

The history of autopsy health and social care essay



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The future role of the invasive autopsy in the investigation of deaths and possible alternatives. Mohammed Saleh Madadin
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Abstract

Autopsy is dissecting of dead body, Autopsy practiced since long time in the history. Autopsy role was changing with time and practiced for different reasons . In the past , study of disease was motivation to do autopsy but for current modern practice of autopsy objectives are mainly to determine cause an time of Death with other important objectives . Currently two types of autopsy practiced hospital and forensic autopsy. Forensic Autopsy is essential part of death investigation as it reveals important information such as cause of death along with others. The organization of death investigation and autopsy in different countries may follow different systems, judicial system, the medical examiner system, and the coronial system are the commonest. For last decades there clear decline in autopsy rate , There are many reasons for the decline in autopsy rate , one of the important reasons the attitude of public toward the autopsy , this attitude towards both Death & autopsy differ by different societies , religious backgrounds and believes which almost all agree that autopsy is considered as disfiguring for the dead body. in the same time development of imaging techniques led to decrease autopsy rate as diagnosis became more accurate . Both reasons make imaging techniques good alternative to traditional autopsy . many studies and projects commenced to test reliability of radiology in medico legal investigation , by research in these studies many advantages as well limitations on using this method and some medico legal questions need to be answered are concluded . At current time, imaging autopsy need to carry further researches and studies to increase its accuracy , solve the problems <https://assignbuster.com/the-history-of-autopsy-health-and-social-care-essay/>

and answer the medico legal questions. Imaging Autopsy could help enhance the diagnostic yield of traditional autopsies, and eventually could replace it in the future.

Introduction

Medico Legal autopsy carries important role in death investigation. But there are public objections toward invasive nature of the autopsy especially in presence of advanced diagnostic techniques such as imaging radiology . the focus of this research the future of invasive autopsy and alternative. This paper reviews how forensic autopsy in current practice came out through history and describe objectives and roles of autopsy either in forensic settings or other roles . then explain the legal status of autopsy in UK and other countries . in addition review of different attitude in different countries and religions toward the autopsy. This paper aim to study alternatives for invasive autopsy and reliability of these alternatives and the future of forensic autopsy. Literature searches carried out in related articles. Several research articles that had studied efficacy, outcome expectancies and future of imaging autopsy and others studied specific use of imaging technique that can be helped in medico legal investigation . Although difficulties in legal issues related to the imaging autopsy was encountered as few literatures discussed the issue and different legal systems worldwide made it more difficult but some legal questions addressed in this research. This study concluded the current situation of alternative autopsy and generated information about future work must be carried to make imaging autopsy more used as medico legal alternative for autopsy .

History of Autopsy

Autopsy role was changing with time , attitude toward the dead body different in the history, many reasons led to different acts toward the dead body in the past either because of religious beliefs, cultural and geographical background , in the past history many act and practice toward the dead body recognized and practiced such as mummification , burials , cremation or even the dead body used in arts . 1

Early pre-historic

In Ancient ages procedure for examining animals organs such as liver was practiced that's called Hepatoscopy this was known to be practiced 3500 years BC in Babylon, also examination of slaughtered animals for signs of disease practiced in the Talmudic period and ancient Egyptians practiced the mummification . 2Hippocrates who lived between 468-377 BC , he was first Real physician because he was first one who highlighted that disease resulted from natural causes and was not due to spiritual origin and his thoughts and ideas determined the progression of scientific medicine later on . But even after this naturalistic philosophy, autopsy did not has role immediately and autopsy has major role in pathology 1800 years after Hippocrates period. 3For early medical theory, anatomy had nearly no or very small role . Anatomical knowledge continued to increase slowly in the ancient time and had minute influence on medical theory. 1During that early period, embalming was practicing in Egypt and because the cutting of dead body was not prohibited, dissection of dead was practicing in Alexandria and in Greek world at 3rd century , actually no human dissections were performed in the Greek world prior to the third century . Erasistratus who

was anatomist and physician , lived between 310-250 BC, he did dissections and made observations about the effects of disease. 2, 3

Middle ages

Data and information about autopsy is little for this period, some references show some autopsy interest. Also there is some evidence of autopsy related activities carried in England in the 13 century is delivered by a manuscript dating about 1290. 4Cetto. Singer has determined that dissections were being done in Italy between 1266 and 1275, and that the earliest dissections were medicolegal. 3, 4In pathology the system of Galen was still leading; Galen is roman physicina(131-200 AD), he carried out dissections on animals and extrapolated the anatomical findings to humans. 5

Modern or recent ages

During the 15th century autopsies done with more pathology consideration, In the 16th and 17th centuries many autopsies were done and pathology made significant advance and the autopsy continued to has advanced role. In the 18th century new developments, thoroughly linked to the French Revolution, introduced new changes into pathology and the conduct of autopsies. This because battlefields produced more practice and more experiments is done. 1-5Xavier Bichat , French anatomist and physiologist (1771-1802) he was named as father of histology because he made a turning point in medical history. He focused the medical sciences toward pathology , anatomy & physiologyHe directed attention away from organs toward the components of organs (the tissues). 6The golden period of autopsy was 19th and 20th century . starting from the first half of the 19th century, other new developments greatly made the frame of the medicine , the basic sciences or <https://assignbuster.com/the-history-of-autopsy-health-and-social-care-essay/>

preclinical sciences underwent a sharp spurt. Further progress in Physiology and chemistry made great progress and more vital revolution was the development of the microscope this development led to what we call it the Cell theory, the direct outcome of microscopy, which introduced a whole new dimension into the study of disease. All of these development lead to further progress in autopsy till it reached to its practice . 3

