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Research Article

The Necessity of the Autopsy in Clinical Diagnosis

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Abstract

The autopsy is increasingly acknowledged as a critical component of medicine, and it has played an important role in the advancement of medical practice. The autopsy not only establishes the final diagnosis, but it also links the cause of death to the accompanying diseases and explains how well the two interact. The autopsy, formerly regarded as the "gold standard" for diagnosis by twentieth physicians, has largely been superseded by antemortem diagnostic testing. Many doctors and medical organisations are unaware of its importance in modern medicine. Autopsy rates have plummeted to extremely low levels, notwithstanding their importance. Despite this downward tendency and disintegration, the post-mortem examination remains therapeutically useful for a variety of reasons: the data gleaned aids in the understanding of diseases; it provides critical feedback to clinicians and leads to quality assessment and education; and the findings received is useful to epidemiologists. This paper intends to put light on how autopsy is significant for decreasing the diagnostic errors and increasing the overall quality of treatment.

Keywords: Autopsy; Clinicians; Diagnostic errors; Gold standard; Medicine; Virtopsy

Introduction

The key aim of forensic medicine are to record, evaluate, and explain scientific medical findings in both live and dead people in a form that may be presented in court [1]. With the emergence of Virtual autopsy which is non-invasive technique to determine cause of death without mutilating the body it is pertinent to critically analyse the status of autopsy. Wullenweber et al described the pattern of gunshot wounds to the head in 1977, which was the first forensic application of CT.

The name is a portmanteau of ‹virtual› and ‹autopsy' and is a trademark registered to Prof. Richard Dirnhofer (de).The Virtopsy project of the Institutes of Forensic Medicine, Diagnostic Radiology, and Neuroradiology at the University of Bern, Switzerland, attempts to achieve this combined documentation.

The autopsy is increasingly acknowledged as a critical component of medicine, and it has played an important role in the advancement of medical practice. The autopsy not only establishes the final diagnosis, but it also links the cause of death to the accompanying diseases and explains how well the two interact[1]It explains the cause of death, the pathophysiology of illnesses, and the conditions of death, which has resulted in a slew of diagnostic surprises. It also explains why in most treatments error occur [2]. Influenced by The washings Away of Wrongs, Bartolomeo da Varignana conducted the first known legal autopsy in 1302 in Bologna, Italy. Surgeon Buckley is credited with conducting autopsy with first post-mortem in India in 1693 [1].

The autopsy, formerly regarded as the "gold standard" for diagnosis by twentieth physicians, has largely been superseded by antemortem diagnostic testing [3]. Many doctors and medical organisations are unaware of its importance in modern medicine. Despite its value, autopsy rates have dropped to dangerously low levels.

Furthermore, physicians may falsely assume that autopsy results have little bearing on pathophysiological processes [4].

Autopsies have been criticised as "wasting medical resources"[4] and creating "a dispersion of medical effort that is ludicrous"[5].

Fellows in academic institutions are responsible for obtaining consent for autopsies, and they frequently lack the skills needed to contact bereaved families, obtain consent, and follow up on autopsy report. The cause appears to be the latest diagnosis technology, as well as the clinician's disinterest in post-mortem diagnosis. The disinterest of clinicians, enhancing confidence in ante-mortem diagnosis, more intricate reforms regarding human tissue procedures, and, last but not least, an inadequate priority given to autopsies by autopsy surgeons burned with increasing workloads of academics, research are all factors contributing to this decrease [7].

The procedure's uncertainty, as well as the risk of various diseases and conditions to which the Autopsy Surgeon is susceptible, should not be overlooked. Likewise, new molecular and imaging tools that are less or completely non-invasive are increasingly replacing traditional autopsies. Many investigations, however, have found a low correlation rate between the diagnosis of these new forms of autopsies and the diagnostic of traditional autopsies.The traditional autopsy, which includes an external and internal assessment of each organ, as well as a tissue sampling analysis, remains the most comprehensive approach for determining a definitive diagnosis [8].

