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Cranial injury caused by penetrating non-missile foreign body: An autopsy case

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SUMMARY
Presented case was 32-year-old male marble worker, who underwent industrial accident at workplace. On gross physical examination; on forehead region round skin wound in 0.9 cm diameter was detected, radiological examination showed the image of metallic object. in the skull cavity. Brain dissection showed obvious brain injury, haemorrahge explaining the pattern of injury caused by the metallic body's path, from left frontal lobe to the left cerebellar hemisphere was identified. We presented rare case of penetrating injury of the cranial region caused by non-missile foreign body.

Keywords: cranial injury – non-missile foreign body – autopsy

Poranění hlavy způsobené proniknutím cizího tělesa: Případ z pitvy

SOUHRN
Prezentován případ 32 -letého muže, dělníka pracujícího s mramorem, kterého postihla nepředvídatelná nehoda při hrubé tělesné práci : V čelní krajině byla zjištěna v kůži okrouhlá rána 0,9 cm v průměru. RTG vyšetření ukázalo obraz kovového objektu v dutině lebeční. Při pitvě bylo prokázáno zřetelné poranění mozku, krvácení vysvětlující vzhled poranění, které bylo způsobeno průnikem kovového tělesa z levého čelního laloku do levé mozečkové hemisféry, kde bylo těleso identifikováno.
Je prezentován řídký případ pronikajícího ne-střelného poranění v oblasti hlavy, způsobeného cizím tělesem.

Klíčová slova: kraniální poranění –cizí těleso (ne střelného původu) – pitva

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Penetrating non-missile foreign body injuries of the cranial region are rare events, and few cases are reported in the medical literature (1–4). Researchers reported variety of interesting and different objects (1–6), detected in injured cases presented after violent attacks, industrial accidents (2). Our goal was to discuss the rare case of penetrating non-missile foreign body cranial injury in medico legal aspect.

CASE REPORT

Presented case was 32-year-old male marble worker who underwent industrial accident at workplace. According to information provided by coworkers in marble-cutting workshop, during the process of marble cutting, a worker suddenly felt down, bleeding wound on his forehead was detected. The crime scene investigation and prosecution document determined that worker died during transport to the emergency service. During investigation of marble-cutting workplace, a marble-cutting machine assembly with hollow steel cylindrical section, has been found to be broken, and autopsy was mandated after examination of the prosecutor. The deceased was 185 cm tall, 90 kg in weight On gross physical examination;on forehead region, circular, smooth edged skin wound in 0.9 cm diameter was detected (Figure 1), radiological examination showed the image of metallic object. in the skull cavity. Macroscopic autopsy examination revealed 1 cm in diameter, round shaped bone defect with smooth edges in the medial part of the frontal bone, brain, the cerebellum and brainstem weight 1500 gr. Brain dissection revealed brain damage on metailc object trajectory. The serial sections showed obvious brain injury, haemorrahge explaining the pattern of injury caused by the metallic body's path, from left frontal lobe to the left cerebellar hemisphere was identified. On histopathological examination of central nervous system, widespread subarachnoid and intraparancymal hemorrhage was detected. Examination of the skull bones exposed 0.9 cm in diameter, round shaped, smooth edged bone defect on frontal bone, fracture line without dislocation involving the skul base of the left middle fossa skull base, and extending through the sella turcica. Cylindrical shaped steel metallic object in 0.9 cm diameter with hole was found in the skull base of the left occipital region (Figure 2, 3). Analysis of the organ specimens revealed none of the substances screened for in systematic toxicological methods. Death was reported as traumatic skull frakture and brain injury due to penetrating non-missile foreign body.

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Figure 1. Circular skin wound

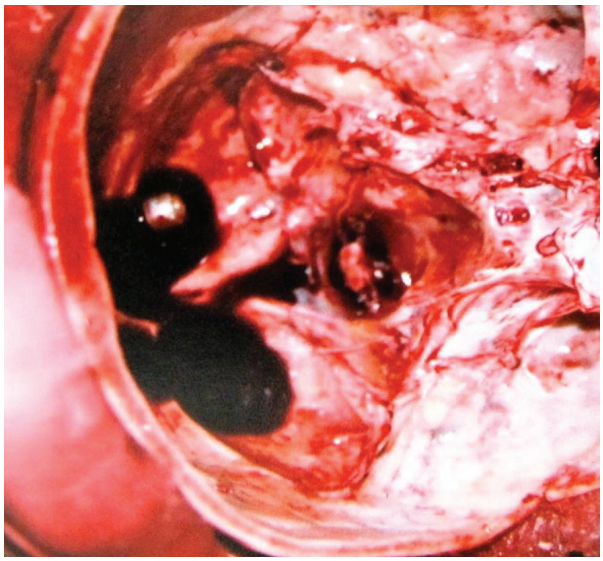


Figure 2. Cylindrical metallic object left occipital region



Figure 3. Metallic object with hole

DISCUSSION

Penetrating injuries of the head region caused by non-missile foreign body were rarely reported among the civilian population (1–4). In the literature as the similar to the reported case, injuries occurring after industrial accidents were emphasized as the commonest reason and often detected in the form of transorbital injury (2,3,4). Researchers identified variety of different non-missile foreign objects like metallic rod (1), nail (2), bicycle brake handle (3), spherical bolt (5), and paint brush (6) in different cases. It was stressed that in the cases with skin wounds as in the presented, with a regular shape could lead to misdiagnosis, with bullet wounds, different metalic or non-metallic foreign body injuries, for these reason clinical and autopsy findings need to be interpreted with extreme caution to prevent under diagnosis (3). Detailed, object, type of injury and crime scene investigation were emphasized to be essential in terms of diagnostic approach (4,7), foreign body injuries with cranial penetration were often believed to be caused by the high-velocity objects, whereas only with inspection of the external lesions, injuries occurring with low-speed objects penetration were easily misdiagnosed. Studies revealed that in some patients with metallic foreign body penetrating cranial injury due to different ballistic properties of these objects, injuries were described at various levels, from extremely light neurologic deficits and minor anatomical damage to lethal injuries (5.6). Gökćek et al. reported high mortality rates in early injury period among cases similar to our cases with intracerebral hemorrhage, brain contusion, and major vascular injuries (2). After careful radiological examinations for determination of the location and shape features of the metallic body, successful craniectomy operations were reported to be effective in cases with minor brain damages (1,2,4,7). Depending on clinical suspicion, early detection of foreign body was claimed to be extremely important for planning extraction of foreign body, besides delayed intervention of emergency surgery was associated with 53% mortality in some cases (2). In cause of detecting penetrating wounds of the cranial region, detailed examination of the crime scene and deceased person should be performed, also it should be noted that cranial penetration may occur with various non-missile foreign objects with different characteristics.

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