What is Autopsy? (Overview)

Definition

Autopsy is dissecting of dead body , although Necropsy more accurate but autopsy is more wild used . in UK and some other countries term Post Mortem Examination used but this term lack accuracy as it doesn't describe extent of the examination , whether it is only external examination or dissecting. 7 Autopsy term originate from greek word Autopsia that means self-examination or seeing by one own eye . in Oxford English dictionary the definition is dissecting of dead body. 8

Objectives

Autopsy practiced since long time for different reasons. in the past , study of disease was motivation to do autopsy but for current modern practice of forensic autopsy objectives are to determine cause an time of Death , help in determine the manner , identify the body and document the injuries , obtain samples for further investigation , teaching and education 7, 9

Types of Autopsy

There are 2 types of autopsyHospital Autopsy : this carried to determine the cause of death , extent of disease , effect of therapies or for education . it

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has great value to reveal undiagnosed conditions . 10, 11Medicolegal or Forensic Autopsy : this carried in medico legal cases and called also forensic autopsy which carried mainly to obtain cause of death , it differ from hospital autopsy in consent which not needed to carry forensic autopsy . 12

Procedure of Autopsy

Procedure of autopsy is uniformed although some regional and national differences in regulation are presented, the practice of medico legal autopsy is organized and standardized by legislation and done under instruction of authority. Different guidelines differ from country to other, in UK Royal College of pathologist maintain its guideline to practice autopsy within UK . 13There is increase in international interest to make international rules to practice forensic autopsy for example the General Assembly of the United Nations published the Model Autopsy Protocol of the United Nations. The European Council of Legal Medicine (ECLM) also published 'Harmonization of the Performance of the Medico-Legal Autopsy. 14

Pre Autopsy

This include circumstances history and hospital reports, scene reports and any available data

Examination

This include clothes examination, external examination, dissecting the body and examining and dissecting the organs, taking the sample and restoring the body

Post – investigation

This include laboratories tests such toxicological test, DNA. 7, 10

Autopsy Report

Autopsy result is written in report , what called Autopsy report . the Autopsy Report is not only the description of finding but it correlate these finding to the history , investigation and laboratories results . many Different forms of autopsy reports , may be detailed specially in teaching institutes while some focused as in medical examiner office. Although nowadays almost all forensic pathology textbooks standardize the formula of writing autopsy report of course with flexibility of little change from book to another . 15

Role of Autopsy

In Death investigation :

As I mentioned before , Forensic Autopsy is essential part of death investigation as it can reveal important information such as determine cause of death , time , manner of death, collecting sample for toxicological analysis and further investigations.

Other Roles of Autopsy

Autopsy plays important role in different aspects, not only in death investigation . Autopsy has its important role in diagnosis of undiagnosed clinically conditions and autopsy involved in investigation of malpractice in addition autopsy has role in education or medical education as I will discuss in this section. Autopsy is still retain its importance for verifying clinical diagnosis, even with improved diagnostic techniques. A large meta-analysis suggested that approximately one-third of death certificates are incorrect

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and that half of the autopsies performed produced findings that were not suspected before the person died¹⁶, these diagnosis include many clinical condition such as tumors. In previous study¹⁷, it revealed that diagnosis of tumor by autopsy is still better comparing to clinical diagnosis. Also autopsy carry important diagnostic roles in cardiovascular diseases comparing to clinical data and this can lead us to question the validity of statistics derived from death certificate diagnoses and limits the sensitivity of epidemiological studies that do not consider limitation these methods and not depended on autopsy which is more accurate¹⁸. So Autopsy is increase accuracy of cardiovascular disease statistics. Autopsy too find answer for unsolved clinical questions and major source of unexpected finding, these finding of course will lead to improve clinical practice. Previous study¹⁹ showed that 93% of clinically unsolved questions resolved by autopsy. Some unexpected death due to disease not diagnosed clinically and diagnosed by autopsy such as emphysema, bronchopneumonia, pulmonary thrombembolism, arteriosclerotic cardiovascular disease, and myocardial infarction.²⁰ We can conclude that autopsy used as quality assurance by verified clinical diagnosis. Almost all previous studies showed a considerable discrepancy between the main clinical and autopsy diagnoses and low sensitivity, specificity, and predictive values for both diagnoses of cause of death and main clinical diagnoses.. So value of Autopsy is clear in aspects of clinical diagnosis. ²¹Autopsy from its beginning it is known tool in education, in current time autopsy used in teaching of medical student at undergraduate level as well in pathology training. autopsy plays major role in teaching student basics of pathology and clinical pathological relations, an ideal tool for teaching human pathophysiology from morphologic findings and show <https://assignbuster.com/the-history-of-autopsy-health-and-social-care-essay/>

the mutual relationship of lesions in different organ systems. These then are the basis for creative diagnostics also in surgical pathology, and experience gained from postmortem investigations allow the pathologist to identify new and unusual disease patterns. Also it teach them about uncertainty the process by which medical students learn about medicine uncertainties and how to deal with them. the decline in autopsy rate negatively affect the physician education 22-25Autopsy as can detect the cause and mechanism of death , it provide absolute help in lethal cases due to medical malpractice . role of autopsy in malpractice not only in detection of cases or diagnosis but also in prevent such malpractice cases . The percentage of autopsies due to malpractice claims on all autopsies is varying widely between 1. 9 and 20%. 26

