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The Grinding Effect and the Forceps Mystery; the Corpse Carrying a New Challenge: A Case Report

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ABSTRACT

A decomposed body passes through various taphonomic changes of all permutations and combinations till its recovery. A vast number of these post mortem changes are easily explainable on the scientific grounds, some rest on the circumstantial evidence while some rare and nowhere mentioned findings prove to be mysterious, almost unexplainable on any ground till time they form the basis of a new theory. These cases pose a great challenge to the forensic pathologists who perform autopsy on these decomposed bodies in their day to day practice. A further rise of problem occurs when such bodies are unidentified, recovered from remote areas and without any available helpful history. The authors confronted a similar case in whom the decomposed body recovered from a water canal depicted a peculiar post mortem artefact consequent to prolonged grinding over the skull and a complete well embedded surgical forceps was recovered from the right leg of the body. The case leading to a long exhausting discussion and perhaps best possible conclusion, along with the photographs is described here.

Keywords: Decomposition, Grinding effect, Forceps, Lacerated wound, Identification, Artefact

Introduction

It is common for forensic anthropologists and pathologists to be confronted in their professional practice with bodies or human remains states of preservation and/or decay that are not entirely to their liking, such states being many times outside their knowledge and experience. It is not uncommon for the decomposed bodies to carry a number of striking findings with them that create a world of challenges for the forensic experts in their routine autopsy practices. For this reason, it is fundamental that the pathologist has prior knowledge of the various alterations that take place postmortem (the object of the study of forensics called taphonomy). These alterations particularly affect the soft tissues, and are decisive not only for the time taken for skeletonization to occur, but also for the state of preservation of the cadaver.[1] Between a fresh cadaver and a heap of loose bones, there are a series of stages of decomposition and/or preservation that may occur when the environmental conditions are right. Various authors have drawn attention to the need to understand this process.[2, 3]

A cadaver can raise a number of questions, which can be answered by examination. In addition, cadavers may be found in many different situations (in gardens, buildings, ruins, secluded spots, garages, cars, under water, in single or multiple/mass graves, and so on) and states (complete individuals or only parts, naked, or covered). They may also be found in different stages of decomposition.[4] A number of artefacts are produced in the postmortem period which are significantly contributed by the circumstances and situations in which the body is found and carry special significance in decomposed bodies when their interpretation may be a totally new challenge to the autopsy surgeons. These artefacts are more commonly encountered in drowned decomposed bodies that are usually discovered after they have travelled miles of journey, with all sorts of common and uncommon alterations over them.

A similar case of decomposed body was brought to the dep't of Forensic Medicine, Pt. B.D. Sharma PGIMS, Rohtak, Haryana (India) with the findings of grinding effect in a peculiar patterned fashion over the skull. Along with this the recovery of a completely embedded whole surgical forceps from the right leg turned out to be the most fascinating finding.

Case History

An unknown/unidentified decomposed body was referred to the deptt. of forensic medicine, Pt. B.D. Sharma PGIMS, Rohtak, Haryana (INDIA) during the month of November 2013 in mild winter season. Purportedly the body was recovered from a water canal almost full of speedily flowing water and the body was found entangled in a mass of weeds over its bank. Nothing significant was found on perusal of crime scene report and photographs. The apparent cause of death as per investigation officer was 'due to drowning in water'. The findings of decomposition on external examination included bloated unidentifiable facial features, distended chest, abdomen, penis and scrotum (figure 1), gnawing effects over the scalp (with considerable portion of scalp missing), hands (figure 3), around right knee, left thigh and knee region with bones exposed (figure 2), both feet (figure 4), degloving of the hands and feet and the foul smell of body. Body hair including scalp hair were peeled off. Further examination of the body emerged out with two surprising findings that lead to head throbbing discussion between the pathologists:

1. The scalp was missing over the considerable portion of frontal-parietel region (figure 5). An area of size 10x8 cm chiefly over the frontal and adjoining parietal region of skull across the

bregma was found to be converted into a slanting ramp-shaped structure (figure 6). The portion of the skull from the centre of this defect was missing over an area of 4x3 cm with the dura mater being exposed and slightly emerging out through the defect. The defect was constituted by a muddy brown collar of width 4 cm almost all around with minute particles of mud and silt impacted in this collar (figure 5,6,7,8). However no evidence of injury in the scalp or skull like like haemorrhage or features of a typical fracture of the skull at the defect site was noted. This defect was on account of the continuous grinding of this head region with the solid objects found in the water canals like large fix stones, rocks, hard banks etc. leading to gradual rubbing off of the skull matter and is consequent to the entanglement of the body and continuous grinding of this region of head for a prolonged period that lead to the creation of this large defect. Strong water currents significantly speed up the formation of such defects. Thus such a body undergoes a 'flowing-striking-entanglement-grinding' sort of repetitive vicious cycle in the flowing water, as per dependent and protuberant bony portion of the body, which leads to such grinding effects over the parts of the body. Such grinding effects may also be observed over the shoulders, anterior aspect of knees, hands, feet and other bony protuberant body portions. Thus, it was a postmortem artefact and was labeled to be the grinding effect over the skull.

2. As already described above, gnawing effects were present around the right knee region with the surrounding soft tissues exposed. On closer inspection of the lower aspect of the right knee and adjoining leg region some shining metallic structure that was protruding out through the defect gained the attention (figure 9). It was appearing to be some metallic prong like structure. Further dissection along its plane turned out to be a surprising finding. A complete surgical toothed forceps was found impacted in a slightly oblique manner in the right upper leg region (figure 10,11)). No overlying scar or ecchymoses in the surrounding decomposed tissues was appreciable grossly.

- A lacerated wound of size 4.5x2 cm, situated transversely, was found over the occipital region of scalp near the nape of the neck (figure 12). The skull was healthy and intact (excluding the grinding effect described). The dura mater was decomposed. The brain was putrefied pasty grayish with slight bloody tinge (figure 13).

The portion of skin and soft tissues surrounding the forceps region were preserved for histopathology for any vital tissue reaction. The histopathology report read the specimen to be autolysed on account of marked decomposition of tissues. The skeletal findings of the case were typical of a middle aged individual. The cause of death was kept pending awaiting the results of diatom test and chemical examiner viscera report. The recovered forceps was preserved for identification and any trace evidence. The post mortem interval was opined to be 1 to 2 weeks.

Discussion

The decomposed bodies are well known for miraculous findings that sometimes pose a great challenge to the forensic pathologist regarding their possible origin and explanations. The challenge turns out to be even more problematic when such bodies are unknown/unidentified due to lack of any helpful history. Whether such findings are gnawing effects, variable predator activity, interpretation of antemortem and post mortem wounds, various discolorations of the body tissues produced due to decomposition, grinding effects and recovery of unusual objects from the body (as

in the present case), all such phenomenon are a questionnaire for the forensic experts who struggle with such findings in their day to day job. The best way of possible explanation in such cases is a careful autopsy along with ruling out other lesser probabilities step by step and to arrive at the best possible. The present case justifies an example of the similar one. The findings of the aforesaid grinding effect over the skull, recovery of forceps from the right leg and the lacerated wound over the occipital region of the scalp may be discussed in the light of the possible causes as below:

1. Grinding effect over the skull:

- Possibilities with comments:

1. Road side involvements:

- The skull damage may be caused by dragging a person, dead or alive, tied to a motor vehicle with the head hanging down and along a tarmac-ed or concrete surfaced road.
- Drivers (drunk driving) may knock down pedestrians who may then get caught on the under surface of the car by their clothing and dragged a fair distance.
- Police may drag suspected insurgents tied to vehicles resulting in the same sort of injuries.