Despite this declining trend and dissolution, the post-mortem examination is still clinically relevant for a variety of reasons: the data

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gleaned aids in the understanding of diseases; it provides critical feedback to clinicians and leads to quality assessment and education; and the findings received is useful to epidemiologists [6].

This paper intends to put light on how autopsy is significant for decreasing the diagnostic errors and increasing the overall quality of treatment.

Types of Autopsies

The word "autopsy" comes from the Greek word "autopsia," which means "to see for oneself." It is made up of two words: autos, which means "self," and "opsis", which means "eye." [9] Autopsies are divided into two categories: forensic and clinical. The first is carried out in the event of a death that seems to be suspicious, violent, or undetermined.The second procedure is carried out at the hospital by an Autopsy Surgeon with the agreement of the deceased's next of kin in order to determine and better understanding the reasons of death. The autopsy is a post-mortem examination of a body to identify the reason and manner of death, and perhaps to assess any pathology or disease which may be involved [1].

Reasons for Decline in Autopsies

A well-executed autopsy is a time-consuming and costly process that is primarily used as a teaching tool or a quality control mechanism in clinical practice. The number of autopsies performed drastically dropped over the twentieth century. It's important to emphasise that this reduction isn't only local or transitory; it's a global phenomenon caused by modern healthcare system.

Costs

The expenses of post-mortem analysis cannot be passed on to family members since the results of the autopsy are unrelated to their relative's care. Hospital administrators are difficult to persuade to spend money on treatments that have no direct impact on patient care and are solely for educational purposes. [10] A single autopsy in India cost 757 rs. The cost of an autopsy in Belgium is expected to be 473 euros, and it is covered by the social security system. When the costs of constructing a morgue are included in, an autopsy in London costs 850 euros.

Modern technology

It might be claimed that contemporary diagnostic methods' sensitivity would minimise diagnostic mistakes to the point where autopsies would be unneeded. A research by Goldman and colleagues [11], who looked at the time course of diagnostic mistakes in the 60s, 70s, and 80s and found no changes between the three eras, refuted this rationalisation:

In each of the three eras, roughly 10% of autopsies indicated a class I misdiagnosis (Table 1). Diagnostic mistake rates have remained constant for significant missed diagnoses over the last three decades, even after accounting for case mix, nation, and post-mortem rate [12].

Better case selection by doctors might be one explanation for the mistake rates' stability. Clinically difficult patients may be more likely to be chosen for autopsy since fewer autopsies are done. Several prospective investigations conducted in the 20th century, however, revealed that physicians had a poor capacity to predict situations that may result in "diagnosticsurprises' [13].

In situations where physicians stated they would have sought an autopsy, 15 percent of primary diagnoses were not confirmed by autopsy, according to Cameron and colleagues [14]. In situations where doctors stated they would not have sought an autopsy; the percentage was 14 percent.

So, because sorts of missed diagnosis vary in different eras, the absence of a decline in the proportion of missed diagnoses throughout the previous decades does not reflect a lack of advancement in medical knowledge. Rather, it implies that current clinical and technical research into novel medical disorders are far less sensitive [15].

Class	Type of Discrepancy	Definition
I	Major	Directly related to death, if recognised, may have altered treatment, or survival
II	Major	Directly related to death, if recognised, would not have altered treatment, or survival
III	Minor	Incidental autopsy finding not directly related to death but related to terminal disease process
IV	Minor	Incidental autopsy finding unrelated to cause of death
V	No Error	Clinical and autopsy diagnosis in complete agreement.

Table 1: Criteria for Goldman Classification

Autopsies Role in the Clinics

Necropsies can be used to ensure that existing diagnostic techniques are accurate

The poor connection between pre- and post-mortem data demonstrates that current diagnostic techniques cannot always guarantee the presence of a specific disease entity. Autopsies provide valuable information on the frequencies of differences between clinical and histological diagnoses. It do not always provide 100% certainty about the existence of a specific disease entity [10].