Legal Status of Autopsy

System and organization in UK

medico legal autopsy in UK is under coroner authority , A coroner is an independent judicial office holder, appointed and paid by the relevant local authority. A coroner is a lawyer or a doctor, and in sometimes is both. Coroners inquire into suspected death such as violent , unnatural, unknown sudden deaths and death in custody. The purposes of the coroner service, when a death is reported to it, to establish whether a coroner's inquest is required, if so, to establish the identity of the person who has died, and how, when, and where the person came by their death, to assist in the prevention of future deaths, and to provide public reassurance. In some cases a death may be referred to the police for investigation on behalf of a coroner. In other cases a separate investigation into a death may be undertaken by an

independent body such as the Health and Safety Executive. Less than 50% of deaths are reported to the coroner. In many cases the deceased's own doctor, or a hospital doctor who has been treating him or her during the final illness, is able to issue a Medical Certificate of the Cause of Death (MCCD) without reference to a coroner. The coroner may ask a pathologist to examine the body and carry out autopsy. After the post-mortem examination is completed the coroner will normally issue the necessary authority permitting burial or cremation, so that the funeral can be held, even though an inquest may be required but has not been concluded. Regulation of autopsy for the pathologist is under organization of royal college of pathologist which guide the practice of autopsy. In 1998 the royal college of pathologist commissioned the code of autopsy practice in UK. 13, 27, 28

System in other Countries

The organization of death investigation and autopsy in different countries may follow one of the 3 systems : judicial system; the medical examiner system ; and the coronial system. The Judicial System : Occasionally known as " civilian" systems, the generic criminal investigation and judicial system is found mainly in most European Union countries where an official is responsible for investigating crime and prosecutions. In most countries judicial involvement comes from the examining magistracy, who also takes responsibility for directing the investigation. In all countries that follow this particular system, there is a requirement for the authorities to undertake autopsies for which the next of kin have not provided consent, even though autopsies usually are performed only when there is suspicion of a crime surrounding the death. In these cases, forensic autopsy specialists perform

the autopsy. 29The Medical Examiner System : The first medical examiner system was established in the state of Massachusetts(USA) in 1877. The system required that a physician known as a medical examinerreplace the coroner. it is directed by forensic pathologists who establish the cause of death but who generally do not inquire into the circumstances of that death. Within this system, forensic pathologists provide services to police and criminal investigation services and undertake in-house autopsies and other scientific investigation services. 30The Coronial System : The coronial system as discussed earlier used in UK and other countries, now known as those within the Commonwealth, and in the United States. 29, 30

Decline Rate of Autopsy

Decline of Autopsy rate in UK

The autopsy rate, defined as the ratio of the number of autopsies to the total number of deaths. Reporting of autopsy cases differ by institution or whether hospital or forensic autopsy. For last decades there clear decline in autopsy rate specially hospital autopsy 31Autopsy rates can vary with manner of death, sex and age, and may be susceptible to the influence of regional variations . 32No of Death occur each year in UK varied, for 2010 number death in England and wales is 230, 600 deaths while it is less in 2011 around 222371 deaths. Around 47 % of all deaths reported to coroner and this percent almost constant for last few years. the percent of cases that underwent to post mortem examination from all deaths that reported to the coroner 46% in 2009 , 44% in 2010 , 42% in 2011 which continuing to decrease from year to year. 33

Decline in Autopsy rates World wide

Decrease rates in autopsy is not exclusive for UK but it is global and international change . in USA No. of autopsies decrease recently , in comparison study between autopsy prevalence in 1993 and 2003 showed decrease prevalence of autopsy recently with time . 32Current percent of hospital autopsy in USA around 6% while it was 30-40% in 1960s 34. In Australia rate of autopsy dropped by fifty percent between 1992 and 2003. 35In Denmark the percent of autopsy cases was 45% in 1975 compared to 1990 only 16% autopsy rate 36. In France declined from 15. 4% in 1988 to 3. 7% in 1997 . 37

Reasons for Decline of autopsy rate

There are many reasons for the decline in autopsy rate. One reason is that there has been a shift in care, older and sicker patients are dying in long-term facilities and in the hospice care setting . Another reasons is Cost constraints , especially with the changes in healthcare coverage and reimbursement, autopsies were essentially no longer funded. Cost of Autopsy Few data exist as to the true cost of an autopsy (including both fixed and variable costs), although from the small number studies that attempted to capture both fixed and variable costs, there is great variability. 38 The most recent published mean cost estimate per autopsy case was \$1, 275. 00 . The actual cost of an autopsy depends on many variables, including the case load and cost for personnel, space, materials, processing, and ancillary testing. 39In addition, the cost of an autopsy is generally not covered by managed care organizations or by third-party insurers as part of an individual's healthcare coverage. As a result, costs may be passed on to

the next of kin of the deceased at the discretion of the hospital or individual pathologist performing the procedure. 38, 39 One of important reason, Difficulty obtaining consent from relatives and this usually due to many factors that lead the relative not to consent for autopsy such as their perceptions and believes about death and autopsy , religion and cultural believes , excessive time lapse between patient's death and receiving report. Lack of direct feedback between pathologist and clinician at the time of autopsy. 40 Another Reason for decrease rate is advanced radiological and diagnostic technique which reduces the need for autopsy. Also one reason is decrease autopsy education among medical personnel . students had an insufficient knowledge of the task and value of an autopsy. Physicians who did not attend autopsies during their training also did not believe in the benefits of this procedure in practice. 40 , 41