Comments: The possibilities of all these facts may be ruled out on the basis of the absence of other significant injuries like fractures of limb bones, ribs, ecchymoses of muscles and possibly others in the present case. Such violent dragging will lead to other appreciable injuries too. Also such dragging will lead to at least some sort of typical fracture(s) of the skull and not just the rubbing off of the skull substance as in the present case. Furthermore why anyone would kill/torture the person in such a manner and then dispose off the dead body in a water canal which in itself is an unusual way of concealing these sort of crimes. However prolonged dragging and striking of the body protuberant surfaces (like skull in the present case) along the bottom surface of water resources may justify the same which may be on account of strong water currents or by marine fauna.

1. Old healed fracture skull with callus formation/previous neurosurgical intervention:

- The deceased may have an old fracture of the skull or possibly any old neurosurgical intervention followed by the formation of callus type of structure at the site.

Comments: It raises question on the possibility of survival of the person with such finding. Such a large defect over the skull with duramater exposed in itself is incompatible with the survival. Furthermore the shape of the so described grinding effect is peculiarly slanting with rubbing off of the skull material with consequent creation of the central hole. Possibility of callus formation or any neurosurgical procedure in such a pattern cannot be justified.

1. Complete surgical forceps in the right leg:

- Possibilities with comments:

1. Stab wound during an assault:

Comments: Why anyone would stab from the blunt base side of the forceps? Also it is unusual to find a stab wound over the leg (an unusual location for stabbing) and none anywhere else. Also the

surgical forceps is not a frequently home available instrument (for stabbing) to a common man. So has it been done by a doctor?????? Whatever, the stabbing chances are one in billion, though an effort had been made through histopathological examination for any vital tissue reaction, that has shown the tissues surrounding forceps region to be autolysed.

1. Impacted on firm strike of the knee to an erected forceps in water canal:

Comments: The option may be considered in the list but answer to it lies more in the common sense than the scientific discussion. Not possible.

1. Medical negligence:

Comments: The only possibility left. But it is unusual to leave a complete forceps in the leg (possibly during an orthopaedic surgery). Negligence on account of leaving the surgical instruments and swabs usually occurs during thoracic and abdominal surgeries. But leaving the complete surgical forceps in a body region like leg; will be the fate deciding for that surgeon. Still amongst all, there is relatively greater possibility of this one.

1. Lacerated wound over the occipital region of scalp:

Comments: The manner of this only wound cannot be commented upon as the same may be inflicted before (by someone else), during (on striking head to hard bank of canal) and after (striking of head at the bottom surface) fall into the water. Any corroboration of this injury with the above two findings, is a matter of a rare chance.

Conclusion

To conclude is more to discuss all possibilities of the above two findings in the present case. Meticulous autopsy pays and tells the truth with the most miraculous organ, is a well said dictum. But certain questions may remain unanswered even after performing a careful autopsy. The mystery of the present case necessitates the prompt identification of such cases so that the real keys to these sorts of locks may be obtained and a better opinion may be framed considering the circumstances of the case. The described case has not gained any progress till date.

Suggestions

The experts and readers are requested to send their valuable comments and suggestions in the present case to the corresponding author. Every suggestion, every opinion is important to the authors.



Figure 1: The Decomposed Body



Figure 2: Gnawing effects around left thigh and knee with femur exposed



Figure 3: Gnawing effects over right hand



Figure 4: Gnawing effects over right foot



Figure 5: Grinding effect over the skull. Prolonged grinding over skull leading to impression and defect over the skull. The portion of central missing skull and dura mater exposed through the same. The surrounded collar of grinding with impacted mud and silt particles inside. Also note the zone of healthy skull separating the central missing portion from this collar.



Figure 6: Conversion of the frontal region of skull in a rounded slanting ramp-shaped structure (*arrow*) with central missing portion of skull, on account of prolonged grinding (note the shape, pattern and slant).



