

“Forensic Radiology in India: Current trends”

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Abstract:

Forensic medicine is a wide subject concerning with legal aspects, consisting of various branches like forensic radiology, forensic pathology, forensic odontology etc. Forensic radiology is one of the integral branch of forensic medicine. Forensic radiology plays an important role in various criminal investigations which are helpful in determination of identity, evaluation of different injuries, various criminal and civil cases etc. This article reviews different important and useful aspects of radiology in relation with forensic medicine. Radiological imaging plays a vital role in forensic medicine in many intersections identity, injury and postmortem examination. The virtual autopsy will may become one of the important modality in the postmortem examination in future.

Keywords: Forensic radiology, Virtual autopsy.

Keynotes: Applications of radiology in forensic medicine.

Introduction: Forensic medicine is a wide subject concerning with legal aspects, consisting of various branches like forensic radiology, forensic pathology, forensic odontology etc.

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of forensic medicine. Forensic radiology plays an important role in various criminal investigations which are helpful in determination of identity, evaluation of different injuries, various Criminal and civil cases etc. This article reviews different important and useful aspects of radiology in relation with Forensic Medicine.

The proper communication of the Forensic dept. and Radiology dept. both can help to solve various sequels in certain genuine cases. The various modalities of radiology like X-rays, CT, MRI, and ultrasonography etc. can be used depending on various forms of cases and their requirements in routine investigations as well as

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confirmation of various results regarding medicolegal cases, death reports etc.

Historical aspects:

Wilhelm Conrad Roentgen created revolution in the medical field by discovering the x-rays in the 19th century.¹ Since then radiology came in front in playing the vital role in medical science. Forensic medicine deals with legal aspects of medical science. X-rays, CT, and MRI act as important documentary evidences in court in certain cases of conflict where these evidences plays prime role in analyzing as well as confirming the status of that particular matter in the eye of documentary evidence.

Scope of Forensic Radiology:

1. The various radiological techniques are widely used in post mortem-autopsy examination as well as clinical forensic medicine. Radiology is usually implemented after external examination and prior to the dissection. Foreign bodies like bullets can be visualized on X-rays.
2. These foreign bodies can migrate from entry site, so whole body radiological examination is advocated.
3. X-rays are helpful in detecting pathological conditions like pnuemothorax, air embolism and pathological fractures.²
4. Forensic Radiology is used in identity, injury cases, and postmortem examination. Now a day it is also used in virtual autopsy and research purposes.
5. Radiology is helpful in determination of identity of decomposed and mutilated bodies in following ways.³
6. Radiographs of the teeth and joints for age estimation, radiographs of pelvis, chest for sex determination and radiographs of extremities for any implant.
7. Fractures are easily detected on X-rays. In child abuse cases fractures are usually diphyseal spiral, oblique or transverse. Multiple rib fractures, bucket handle fractures of metaphysic are important diagnostic signs of child abuse. Cranial fractures are linear, unilateral and associated with sub-archnoid haemorrhages.⁴
8. In firearm injury cases radiology plays significant role. It helps in localization of bullet, caliber of bullet, direction and type of weapon.

Postmortem Examination and Virtual autopsy:

Nowadays virtual autopsy is in phase of more popular in European countries. Forensic Medicine and Radiology departments of The University of Bern's Institute, has combined the various forms of latest imaginary technologies with forensic science to provide bloodless, minimum invasive method for accidental and homicidal deaths.

Application of digital radiological techniques in Forensic Medicine.

- a) Application of multislice C T, M R I, 3-dimentionaal techniques .
- b) Geometric presentation of body surface.
- c) Detection of biochemical profile measurement by M R spectroscopy.

It will never the replacement of manual autopsy but will be additive modality for postmortem examination. In india , there are many obstacles like its acceptance by judiciary, economical burden and one important thing attitude.

Smuggling: Smugglers are also called as 'body packers'. They transport illegal drugs across borders in specially devised packages hidden in their rectum, vagina, or alimentary canal. Cocaine and heroin, usually transported in alimentary tract. The packaging material is of latex like condoms, fingers of surgical gloves. On X-rays these material appears round foreign bodies outlined by thin, bow shaped air shadows.⁵

Art forgeries: Radiography used to detect fraud and forgeries in art world. The techniques used are X-ray fluorescence, stereo radiography etc.⁶

Education and research: Forensic Radiology has wide scope in Education & Research. In India forensic radiologist concept is on the way to rise. Many projects related to forensic radiology such as age determination, postmortem examination and injury can be implement for educational and research purposes.

Important issues related to

Radiography:

Record keeping:

Radiographs are property of hospital but patient can have access to it. Institutional medical record policy gives guidelines for maintenance and safe custody of medical records.

- a) For simple medical cases medical record should be kept for at least three yrs.

- b) In complex cases medical record should be kept up to 5 yrs.
- c) In case of criminal prosecution record keeping is required even for longer time. (Section 29 of PNDT act 1994)⁷

Expert Witness:

Expert testimony may be required in civil cases of negligence, as well as in criminal cases. Court always depends on expert witnesses for their scientific knowledge. In courtroom, expert witness should explain the radiological findings in simple language. The opposite lawyer may ask abusing questions to the expert, but expert should remain calm and maintain professional attitude.⁸

Knowledge update by Forensic Experts: There is also need to update knowledge by our experts related to different technologies in radiology. Over the years, the general trend has been to seek specialist advice even for minor aspects, now there should be change in the attitude of our forensic experts in India.⁹

Extensive development and growth of Information technology has made vast changes in recent years in medical education system in India at both the teaching level as well as research level.¹⁰ Similar changes in radiology practice has also been occurred.

Conclusion:

After discovery of X-rays, radiology became integral part of forensic medicine which brings a lot changes in application of these different radiological techniques in developed countries.

Radiological imaging plays a vital role in forensic medicine in many intersections identity, injury and postmortem examination. The virtual autopsy will may become one of the important modality in the postmortem examination in future.

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