Society's attitude toward autopsy

Attitude towards both Death & autopsy differ by different society not only by society but also by different time in same society. as we mentioned in history different attitudes toward autopsy passed and usually these attitudes has role in decreasing autopsy rate or has role in arise alternative for autopsy . 31 When we consider benefits of autopsy , we must do in respect of moral & society culture and believes , in same times sometime the autopsy is obligatory and need rather than accessory . that's why forensic autopsy can be carried against family well, however, a procedure burdened with a variety of misconceptions, myths, and emotions by lay people as well as by physicians. 42 The public believes has major role in decreasing rate of autopsy. In previous study 43 59% believe that autopsy cause visible

disfiguring of the body and 69% believe autopsy will delayed the funeralThe corps is believed by some it stands as the only concrete symbol of the self's integrity, the corpse is the symbol of the dead person's life. 31So the autopsy threatens the most powerful symbol, the central symbol in modern rituals of death: the body. Particular family circumstances and some religions may require adherenceto specific timing restrictions which can be honored by expediting the autopsyor the performance of a limited examination. autopsy, except under civil law requirements, is prohibited within some major religions. 44Although in modern societies idea of autopsy may be understandable by some communities. Many studies showed different believe across different countries According to a Swedish study 45, the large majority of people would theoretically accept an autopsy on a close relative. This is supported by a study in the United States conducted on family members of subjects who died in a hospital . These results may, however, not apply to the forensic autopsy. 42In same previous study 42 Eighty-four responders replied to the question whether they had a positive, negative, or neutral attitude toward the performance of an autopsy on the relative's body;(43%) reported that they welcomed the fact that an autopsy would be performed. The main reasons for this acceptance were the desire to know the cause of death and the wish that the circumstances of death should be investigated. Thirty-three (39%) of the responders had an indifferent attitude, and (18%) were opposed to an autopsy. in Japanese study46 The majority of the general public indicated they believed an autopsy was necessary. However, in cases of unclear medical error or unclear causeand effect relationship of medical care and patient death, the general public were much less likely to indicate they would actually request an autopsy. In china <https://assignbuster.com/the-history-of-autopsy-health-and-social-care-essay/>

More than half of the responding members considered autopsy beneficial. 47 In Uganda A reason for refusal was given by family members who declined an autopsy. The most frequent reason was 'not wanting to delay the burial' 59%. , not useful to know cause of death 16% , 'being satisfied with the clinical cause of death' (10%). Cultural and religious reasons were mentioned in 6% and 1% of cases, respectively. 48 In Islam where the Islamic law called sharia, Islam, one of the youngest and largest of faiths, is similar to Christianity and Judaism in that it contains subdivisions with different beliefs and practices. Neither the Quran nor the Hadith (the sayings and practices of the prophet Muhammad) addresses the issue of autopsy. But the Muslim jurist scholars, which give solution for nonbinding answers to questions not-found in the ancient texts they allowed for medico legal autopsy under certain condition . In Islam body should buried as soon as possible and the autopsy can be performed. If the autopsy is required by law (for example, in criminal death), the autopsy can be performed as well 49, 50 In the Roman Catholic tradition, there is no law or edict that forbids autopsy, Devout Hindus always cremate their dead and burial is not allowed by tradition. In Hinduism it is believed that autopsies are disturbing to the still-aware soul which has just separated from the body. Buddhists believe that the body, which is a temporary shell for the spirit, should be treated with great respect and care so the mind can concentrate on pursuing enlightenment. They also cremate their dead. Jewish law requires immediate burial, including all internal organs and the blood. It is believed that while the soul or spirit leaves the body upon death, it is nevertheless aware and conscious of its surroundings, until after its return to the earth. Any invasive procedure is seen as a desecration . Burial should be as soon as possible.

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51After this review of different cultural and religious believes about body and autopsy , I can conclude that autopsy is considered as disfiguring or by different words , the most vital or argue issue of autopsy is the disfigurement of the body . so this is can lead us to rise question is there any alternative ?

Alternatives to Autopsy

Role of imaging tech. in diagnosis

Radiology is a branch of medical science which uses imaging technology and radiation to make diagnoses and treat disease. It has benefited greatly from the advances of physics, electronic engineering, and computer science, Over the last two decades, technological advances in radiology have revolutionized the practice of medicine . these advances have enhanced our potential to understand and manage disease . 52In radiology, the ability to detect an anatomic abnormality is strongly related to the size and location of the abnormality. Thus, as technological advances enable radiologists to detect smaller abnormalities in more remote regions throughout the body 53. Advances in radiology may cause us to overestimate not only the prevalence of disease, but also the effectiveness of earlier diagnosis and associated treatments 52. 53However, this technological progress does not necessarily translate into better health, much less lower costs. If clinicians and radiologists are not properly equipped with information and decision making tools to help them decide whom to test, how often to test and how to interpret the test results, technological progress may actually lead to more harm than good despite appearances to the contrary 52, 53Today, the mainstream modalities which are widely used in hospitals and medical centers include radiography(x-ray), fluoroscopy, computed tomography (CT), <https://assignbuster.com/the-history-of-autopsy-health-and-social-care-essay/>

