

VIRTOPSY: THE NEW TOOL IN THE FORENSIC SCIENCE

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ABSTRACT

The word "autopsy" denotes "to see with own eyes." Autopsy (postmortem) is a process that includes a thorough examination of a corpse noting everything related to anatomization, surface wounds, histological and culture studies. Virtopsy is a term extracted from two words "virtual" and "autopsy." It employs imaging methods that are routinely used in clinical medicine such as computed tomography and magnetic resonance imaging in the field of autopsy, to find the reason for death. Virtopsy is a multi-disciplinary technology that combines forensic medicine and pathology, roentgenology, computer graphics, biomechanics, and physics. It is rapidly gaining importance in the field of forensics. This approach has been recently used by forensic odontologists, but yet to make its own mark in the field. This article mainly deals with "virtopsy" where in various articles were web searched, relevant data was selected, extracted, and summarized here.

KEY WORDS: Autopsy, Virtopsy, Roentgenology, Forensic odontologists.

INTRODUCTION:

Virtopsy is a term that came from virtual autopsy. It was developed by Richard Dirnhofer, former director of Forensic Medicine, Berne, Switzerland. Originated in mid 1990's^[1]. It is a scalpel free procedure to carry out autopsy using medical imaging techniques. An autopsy (postmortem examination, autopsia cadaverum, or obduction) is a highly specialized surgical procedure that consists of a thorough examination of a corpse to determine the cause and manner of death and to evaluate any disease or injury that may be present. Virtopsy is a word combining 'virtual' and 'autopsy' and employs imaging methods that are also used in clinical medicine such as computed tomography (CT), magnetic resonance imaging (MRI), etc., for the purpose of autopsy and to find the cause of the death^[2,3]. Virtopsy can be employed as an alternative to standard autopsies for broad and systemic examination of the whole body as it is less time consuming, aids better diagnosis, and renders respect to religious sentiments. Virtopsy is quickly gaining importance in the field of medicolegal cases, but still has its own disadvantages. This technique has been recently used by forensic odontologists, but yet to receive its own limelight.

THE IMAGING TECHNIQUES APPLIED:

Whenever a photograph is taken, it always gives a two dimensional view of the particular object. So, if a wound photograph is taken, it will give the position, as well as length and breadth of the wound but cannot display the depth of the wound. So for determination of the depth, a three dimensional view of the wound is essential to understand the actual dimensions.

So, in Virtopsy, there is combination of the technologies of medical imaging techniques as well as other technologies used in other field of science.

- 3-D surface scan used in the automobile designing is used to map the exterior of the body. It gives and documents the three dimensional image of the body surface area in details.
- Multi-slice computed tomography (MSCT) and
- Magnetic resonance imaging (MRI) – which visualizes the interior of the body for collection of all the data in details in regards of condition of different organs. One can examine the part of the body slice by slice in different planes according to the requirement of the situation.

Apart from these, using the magnetic resonance imaging spectroscopy, time since death can also be estimated by measuring metabolites in the brain, emerging during post-mortem decomposition. The samples for histopathological examination if required can be collected more precisely using CT guided needle biopsy. Postmortem angiography is used to visualise the cardiovascular system.

BENEFITS OF VIRTOPSY

- It can be done in highly infected dead bodies, or those with radioactive exposure.
- The dissection of body is minimal, thus providing a more humanitarian approach.
- It is preferred by family members due to its non-invasive nature.
- It saves time and data, which can be stored indefinitely.
- Opinions are more observer-independent and less subjective.
- It can be used to complement standard autopsies and increase the quality of autopsies.
- It permits additional analysis on the same body by other forensic pathologists, i.e., should allegations creep up in the future, second or third opinions can be sought even years later.
- Visualization tools increase the quality and efficiency of forensic methods.
- Infections and health hazards for forensic experts can be reduced.
- Unlike a traditional autopsy, a virtopsy does not destroy the human tissues.
- This can be an important tool in medical teaching.
- The developers of the virtopsy method do not envision the procedure as a replacement for traditional autopsy but as a tool to be used in cases where dissection of the body is not feasible or where forensic evidence is particularly hard to visualize.

SUMMARY:

So, to sum up, virtopsy is a recent advance in the field of investigation in to the cause of death which has many advantages over the conventional autopsy as well as many disadvantages.

DISCUSSION:

Virtual autopsy should replace the conventional method of post-mortem examination. The mental anguish suffered by relatives of the deceased due to mutilation of the corpse can be prevented by virtual autopsy.

It should be provided to at least district headquarters of every state or should be at least done in all 29 states of the country.

The conventional post-mortem method is not the proper dignified way, and is violation of human rights; so human right activists should raise their voice on this pertinent issue to the government.

Virtual autopsy provides a ready-to-compare and reference data whenever the need arises; as post-mortem report is in a digital form, there are less chances of manipulation of data.

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