Autopsies are beneficial in determining pathophysiology

In the ICU, autopsy has been shown to be useful in understanding pathophysiological processes of illness. Even in individuals without diabetes, extensive prospective data has revealed a continuous, virtually linear connection between blood glucose levels in hospitalised patients and poor prognosis [16].

Autopsies aid in the study of epidemiology and the identification of novel disease entities

The interpretation of pathology specimens from individuals dying of confirmed Novel Coronavirus infection is an excellent example of the importance of autopsy in explaining specific epidemiological and pathophysiological characteristics of novel disease entities. The primary pathological alterations linked with Novel Coronavirus infection are seen in the lungs, according to autopsy investigations, which identified different histological profiles.

Autopsies are still a crucial educational resource

There is an ever-growing number of potentially deadly and difficult-to-diagnose opportunistic infections due to the ever-expanding arsenal of immunosuppressant and immunomodulating medications. Patients with these rare infections are frequently at an advanced stage of their illness, with the circumstances of their illness typically

identified only after they have passed away**.** The autopsy serves as a teaching tool by describing the histological characteristics of these advanced pathological conditions as well as their consequences. Furthermore, autopsies can be used as part of the safety evaluation of new medicines. This emphasises the significant educational benefit of post-mortem investigation, and we feel that the declining autopsy rate runs counter to medical diagnostic advancement. We believe that at least some autopsies should be observed by medical students in order to emphasise the relevance of necropsy and its correlation with cause of the death.

Unique and modern approaches may help autopsy produce for better diagnostic results

Molecular autopsy examinations are a fascinating field of study. Molecular examination of frozen sections can eventually clarify 'unsolved' cases of sudden death, even if the anatomical results are normal.

In a young lady who died in the ICU following a near-drowning due to what turned out to be a type of congenital long-QT syndrome, Ackerman and colleagues [17] describe the findings of post-mortem molecular testing and the discovery of a new mutation. The asymptomatic sister with the same mutation was able to get preventive therapy as a result of this molecular discovery at post-mortem. The autopsy standard for abrupt cardiac fatalities recommends freezing a sample of spleen for molecular study.

Public View

When confronted with the request for an autopsy, family' emotions range from apathetic to hostile.The information gleaned from autopsy findings can assist family in determining the reason of their loved one's death. [18] Unfortunately, autopsy results are regularly withheld from them.

Current Situation Regarding Autopsy Practice

Attitude of Undergraduates Towards Autopsy

Autopsy was a common and acceptable procedure in the early 1900s, done by medical doctors. Students not only witnessed autopsy throughout in the past, but they were also trained on how to do them. The autopsy is becoming less popular as a teaching tool, with indications suggesting many recent students and junior doctors have never seen one. [19] 'Unpleasant mutilation,' 'the brutal character of the surgery,' and 'one more step down the route of losing your natural sensibilities as a doctor,' the remarks expressed, reflected a personal aversion from the autopsy surgery. This addresses a number of significant concerns, not the least of which is the necessity for death and dying topics to be prioritised in medical education.

Attitude of Clinicians Towards Autopsy

Physicians may not request permission to perform an autopsy because they believe modern diagnostic techniques have rendered the process obsolete. This, along with a fear of asking bereaved relatives for approval, has significantly diminished interest in the practice. This is due to an obsessive focus on the technologies used to establish the diagnosis, as well as the fact that a significant quantity of history of the patient was available prior to death. [20]

Notwithstanding this overconfidence, significant differences between pre-mortem and post-mortem diagnosis are being discovered. Clinicians typically ascribe such findings to selection bias, which arises from the fact that autopsy was conducted only in patients with the highest diagnostic ambiguity. Considering this, clinicians have demonstrated a limited ability to predict the occurrence of significant disparities.[12]

Several physicians express an interest in getting autopsies, but this enthusiasm may be tempered by anxieties about litigation, [21] insufficient understanding about autopsy processes, and apprehension about requesting the next of kin for permission. [22]

In regards of medical malpractice, some physicians concerned about patient care fear that autopsies would raise their chance of being sued, although some Autopsy Surgeons anticipate that conducting autopsy will result in unneeded malpractice suits. [12] For and of themselves, autopsies just give information that may corroborate or dispute expert judgments. They don't show or refute whether or not patient treatment was inadequate. [23]

Liability must be demonstrated in order to prove medical negligence. In such situations, it must be shown that the physician had a duty towards the patient by providing treatment; that the physician failed to satisfy the appropriate standard of care; and that the patient was injured and suffered damages.