ultrasound, magnetic resonance imaging (MRI), and positron emission tomography (PET).⁵⁴ Medical images contain many structures including normal structures such as organs, bones, muscles, fat, and abnormal structures such as tumors and fractures. Segmentation is the process of identifying structures, both normal and abnormal, in the images. It is fundamental to the interpretation of medical images⁵⁴. With this improvement of imaging technique in diagnosis is a major reason to decrease hospital autopsy but a question raised can it be an alternative for medico-legal autopsy.

Alternative to autopsy

As we discussed, people have objections toward autopsy whatever the reason but there is an objection. Public objection to autopsy has led to a search for minimally invasive alternatives. Imaging has potential to be the minimal or less invasive alternative for autopsy. Many research articles published focused on imaging as an alternative for autopsy and many practical projects started to apply this issue. For example, in the UK, religious factors and public pressure are becoming increasingly important in influencing and this led to many studies about the role of MRI in replacing autopsy and the majority of postmortem work with MRI on adult patients so far has been driven and paid for by the Jewish community in North Manchester.⁵⁵ Imaging autopsy can be defined as the use of different imaging techniques such as high-definition CT and/or MRI scans of the decedent in addition to, or in lieu of, traditional autopsy.⁵⁶ CT: include technologies such as high-resolution computed tomography (CT) scanning, which can capture several thousands of cross-sectional images of a cadaver in less than a minute, paved the way for the

advancement of forensic autopsy procedures. 54MRI : Magnetic Resonance Imaging , technique used in radiology to visualize internal structures of the body in detail. MRI makes use of the property of nuclear magnetic resonance (NMR) to image nuclei of atoms inside the body. 55Ultra sound : Ultrasonographic techniques are relatively easy to learn and use. Ultrasonography is presently used in various resuscitative clinical scenarios and in imaging of ultrasound-accessible anatomic structures for example cardiac evaluation, tumors and other types of masses, abscesses, vascular structures, solid organ assessment, and pregnancy. 56laparoscopic : Laparoscopic and thoracoscopic autopsies have previously only been performed on an experimental basis to determine their potential usefulness as a substitute for a conventional postmortem examination. 57in traditional autopsy setting Usually imaging can be performed after traditional autopsy in order to obtain additional information regarding skeletal, muscular, and other anatomic structures that not fully examined during the traditional autopsy 56

Using imaging in Forensic setting

Advanced imaging techniques have been used for some time during forensic investigations , Radiological imaging is used for medico-legal purposes was seen in the forensic practice since long time, 1896. Martin and Arroio 58 showed the applicability of post-mortem radiographic techniques in order to identify bodies through comparative analysis of the cranial sinuses. Besides, numerous cases were reported in which liver, heart, brain and bone injuries were investigated radio graphically revealing the possible death cause 59. and the researches increases subsequently Till 1990s when virtual autopsy

programs in different places appeared such as Swiss. and USA⁵⁶. A recently published study⁶⁰ by the forensic institute in Leicester, UK examines 8 different cases: 2 fire deaths, 2 traffic deaths, 2 stabbing cases, 1 ligature to neck death and 1 shotgun homicide by a post mortem full-body CT scan and on the other hand by a full post mortem forensic autopsy both including results of an external examination and scene details as well as toxicology results, that could be retrieved without dissection, where available. However, the histology results were not included in the non-invasive post mortem CT report, because histology was considered as more invasive examination and therefore only included in the autopsy report.⁶⁰

Virtual Autopsy

That is the promise of virtual autopsy or virtopsy, a radical new approach to forensic imaging developed in Switzerland that is fast winning converts in Britain and elsewhere. "Virtopsy" (Virtopsy Project, Zurich, Switzerland), which was derived from the words "virtual" (Greek: *virtus*: effective) and "autopsy" (Greek: *autos*: own + *opsomei*: to see)⁶¹ the Swiss team, led by Professor Michael Thali of the Institute of Forensic Medicine in Zurich, has gone a stage further, not only using X-ray imaging to create scalpel-free 3D images of intact cadavers but also building a "Virtobot" capable of carrying out precise postmortem tissue sampling – and all without exposing pathologists to harmful radiation or bodily contaminants. In addition, the virtopsy team can perform CT angiography, a procedure that entails injecting a contrast agent into blood vessels with a needle in order to reveal leaks and lesions that can be overlooked using conventional autopsy methods. Finally, the same 3D surfacing scanning can also be used on injury-causing

instruments . 56, 61The main objection observed in the application of virtual autopsy, is its support to be performed in less developed countries, in which high-technological imaging devices are not easily feasible for scientific purposes. Despite that, the bioethical issue related to the digital imaging transferring is another objection for the use of virtual autopsy. However, as any other new trend in science, the virtual autopsy is still developing and getting space among the commonly used methods. 59

