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## CASE STUDY

### AUTOPSY DONE ON SKELETAL REMAINS OF A FIREARM VICTIM

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#### ABSTRACT

**Background:** According to Bichat, there are three modes of death, depending upon whether death begins in one or the other of the three systems (circulatory), (respiratory) or (nervous system) irrespective of what the remote cause of death may be. These modes are:

(1) Syncope (2) Asphyxia (3) Coma

**Case Report:** Putrefied remains and partially skeletonized body of a male came to the Department of Forensic Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi in March 2018 for the purpose of identification and to determine the cause of death. Three bones were retained and cleaned of adhering tissue debris. The putrefied remains were estimated to be of a male aged 21-24 years with a gutter fracture along with linear fracture of 4 cm and petrous part of the temporal bone was found to be missing. The most likely cause of death was opined to be coma as a result of head injury caused by firearm. Time since death was estimated to be more than four weeks based on the ambient temperature, site of disposal of body, entomology and semi-skeletonized condition of the body.

**Conclusion:** The case has been reported in the view of the fact that a highly putrefied body with unknown cause of death came to us for the purpose of identification, opinion about cause of death and time since death turns out to be of a male having bullet injury in skull and a case of possible homicide. Hence, thorough autopsy is recommended as negligence leads to obscure autopsy.

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## INTRODUCTION

The cause of death is the disease or injury responsible for starting the sequence of events, which are brief or prolonged and which produce death (Narayan-Reddy, 2012). Several surveys in various countries have shown that in case where a doctor offers a cause of death without the benefit of autopsy findings, the error rate is of the order of 25-50%, even in hospital findings, thus the importance of autopsy in determining the cause of death is undoubtable. If the autopsy is not carried out properly it may fail to reveal the cause of death, this is called obscure autopsy (Vij, 2014). Due to obscure autopsies there may arise a need of second autopsy. The cause of death in some cases gives direct link of manner of death. If death occurs exclusively by injury or is hastened due to injury in a person suffering from natural disease, the manner of death is unnatural or violent. Violence may be suicidal, homicidal, accidental or of undetermined and unexplained origin (Narayan-Reddy, 2012).

It is duty of forensic expert to provide a right direction to the investigation, especially in case of suspicious deaths, so that a certain conclusion may be derived. In cases where a homicide has to be proved the evidences should have solid evidential value to prove the crime.

### Case Report

Putrefied and partially skeletonised body came to the Department of Forensic Medicine, Institute of Medical Sciences, BHU Varanasi on 1st April 2018. The information given by the police was as mentioned below: The body was dug out of grave. After killing the person the body was hidden in bushes for 2 days and was then buried. The person had been missing from 25.02.2018. A missing person report had been filed on 9.03.2018. The body was recovered on 29.03.2018 and then was sent to MAU for post-mortem examination. The autopsy turned out to be obscure and cause of death could not be determined. The body was in a partially skeletonised state and a trouser, a lower and a shirt was recovered. The putrefied remains were sent for a second autopsy to Institute of Medical Sciences, BHU. The remains were sent to department for identification and to determine cause of death as well as time since death.

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Photograph 1. FEMUR: With the help of femur stature was calculated



Photograph 6. Femur, Pelvis, Skull and Mandible; soft tissues can be seen adhered to femur and pelvis



Photograph 2. Pelvis: Features in pelvis lead to sex determination



Photograph 3. Gutter fracture of skull with bevelling of inner table



Photograph 4. Mandible: with wisdom tooth erupted and prominent jaw line



Photograph 5. Fixation of the fracture from two anatomical landmarks i.e, sagittal and lambdoid suture

**Autopsy Examination**

India is a tropical country and in Varanasi temperature in month of February and March is not very high, the temperature being 32+/-5. The body was recovered from a grave so there is high probability that the rate of decay was retarded. The body was emitting foul odour suggesting advance decomposition. Presence of mature maggots and liquefied condition of tissues and organs especially brain suggest that the body was more than 4 weeks old. After examining the three bones were preserved i.e.