Physicians are generally unaware of the practicalities of getting an autopsy. They may not have sufficient understanding of the autopsy technique, its cost, or other operational issues. These circumstances may make it more difficult for the doctor to ask the patient's family for consent to undergo an autopsy.

The assumption that only some internal medicine programs devote any curriculum hours to autopsy discussion accounts for a large part of this knowledge gap. [24] Accumulated evidence suggests that when physicians receive professional training in autopsy consent, their autopsy rates skyrocket. [25]

The strongest and most lasting improvements in autopsy rates, according to interventions aimed at junior physicians, occur when senior medical personnel, such as senior residents and department chiefs, provide continuous periodic motivation. [26]

According to some research, doctors do not request authority to undertake an autopsy because they have had bad experiences with autopsy report not being disclosed on time or the standard of the autopsy being poor. [27] Additional issues raised by doctors include a lack of direct communication seen between attending clinician and the autopsy surgeon prior to the autopsy, the failure to address clinically relevant concerns, and long reports that list anatomic diagnosis without sufficient explanation. [28]

Autopsies, according to the Autopsy Surgeons, are time-consuming, expensive, and do not produce income. Some hospitals hire Autopsy Surgeons specifically to do autopsies inside their specific department. Numerous autopsy surgeons, especially those at academic institutions, say that research, teaching, surgical and clinical pathology prevail over autopsies, which can take hours or days.

Clinicians and autopsy surgeons realise that the declining number of autopsies conducted currently has a detrimental influence on budding autopsy surgeons' capacity to develop the competence required to execute a competent autopsy.

Declarations

- Ethics approval and consent to participate: Not Applicable.
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Conclusion

Post-mortem rates have been falling in recent decades, and research on autopsy findings are few. It is doubtful that autopsies will be phased out entirely. We persuaded that autopsy is essential for a variety of reasons. Firstly, research shows that, despite technological advances, the number of undetected diseases has not decreased since the 60s and 70s. In quite an epoch of COVID-19 pandemic, novel immunosuppressive therapies for transplant patients, and auto-immune disorders, the cause is the emergence of numerous new pathologies with increased opportunistic infections. Second, we suggest that a post-mortem examination can be beneficial to family members, particularly if the reason of death is unknown.

Furthermore, clinicians and autopsy surgeons have a difficult time communicating with each other. The clinician's opinion might encourage the autopsy surgeon to look for novel, uncommon, or unknown illnesses. When tried to compare to the entire expenditures of an ICU stay, the costs of a post-mortem examination are minimal. We ought not regard the price as a justification to avoid autopsy because the results may enhance our clinical practice.

The necessity for autopsies remains, especially in forensics and certain fields of study, where specialized autopsies (those confined to addressing a single issue) are becoming increasingly prevalent.

Although emerging innovations, such as full-body three-dimensional (3-D) imaging, do not yet have the complexity to surpass examinations, that are used as a supplement to conventional autopsies and to improve forensic autopsy assessment. Clinicopathological conferences should be held on a regular basis (e.g., once a month). This necessitates teamwork between clinicians and autopsy surgeons. The clinicians must notify the Autopsy Surgeon of the patient's pre-mortem condition, anticipated outcome, and unanswered issues.

The autopsy surgeon must comprehend the significance of autopsy findings in medical advancement. Necropsies can raise knowledge of uncommon and developing illnesses, which can enhance the therapeutic future practices.

So as a result, we request that the relevance of post-mortem investigations be reassessed, as autopsy remains the ultimate tool for clinical evaluation and treatment of existing and new illnesses.

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