Advantages

As I mentioned the imaging autopsy can be applied in a broad number of forensic situations, such as thanatological investigations; carbonized and putrefied body identifications; mass disaster cases; age estimation; anthropological examinations and skin lesion analyses and great advantages for using such technology in forensic casesCT-scanning can be a helpful supplement to the medico-legal autopsy . In traumatic cases; the CT-scanner can produce very useful evidence and documentation, which is difficult to obtain otherwise. the CT-examination has shown Useful in cases of intracranial hemorrhages, cerebral contusions and edema, splenomegaly, pelvic fractures and extremity fractures . 63In drowned bodies the CT information about the volume, density, size of the lungs and the amount of liquid observed in them is helping in diagnosing the cause of death also in cases of firearm projectile injuries are often difficult to examine in autopsy because either sometimes the bullet is not in the body, or diverted by an anatomical structure, or it can be in unknown body parts. Therefore, knowing the location of the projectile before the autopsy is performed facilitates the examination 59, 69In hit and runs cases the virtual autopsy can help, for

example an incident on a country road near Bern in 2007 where 3D crime scene imaging was used to prove a motorist's culpability in the death of a cyclist. (The 3D reconstruction showed the cyclist had been hit from behind, not from the side as the motorist had claimed, and that the bike had been lifted and thrown several metres forward, indicating that the driver had been speeding.) 63Autopsy appears as a helpful and complementary tool for dental cadaveric examination. 59Micro-CT and micro-MR might be used to perform micro- Virtopsy on forensic tissue specimens prior to destructive sectioning. Routine histology can then be guided to various regions-of-interest identified on images acquired prior to sectioning. This approach is expected to reduce sampling errors and tissue processing times. Magnetic resonance microscopy images do not, however, yield maps of cellular structures but maps of tissue morphology and tissue composition. 64Post-mortem radiological imaging is a potential alternative method of investigating perinatal loss. Such as in still birth .(perinatal 1). with the use of multi-detector CT (MDCT), images can easily be reconstructed in any plane, which helps to interpret complex anatomical deformities. 65As everyone focus on CT and MRI advantages we should not to forget some of the advantages by using ultra sound. Potential uses of ultrasound in the post-mortem setting may involve sonographic evaluation of various organs, pleural air and pleural effusions, cardiac and pericardial abnormalities (including pericardial tamponade), hemoperitoneum, and even skeletal injuries. 68One of the great advantages is that the reviewable permanent digital images that result from post-mortem imaging. Post-mortem images are outside the scope of the Human Tissue Act 2004 (which applies in England, Wales, and Northern Ireland); therefore, Unlike tissue samples and <https://assignbuster.com/the-history-of-autopsy-health-and-social-care-essay/>

organs, these images can be kept for audit and diagnostic review, even after the coroner's authority has ended, with no legal requirement for consent.

66 Finally, medical and surgical education programs stand to benefit greatly from more widespread use of imaging autopsy. Knowing why the patient died is instrumental to our medical education paradigm. A proposed algorithm for the utilization of CT/MRI autopsy in medical/surgical education has been previously published. 67 as conclusion for its advantages If used as a pre-autopsy screen, imaging might avoid unnecessary autopsies (eg, for ruptured aortic aneurysm), identify lesions difficult to diagnose by dissection, and help to guide dissection by identification of pathologies needing further investigation. Therefore, imaging could reduce the number of invasive autopsies at the same time as improving their quality.

Reliability of imaging autopsy (is it accurate?)

Its accuracy is unknown. Many studies conducted to identify the accuracy of post-mortem CT and MRI compared with full autopsy in a large series of deaths either on adult or infant and perinatal deaths. 69 in study assessed 182 unselected cases 69. The major discrepancy rate between cause of death identified by radiology and autopsy was 32% for CT, 43% for MRI, and 30% for the consensus radiology report, the major discrepancy rate compared with autopsy was 16% The most common imaging errors in identification of cause of death were ischemic heart disease, pulmonary embolism, pneumonia, and intra-abdominal lesions. Studies showed that when using CT/MRI in the setting of postmortem examination, cause-of-death determination rates vary between 49% and 91%. 56 Researchers found that, compared with traditional autopsy, CT was a more accurate imaging

technique than MRI for providing a cause of death. The error rate when radiologists provided a confident cause of death was similar to that for clinical death certificates, and could therefore be acceptable for medico legal purposes. However, common causes of sudden death are frequently missed on CT and MRI, and, unless these weaknesses are addressed, systematic errors in mortality statistics would result if imaging were to replace conventional autopsy. 69Discrepancy rate compared with autopsy was significantly higher for MRI than for CT and consensus reports. In forensic practice CT provides better spatial resolution than MRI and is effective for showing fractures and hemorrhages. Non-forensic and pediatric practices have used MRI because it provides greater detail of soft tissues than does CT. 69, 70CT has important practical advantages, being more widely available, less expensive, and quicker to do than MRI. CT could also be combined with angiography, increasing the accuracy of detection of vascular lesions . 70Study showed that multi slice-computed tomography (MSCT) technique in order to evaluate a case of homicide with putrefaction of the corpse before performing a classical forensic autopsy. This non-invasive method showed gaseous distension of the decomposing organs and tissues in detail as well as a complex fracture of the calvarium. MSCT also proved useful in screening for foreign matter in decomposing bodies, and full-body scanning took only a few minutes. So they concluded postmortem MSCT imaging is an excellent visualization tool with great potential for forensic documentation and evaluation of decomposed bodies. 71In stillbirth and infant where consent less likely to be given , addition conventional invasive autopsy might be difficult when fetuses are small, or maceration and autolysis are present, particularly for adequate examination of the brain and

