

Origin and Development of Forensic Pathology

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Abstract - The “forensic” word comes from the Latin word “forensis” which means “in open court” or “public.” When anyone describe something as forensic it usually mean that is has to do with finding evidence to solve a crime. In modern use, the term “forensics” in the place of “forensic science” can be considered correct as the term “forensic” is effectively a synonym for “the courts” or “legal system”. Forensic pathology is the field of medicine concerned with determining the cause of death, examination of injuries which is related to crime and also examination of tissue samples relevant to crimes oras well as the suspected crimes. Forensic pathology, that is an important part of forensic science.

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I. INTRODUCTION

The “forensic” word comes from the Latin word “forensis” which means “in open court” or “public.” When anyone describe something as forensic it usually mean that is has to do with finding evidence to solve a crime. In modern use, the term “forensics” in the place of “forensic science” can be considered correct as the term “forensic” is effectively a synonym for “the courts” or “legal system”. Forensic pathology is the field of medicine concerned with determining the cause of death, examination of injuries which is related to crime and also examination of tissue samples relevant to crimes oras well as the suspected crimes. Forensic pathology , that is an important part of forensic science. Forensic pathologists, all are highly trained medical doctors who assist the law enforcement in gathering evidence for criminal trials. Medical examiners are forensic pathologists. The autopsy is performed by medical examiner or coroner, usually during the investigations of civil law and criminal law cases in some jurisdiction.

Subspecialty board certification is available in forensic pathology after completion of a minimum of three-years in pathology residency and an additional fellowship year in an authorized forensic pathology training program.

II. BRANCHES AND SUB-BRANCHES IN FORENSIC PATHOLOGY

Some important branches and sub-branches of pathology include:

Anatomical Pathology:

This type of pathology involves the examination of surgical specimens, that removed from the body or sometimes the examination of the whole body (autopsy) to investigate and diagnose disease. On examining a biopsy, the following aspects are considered:

Microscopic appearance of cells; Gross anatomical make up of the sample; Immunological markers present in the cells; Molecular biology of the cells, tissues, organs and sometimes whole body; and lastly Chemical signatures in the sample.

Anatomical pathology is further classified into sub specialities, which include:

- Surgical pathology - This involves the examination of specimens obtained during surgery such as a breast lump biopsy obtained during mastectomy.
- Cytopathology - In cytopathology, cells that have been shed into bodily fluids or have been obtained by scraping or aspirating tissue are examined. Typical examples include sputum, cervical smear and gastric washings.
- Forensic pathology that involves the post mortem examination of a corpse for cause of death using a process called autopsy.
- Dermatopathology basically concerns the study of skin diseases.
- Histopathology - That refers to the examination of cells under a microscope after they have been stained with appropriate dyes.

Clinical pathology:

This area of pathology involves the laboratory analysis of body fluids (such as urine, blood or cerebrospinal fluid) and bodily tissue for the diagnosis of disease. Some of the main subspecialities of clinical pathology that include:

- Chemical pathology, that is also called clinical chemistry, It involves the assessment of various type of components in bodily fluids such as the blood or urine, although for the main part it concerns the analysis of blood plasma and serum.

- Hematology or hematopathology, It concerns the investigation and diagnosis of blood diseases.
- Immunology or immunopathology basically refers to the study of immune system disorders such as organ-transplant rejection, immunodeficiencies and allergies.

Molecular pathology:

It is a multi-disciplinary field that focuses on disease at the sub microscopic, molecular level. Aspects studied may include a mixture of genetics, molecular biology, biochemistry, anatomical pathology, and clinical pathology.

The Basic Terminology for Describing Traumas In Forensic Pathology includes:

- Puncture that is a penetrating injury due to pointed object without a blade.
- Incised wound, it is a cutting injury due to slicing action of a blade-like object. Serrated blades produce the same smooth edges as do nonserrated blades.
- Abrasion is a friction injury that removes superficial layers of skin.
- Laceration is a tearing injury due to the friction or impact with a blunt object.
- Contusion is a bruise due to penetration or rupture of small-caliber blood vessel walls.

Contact wound: Muzzle of gun was applied to skin at the time of shooting. Classic features may include an impression of the muzzle burned around the entrance wound and absence of fouling and stippling.

Close range (6 – 8 inches): The entrance wound that is surrounded by fouling, due to gun powder particles which get stuck to the cloths or skin of the victim from the proximity.

Intermediate range (6 – 8 inches to 1.5 – 3.5 feet): Hot fragments of burning gun powder follow the bullet to the victim and thus produce stippling by causing pinpoint burns around the entrance wound.

Distant (greater than 1.5 – 3.5 feet): There aren't clear signs like in the previous distance classifications from the above, like gunpowder and such, however by examining the entrance and exit wounds, a forensic pathologists can precisely determine the firing range using common means from his practice.

III. SCOPE IN FORENSIC PATHOLOGY

The Forensic Pathologist:

Forensic pathologists, or medical examiners, are specially trained physicians who examine the bodies of people who died suddenly, violently or unexpectedly. They are responsible for determining the cause (the immediate and ultimate reasons for the cessation of life) and manner of death (homicide, accidental, suicide, natural or unknown).

To determine the identity of the victim and the time, manner and cause of death, the forensic pathologist:

- a. Studies the medical history
- b. Evaluates crime scene evidence including witness statements
- c. Collects medical and trace evidence from the body for further analysis
- d. Performs an autopsy to uncover evidence of injury or disease

In addition to anatomy, the forensic pathologist may draw upon specialized knowledge and training in toxicology, trace evidence, serology (blood analysis), DNA technology and firearms/ballistics.