**Skull with mandible 2. Femur 3. Pelvis**

**Sex was estimated to be MALE**

**Findings indicating sex**

Skull along with mandible	<ul style="list-style-type: none"> <li>• All eminences were prominent except frontal and parietal eminences</li> <li>• Glabella, zygomatic arc and digastric groove were prominent</li> <li>• Occipital protuberance was more prominent</li> <li>• Mandible was 'u' shaped</li> </ul>
Pelvis	<ul style="list-style-type: none"> <li>• Obturator foramen was oval</li> <li>• Sciatic notch index=148.6cm</li> <li>• Ischiopubic index=90.9 cm</li> </ul>

**Age was determined to be between 21 to 24 years**

**Findings indicating age**

Skull	<ul style="list-style-type: none"> <li>• Presence of wisdom tooth in lower quadrant of jaw(calcification of tooth completes by 18 - 25years)</li> <li>• Fusion of sagittal suture had not started in the inner table which indicated that age was less than 25 years</li> <li>• Basi- sphenoid along with basi-occiput had fused indicating the age to be above 21 years.</li> </ul>
Pelvis	<ul style="list-style-type: none"> <li>• Iliac crest, pubis and ischium had united indicating that the age was 21 or above</li> </ul>

**Estimation of Stature:** Length of femur=44.5 cm. Hence, the total length of body will be=(44.5\*3.70) +2.5cm for soft tissues which is equal to 167.5cm (approx.)

**Estimation of cause of death:** Coma as a result of head injury caused by firearm

- A gutter fracture of dimension 1.4cm length and 1cm breadth due to bullet entrance wound caused by firearm weapon was present over right parietal

eminence which was 2.5cm lateral to sagittal suture and 4.5 cm above the lambdoid suture.

- Outer table of the skull bone was having clear cut margin with bevelling of inner table.
- Linear fracture of size 4cm was present over posterior part of left temporal bone on squamous part and petrous part of temporal bone was missing.

#### The examination was carried out in three parts

- The digging out of the body of its grave was studied through the videography obtained. This helped in determining the Time Since Death as the body was in colliquative liquefaction state and was infested by maggots.
- After the body was brought for autopsy and bones were retained the cause of death was determined by examining the skull and bullet injury present in the skull
- After cleaning of the bones, sutures in the skull and other features could be clearly demonstrated leading to establishment of age and sex.

## DISCUSSION

The advancement of putrefaction depends upon many factors and varies according to external and internal factors. External factors include humidity, clothing, manner of burial, temperature and internal factors include sex, age, condition of body, cause of death etc (6). The body was in open for two days before being buried. For the first two days the decomposition was at its maximum rate as per Casper Dictums rule. After being buried this decomposition rate got retarded which lead to delay in putrefaction. If the body is rotting before burial then, although the process slows down, it will still severely damage the corpse, as enzymatic and bacterial growth have had initial encouragement from a higher ambient temperature and free access of air, thereby producing conditions in which secondary invaders including anaerobes can continue their work in a good culture medium that is already partly decomposed state of corpse (2). Stage of decomposition which was liquefaction of organs and soft tissues, presence of adult maggots, manner of burial and temperature indicate the post-mortem interval to be more than 4 weeks. Gutter fractures are formed when part of thickness of the bone is removed so as to form a gutter, e.g., in oblique bullet wounds. They are usually accompanied by irregular, depressed fracture of the inner table of skull. The dura mater and brain may be torn (1). The bullet had made a clean hole in skull and was lodged in the brain. This lead to head injury. Head injury is defined by the National Advisory Neurological Disease and Stroke Council, "as a morbid state, resulting from gross or subtle structural changes in the scalp, skull, and/or the contents of skull, produced by mechanical force. To be complete, however, it should take into account that impact responsible for injury need not be applied directly to head (3).

A rate of 38-43% is observed in mortality due to traumatic head injury. Bevelling is observed in inner table of skull in case of entry wound of bullet.

## Conclusion

The case had been reported in view of the fact that a putrefied and partially skeletonized body had been sent to us for the purpose of detection of cause of death. This was second autopsy done on the remains as the first autopsy turned out to be obscure. The cause of death revealed was coma due to firearm injury to head. If an autopsy is not carried out properly it will fail to reveal the vital information necessary to carry out further investigation and the post mortem examination will not serve any purpose or may mislead the case. It is necessary that all the protocols must be followed and autopsies should be performed carefully.

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## Conflict of interest: Nil

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**Ethical Clearance:** The present study was approved by "Institutional Ethical Committee" of Institute Of Medical Sciences, Banaras Hindu University, Varanasi. All the information has been taken under consideration of medical ethical committee.

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