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heart these factors lead to increase research of minimal invasive autopsy for this group, in still birth CT was better than plain radiography for imaging skeletal structures and large solid organs and demonstrated a range of pathologies including renal vein thrombosis, mesenteric calcification and skeletal hyperostosis that were not seen on plain radiographs. 65, 71 There are a number of reports on the use of magnetic resonance imaging (MRI) for the evaluation of stillborn fetuses . MRI was investigated for its excellent soft tissue contrast and detailed depiction of anatomical structures, particularly the central nervous system (CNS), an area that presents practical problems for pathologists However, while post-mortem MRI was reported as sensitive for CNS abnormalities, the depiction of abnormalities in other organ systems, and in particular cardiac anomalies, was inferior to autopsy 73 Computed tomography (CT) represents another non-invasive alternative to autopsy with potential to yield valuable information on fetal structural abnormalities as well as growth restriction, but the use of post-mortem CT has been confined to date to adult death and forensic examination . 74

Limitations

radiographic autopsy techniques do not detect all causes of death. and certain relatively minor but critical findings can be " missed" on imaging autopsy studies a problem that is less likely to occur as modern radiologic techniques continue to evolve and their accuracy improves. , the great causes of death due to certain medical conditions (i. e., metabolic disorders) may elude even the most specialized and sensitive imaging techniques. although some researchers solve this issue by saying The main purpose of a coroner's autopsy is to exclude an unnatural death, which could be achieved

without diagnosis of an accurate natural cause. 56, 59, 69 certain imaging artifacts (i. e., intravascular or intrahepatic air) on postmortem CT/MRI studies are still being investigated and their meaning remains to be fully elucidated . 56 for CT as I mentioned , the most common imaging errors in identification of cause of death were ischemic heart disease , pulmonary embolism , pneumonia , and intra-abdominal lesions . 69 Despite application of post-mortem MRI, few studies have investigated the accuracy of imaging in the diagnosis of the cause of adult deaths. Findings in which postmortem MRI was followed by full autopsy, showed important weaknesses of imaging notably, an inability to detect some lesions such as arterial occlusions and to differentiate between pulmonary oedema and pneumonia. 55. 75 Post-mortem changes cause specific difficulties for imaging diagnosis. Distinction of intra-abdominal gas due to putrefaction from antemortem perforation of the stomach or bowel can be difficult, which resulted in a missed perforated duodenal ulcer similarly, the distinction of post-mortem clot from antemortem thrombus has not proved possible with cross-sectional imaging a missed diagnosis of pulmonary embolism was one of the most common errors. 69 Both techniques have strengths and weaknesses eg, CT provides visualisation of coronary artery calcification that is not apparent with MRI, whereas acute myocardial infarcts might be seen with MRI but not with CT. Use of both techniques as a routine would have resource implications and evidence to support this use is scarce. 71, 73-75 Another deficiency is that post-mortem imaging does not include microscopic examination of tissues and organs. Histology indicates clinically unexpected autopsy findings in more than 20% of cases; in 5% of cases these findings are regarded as major . 66 another limitations include Access to suitable imaging facilities, transfer <https://assignbuster.com/the-history-of-autopsy-health-and-social-care-essay/>

of the bodies to the facilities, staffing the service, method of case selection (if any), storing and transferring the data, providing a radiology report within the time frame that may be useful to the Coroner. Financial issues , Determining the cost of a service and how this will be funded (family, religious organisation, Coroner, other). Governance issues, Training radiologists and pathologists, assessing their competence . Again the main objection observed in the application of virtual autopsy, is its support to be performed in less developed countries, in which high-technological imaging devices are not easily feasible for scientific purposes. 66-75, 76

Medico legal question

In addition to the limitations mentioned, one must consider the medico legal questions may be rise when imaging autopsy techniques used. No particular court decree is discussing the acceptance of Virtopsy or forensic imaging autopsy as evidence instead of traditional forensic autopsy or in general the acceptance of Virtopsy or forensic imaging as evidence in court; although X-rays as evidence have been found admissible and accepted by courts in England, Canada and the USA since 1896 . In Australia Coroners Act 2008 and Coroners Act 2009 mentions Virtopsy or forensic imaging such as post mortem CT, post mortem MRI, pm CT angio etc. and In every legislation, relevant sections in codes regarding forensic autopsy or postmortem (examination) can be found. Some of them uses further general terms like " further or additional investigation. Moreover, Virtopsy and forensic imaging, found its way into court rooms as evidence in criminal trials as well as in coronial inquests, mostly with additional autopsy results, but rarely without them, for instance in Australia, Switzerland or Japan. 76, 77A deep literature