Forensic pathologists, or medical examiners, also ensure that procedures regarding the evidence collection are followed, and coordinate their work with law enforcement operations.

A city, state or country may appoint a forensic pathologist to act as a medical examiner.

Clinical forensic examiner also examine living patients, mostly in cases where sexual assault or abuse is suspected.

Once all the evidence is analyzed, the forensic pathologist or examiner prepares a written report and may also testify to those findings in court.

Forensic pathologists or medical examiners also work closely with the medico-legal authority for the area concerned with the investigation of sudden and unexpected deaths i.e. the coroner (England and Wales), procurator fiscal (Scotland) or coroner or medical examiner (United States).

IV. DEATH INVESTIGATION/CORONER\

Coroner:

A coroner is an independent judicial office holder. They are appointed by a local council with responsibility under

the law for the medicolegal investigation of certain deaths. A Coroner must inquire into the circumstances of sudden, violent, unexplained and unnatural deaths. In those cases coroners must investigate to find out, for the benefit of bereaved people and for official records, who has died, when, how and where they died. If a death is due to unnatural causes then an inquest must be held by law.

Depending on the jurisdiction, the coroner may arbitrate the cause of death personally, or may act as the presiding officer of a special court (also called a "coroner's jury"). The office of coroner originated in medieval England [1] [2] and has been adopted in many countries whose legal systems have at some time been subject to English or United Kingdom law. The additional roles that a coroner may oversee in judicial investigations may be subject to the attainment of suitable legal and medical qualifications. The qualifications required of a coroner vary significantly between jurisdictions, and are described under the entry for each jurisdiction. In Middle English, the word "coroner" referred to an officer of the crown, derived from the French couronne and Latin corona, meaning "crown". [3]

Death investigation:

A death investigation is a process whereby a coroner or forensic pathologist, medical examiner, or hybrid medical examiner seeks to understand how and why a person died. A coroner or forensic pathologist must answer five questions when investigating a death:

Who (the identity of the deceased)

Where (location of death)

When (date of death)

How (medical cause of death)

By what means (a classification of the death: one of accident, natural causes, suicide, homicide or undetermined)

The coroner takes possession of the body for their investigation - only the coroner may move the body. The coroner will release the body to a funeral home once the investigation is complete or they have finished examining the body. (Fig1)

Information that may be obtained from several sources including, but not limited to the family members, neighbours, co-workers, doctors, hospital records, police and other emergency service workers. Contact with family is vital as they often have important information that can aid the investigation.

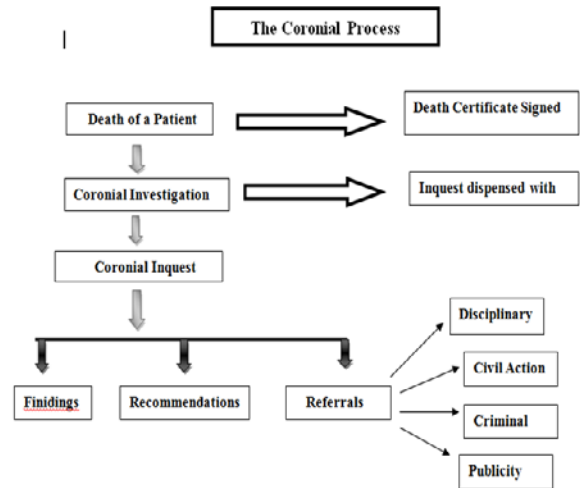


Fig1. The Coronial Process

V. HISTORY

In German-speaking Europe, lectures on forensic pathology were regularly held in Freiburg in the mid 18th century and Vienna in 1804. Scientists like Auguste Ambroise Tardieu, Johann Ludwig Casper and Carl Liman made great effort to develop forensic pathology into a science based on empirics.

Forensic pathology was first recognized in the United States by the American Board of Pathology in 1959. [4] In Canada, it was formally recognized in 2003, [5] [6] and a formal training program (a fellowship) is currently being established under the auspices of the Royal College of Physicians and Surgeons of Canada. [7]

VI. EDUCATION IN INDIA- FORENSIC PATHOLOGY

In India, the speciality is commonly referred to as the Forensic Medicine and Toxicology or Legal Medicine. After completion of medical graduation (i.e. MBBS), one has to complete three years of study and training including thesis research program, which leads to award of degree of MD (Forensic Medicine). One can also alternately pass the board examination conducted by the National Board of Examinations, leading to awarding of Diplomate of National Board (DNB).

The majority of the specialists are attached to the Department of Forensic Medicine and Toxicology in various medical colleges. The classification of posts includes Assistant Professor (i.e. Lecturer), Associate Professor (i.e. Reader) and Professor. The work profile of the specialists includes conducting autopsies and clinical forensic examinations; apart from teaching the medical students. They have to regularly appear in the courts as expert witnesses. A typical department in a government institution conducts 100 to 5000 autopsies a year

depending upon the jurisdiction. Apart from this the clinical forensic examinations constitute a major part of the work and number of cases can run up to 10000 a year in an average institution.

The largest association of the specialty is Indian Academy of Forensic Medicine [8] (IAFM), that also publishes its quarterly Journal of Indian Academy of Forensic Medicine [9] regularly. This association has a specialist member strength of more than 1000.

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