medical Examiner will not bring the case in for an external examination, but will base their decision on the cause and manner of death on the scene investigation of the investigator and a review of the patient's known medical history.

There are some Coroner's/Medical Examiner's Offices in which a person who dies under non-suspicious circumstances, but where there is no physician to sign the death certificate, will bring the decedent in; but because they are 60 years of age or older, they will only perform an external examination and simply sign the death certificate as death due to cardiac arrest due to atherosclerotic cardiovascular disease. The foundation of this practice is that those aged ≥ 60 years have atherosclerotic cardiovascular diseases. However, some forensic pathologists have disagreed with this practice. Just because one is over 60 years of age and has atherosclerotic cardiovascular diseasedoes not mean that they died from it. Typically, the foundation of this practice rests with State or County officials, who want to cut the cost of running the office.

Autopsy Reports:

Autopsy reports should be completed within 30 days of the autopsy. However, autopsies require extensive toxicology and other scientific ancillary studies, which may delay the release of the final report. If this occurs, the family of the decedent and the agencies waiting for the release of the report should be made aware of the delay, the reasons for it, and when the report is expected to be released. I cannot emphasize enough that the family and agencies waiting for the report should always be treated with regard. Doing so is accompanied by good public relations.

Autopsy reports are not signed out until the forensic pathologist who performed the case has reviewed all investigations into the circumstances of the death, the medical records, the microscopic slides, the toxicology report, and the results of any other ancillary laboratory tests. Once the forensic pathologist has completed this review, they are in a position to determine the cause and manner of death.

Related matters (any other relevant information related to Medicolegal postmortems).

I will discuss some of the pragmatic issues that we have experienced as forensic pathologists in this country. Unlike in India, we are legally required to not only determine the cause of death, but also the manner of death. Usually, such determinations occur without incident. However, it is not uncommon for those who may be negatively impacted by the Medical Examiner's/Coroner's ruling to be aware of the consequences of such a ruling. I will provide some examples.

A medical examiner performed an autopsy on a young woman who died as a result of a single gunshot to the chest. The investigation by the police department and the medical examiner's office clearly showed that when her boyfriend went to show her the gun he had just purchased from a friend, he did not know that the gun was loaded. As he was showing her the gun, it discharged, shooting her in the chest. After reviewing the Medical Examiner's investigator and police reports, the medical examiner determined the manner of death to be an accident.

Several months later, two prosecutors from the State District Attorney's Office met with a medical examiner. The prosecutors made it clear to the medical examiner that they wanted to prosecute the boyfriend, and to do so, they needed the manner of death changed to a homicide. The medical examiner explained to the two prosecutors that both the police department and the medical examiner's office had determined that the boyfriend did not know the gun was loaded when he accidentally discharged the gun while showing it to his girlfriend, and consequently, the manner of death was ruled an accident. At that point, the prosecutors told the medical examiner that they were going back to the District Attorney's Office and advising all, including the Attorney General, how uncooperative the medical examiner was. Subsequently, the Attorney General wrote a letter to the police department in the municipality where the medical examiner lived, as well as to the state police, indicating he was to be watched. The medical examiner lived in the state for another 14 months, during which time he was put under surveillance by both the local police department and the state police.

When the medical examiner moved to another state, he noted that he was under surveillance by the local police departments there, which continued for years.

What this medical examiner learned was the same thing another medical examiner was advised by the District Attorney's Office of the state he had just been appointed as theChief Medical Examiner: "Do what you are told."

In our country, it is not uncommon for a Coroner to be employed by a hospital.

This can lead to some unfortunate conduct by clinicians and administrators at the same hospital. As an example, a forensic pathologist who was the director of a

The hospital's pathology department was appointed as County Coroner. Subsequently, a general surgeon performed a procedure on a patient at the same hospital for which he was not qualified. The patient died because of the surgical procedure. Because death occurred during the performance of the medical procedure, the patient was referred to the Coroner's Office. The Coroner had another forensic pathologist perform the autopsy, who determined that the patient had died as a result of the surgeon's negligence. During the course of the investigation into the death of the patient, the Coroner was asked to attend a special meeting at the hospital. In that meeting, the Coroner was advised that it was in his best interest not to rule the case as a therapeutic misadventure (accident), and if he chose to do so, he might find that he could no longer be the Coroner. A few days later, the Coroner was visited by the CEO of the hospital, who advised the Coroner that where he had come from they also had a Coroner who would not cooperate, and they had to get rid of him. The Coroner ultimately ruled the manner of death as a therapeutic misadventure (accident). Following the Coroner's ruling, the Coroner's Office was contacted by the president of the County Medical Society, who informed the office that if it was the last thing the County Medical Society did, they were going to get the Coroner. Sometime later, the Coroner's contract as the director of the hospital's pathology department was not renewed.

The purpose of showing this pragmatic side of being a forensic pathologist is simply to make you aware of the complete picture of what it is like to be a forensic pathologist in this country.

Conclusion

I sincerely hope that the information I conveyed in this editorial provides a perspective on what I have experienced in my 50 years of practice as a forensic pathologist in this country. Do I have any regrets about being a pathologist, forensic pathologist, or neuropathologist? No! I fell in love with the microscope when I was in the Pre-Med Program at Juniata College, and I still love looking through the microscope, doing autopsies, teaching, and consulting.