review presents very rare publications in journals or books about the legal issues, which can arise around Virtopsy and forensic imaging. The future of Virtopsy and forensic imaging was assessed, also in a legal point of view to its legal bases in the Swiss Code of Criminal Procedure, in a positive way. The investigative judges have not seen any obstacles to include Virtopsy and forensic imaging as additional examination and partially or in specific cases as alternatives procedures to traditional examinations, like autopsy, to get evidence in prosecution and for criminal trials . 61, 76. 77According to the relevant interpretation rules, no problems crop up to include Virtopsy/pm forensic imaging involving post mortem CT, post mortem MRI, 3D surface scan, post mortem CT angio and post mortem biopsy under the regulations about autopsy or postmortem examination (as well as further examinations or investigations or studies or tests etc.) of the different jurisdictions, including Australian states and territories, Switzerland, Germany, Austria or the states in the US as examples. 76Many controversies and medico legal question may be arise when using of imaging autopsy , here I looked for these questions without trying to find answer . All these questions remain to be answered but in my opinion the most likely solution will be some form of interdisciplinary cooperation. First, who should be responsible for obtaining and interpreting these studies? Should pathologists be trained to read radiographic studies or should radiologists who have the domain over the CT and MRI autopsy studiesSecond, who will cover the expense of performing and interpreting imaging autopsies? Even without considering the radiologist interpretation fee, the cost of CT/MRI autopsy very high depending on how extensive the study and how many body regions are imaged. However, if performed more routinely, CT/MRI autopsies could actually present savings

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to the healthcare system. Third controversy surrounding the Imaging Autopsy is the fact that variable terminology is used by different research groups to refer to these studies. The most commonly used names include Virtopsy, Virtual autopsy, and Imaging autopsy. Some researchers believe that the term Imaging Autopsy is certainly more comprehensive than other terms, it can refer to all types of radiographic tests performed in the postmortem setting and should be used preferentially. ⁶⁷The fourth controversy surrounds the medico-legal aspects of Imaging Autopsy is potential implications of imaging autopsies on medical liability. For example, should imaging autopsy findings constitute legally discoverable evidence? Any formal implementation of imaging autopsy will require an in-depth consideration of the current medico-legal environment and the impact of Imaging Autopsy on this fragile equilibrium. Some mentioned that effect of imaging autopsy and how it will be used by Defense and how can affect jury opinion Who will Do the imaging Autopsy ? There is also a significant amount of controversy surrounding how and by whom imaging autopsies should be interpreted. This topic area is continuing to evolve and will most likely result in a multi-disciplinary approach to these complex and often difficult-to-interpret radiographic studies. It is likely that imaging autopsies in the future will involve cooperation between pathologists, radiologists, as well as the patient's primary physician. Such cooperation will enable the expertise of the radiologist and the pathologist to be used in conjunction with pertinent clinical information about the decedent provided by the primary physician. ⁶⁷If a forensic pathologist without special radiological expertise could perform the CT-examinations. The preliminary studies show, that this is possible, but the results depend on the experience of the examiner. ⁶³
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Summary & conclusion

Traditional autopsy used since early historic period and progressed with time to be major tool in death investigations . Public objection toward autopsy due to religious, cultural , emotional background led to search for alternative which is less invasive than autopsy , imaging autopsy is seem to be appropriate alternative , many researches conducted in this field. There are many advantages to performing imaging autopsy. The most appealing aspects include its noninvasive nature and the fact that radiation dosing is of no consideration when performing postmortem imaging studies. Imaging autopsies take only a few minutes on modern CT scanners and are reasonably brief when performed on modern MRI scanners. Another advantage it may be viewed remotely enabling sharing of imaging data among experts at different locations. Moreover, the ability to conduct 3D reconstruction and imaging autopsies do not require specialized facilities. Additional advantages include the ability to detect small fractures that may not be apparent on traditional autopsies, the ability to identify foreign bodies (i. e., bullets) embedded deep within the soft tissues, and to determine trajectories of penetrating injuries . Although some limitation of these alternative but still considered and more research is going on. Currently, in medico legal settings imaging autopsies do not replace traditional autopsy , but they do offer complementary information and certain additional advantages. At present, the evidence is insufficient to abandon the tradition autopsy and rely exclusively on imaging autopsy. Published studies looking at the use of modern imaging technologies for cause-of-death determination are few in number and the experience with the technology and what it offers in the context of postmortem analysis is still

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limited although Imaging autopsy grows. one has to consider who will be interpreting these studies and how exactly will this process occur, both in relation to the traditional autopsy and within the framework of the interdisciplinary nature of such an endeavor. Imaging autopsy may be offered as an alternative to traditional autopsy in the pediatric population, especially when there is parental reluctance to give permission to perform an autopsy. traditional autopsy may be refused, imaging autopsy may offer a non-invasive alternative of discovering the cause of death and perhaps providing answers where none would have been known otherwise. so imaging autopsy may also have potentially important implications with regards to confidential peer-review and clinical performance improvement. The main focus of future imaging autopsy clinical investigations should be to better define the meaning of specific findings seen on imaging autopsy examinations. Additional technological improvements will likely lead to better imaging quality of Imaging Autopsy studies including 3D reconstructions and enable Imaging Autopsy to detect subtle but critical postmortem findings. It will also be important to formally clarify various jurisdictions with regards to the acquisition and interpretation of Imaging Autopsy studies. Most likely, the initial utility will be as a screening tool prior to the performance of traditional autopsy. Post-mortem imaging cannot yet be regarded as a universal substitute for autopsy; it is one of several methods available for determining the cause of death. In some cases, post-mortem imaging might be better than autopsy; in others, imaging augments the autopsy. Whichever method is chosen, all death investigations should begin with a thorough review of the deceased's clinical history and meticulous external examination of the body. With time, Imaging Autopsy could help enhance the

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diagnostic yield of traditional autopsies, and eventually replace the need for the latter.