Figure 7: Grinding effect over the skull (vault removed)

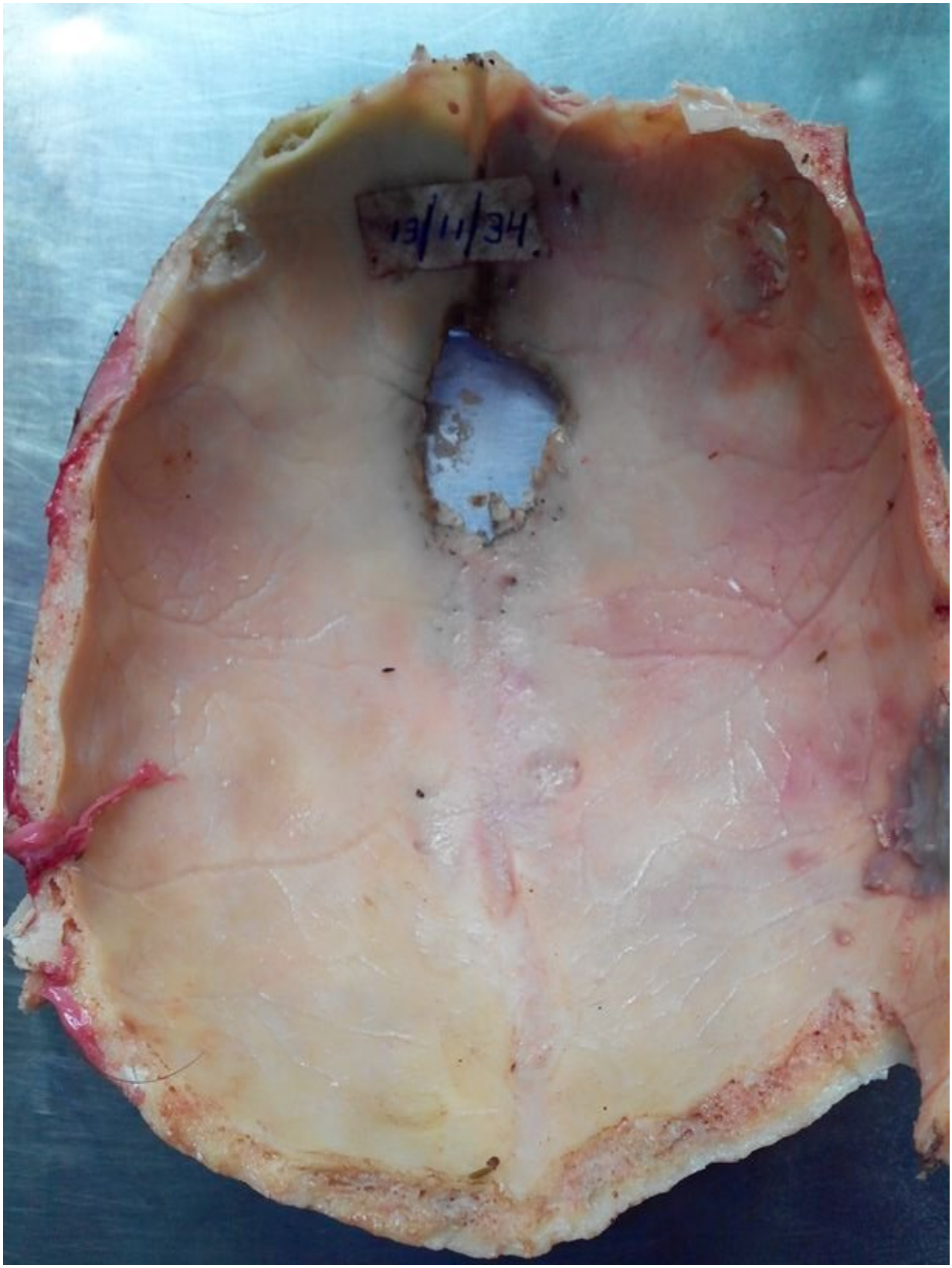


Figure 8: Central missing portion of skull (inside) from grinded area. Note the ragged, rough and rubbed off margins.



Figure 9: Clearly visible tip of prong of the surgical forceps (*arrow*) in the right knee



Figure 10: Forceps further traced on dissection



Figure 11: Complete forceps recovered (right leg) on dissection



Figure 12: Lacerated wound over occipital region of scalp



Figure 13: Putrefied pasty greyish brain matter

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