

Case report

A rare case of suicide by gunshot with nasal entry assessed by classical autopsy, post-mortem computed tomography (PMCT) and post-mortem magnetic resonance imaging (PMMR)

S.N. Abdul Rashid^{a,b,c,*}, R.M. Martinez^a, G. Ampanozi^a, M.J. Thali^a, C. Bartsch^a

^a Institute of Forensic Medicine, Virtopsy, University of Zurich, Winterthurerstrasse 190/52, CH 8057 Zurich, Switzerland

^b Department of Radiology, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia (UPM), Serdang, Malaysia

^c National Institute of Forensic Medicine (IPFN), Hospital Kuala Lumpur, Malaysia

ARTICLE INFO

Article history:

Received 23 July 2012

Received in revised form

18 March 2013

Accepted 19 March 2013

Keywords:

Suicide

Gunshot

Post-mortem CT

Post-mortem MRI

Autopsy

ABSTRACT

Determination of the manner of death in cases of gunshot injuries can be very challenging. The weapon, gunshot residues, blood spatters, fingerprints and DNA evidence are crucial in solving these cases. The presence of an entry wound at an unusual site could create interpretation problems. This is complicated further by atypical wound morphology. It is a well-known fact that the right temporal, mouth, forehead, submental and parietal regions are the typical entrance wound sites for suicide with firearms to the head. Suicidal shooting through the nose is extremely rare. In cases of suicide by firearms some useful points are the site of entry wound, the direction of the internal projectile path and the circumstances of death. PMCT and PMMR clearly showed the projectile, wound tract and damage to the bones and brain tissues prior to autopsy. PMMR also demonstrated the pyramidal tract edema caused by pressure shock waves from the projectile. This finding was reported in living patients who survived gunshot injuries to the head but has never been reported in PMMR. We demonstrate these points in a case of a suicidal gunshot through the nose assessed by classical autopsy, PMCT and PMMR.

© 2013 Elsevier Ltd. All rights reserved.

1. Introduction

Determination of the manner of death in cases of gunshot injuries to the head can be difficult. Classically, the weapon, gunshot residues, blood spatters, fingerprints and DNA evidence are crucial evidence in investigating and solving these cases. The typical entrance site in firearm suicides to the head are: the right temple (about 67%), followed by the mouth (16%), forehead (7%), left temple (6%), submental (2%), and parietal region (1%) [1]. Suicide by gunshot with nasal entry have been described rarely in literature [2,3].

Post-mortem imaging plays an important role in the diagnosis of gunshot fatalities prior to autopsy. Plain radiographs can be used to document fractures and localize projectiles. However, new technologies such as computed tomography (CT) and magnetic resonance imaging (MRI) are gaining importance in forensic medicine due to their cross sectional and 3D capabilities [14]. CT is superior to MRI in the forensic documentation of osseous injury, while MRI is superior in the documentation of soft tissue injury.

In the clinical setting, CT and MRI are used in the diagnosis and follow-up of patients who survive gunshot injuries. The fact that gunshot head injury leads to deep cerebral lesions, distant from the projectile path has been reported by various authors [4–6,7]. Thiex et al. [8] hypothesize that pressure waves led to the development of brain injury and edema in these areas, thus causing delayed neurological deficit and recovery. MRI of these cases showed low signal changes on T1-weighted (T1W) and high signal changes on fluid attenuated inversion recovery (FLAIR) and T2-weighted (T2W) imaging in the pyramidal tracts and brain stem, which improved over time.

In the following report, we present a rare case of a suicide by gunshot through the nose with classical autopsy, post-mortem computed tomography (PMCT) and post-mortem magnetic resonance (PMMR) findings.

We also demonstrate that pyramidal tract and brain stem edema could also be visualized on PMMR.

2. Case history

A 52-year-old male with a history of depression and was reported missing by his spouse. There was no history of previous suicidal attempt or ideation. The man was found unconscious and

* Corresponding author at: Department of Radiology, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia. Tel.: +60 3 89472511, +60 19 3809380; fax: +60 3 89426957.

E-mail addresses: drsnar72@gmail.com, drsnar72@yahoo.co.uk (S.N. Abdul Rashid).

supine in the forest by a passer-by later that same day. The first inspection at the scene by the paramedic team revealed a wound on the face. While transferring the body, they found a small caliber weapon (Semiautomatic Astra Cub.22 short, 6.35 mm) under the body. The pistol's safety was off, one unfired bullet was found in the chamber and a spent brass casing was found at the scene. He was brought to the emergency department where a CT of the head was performed. CT showed a left subdural hematoma with a metallic foreign body in the left posterior cranial fossa, suspicious for a bullet. No surgery was done as his clinical condition was unstable and he died 8 h later.

The first forensic inspection at the hospital showed an opposable, V-shaped wound over the left nostril with some ragged, blood crusted and dark red to black edges. The nasal wound was the gunshot entry wound based on the circumstances of death and the CT findings. Detection of gunpowder particles at the nasal wound with filter paper sodium rhodizonate test (SRT) technique later confirmed the suspicion of an entry wound. There was no exit wound. Bilateral orbital hematomas and two small fresh abrasions were noted over the right nostril. Small fresh abrasions were also found on the forearms, the hands and on the medial aspect of the right leg. Gunpowder particle testing using SRT technique was positive on both hands. Although there was no suicide note found at the scene, based on the circumstances of death, the investigators strongly suspected that he could be a victim of a suicide by a contact gunshot of the nose.

3. Technical data

The body was transported to our center and 10 h later, a whole body PMCT was performed in an artifact-free body bag (Nangeroni AG, Grenchen, Switzerland) using a dual source helical 128-slice CT (Somatom Definition Flash, Siemens Medical Solution, Forchheim, Germany). This was followed by a PMMR of the head and neck region using a 3.0-Tesla MR scanner (Philips Achieva 3.0 T, DA Best, Netherlands). Primary image review and 3D reconstructions of the skull and neck were carried out on a computer workstation (Sectra PACS Workstation IDS7, Version 12.2.3.297(2010), SWEDEN).

4. Findings

4.1. PMCT

PMCT examination of the skull and neck revealed an entrance gunshot wound in the left nostril. The projectile tract passed through the left nasal channel in the postero-inferior aspect of the left frontal sinus (directed superiorly and posteriorly) and traversed the left frontal lobe (Fig. 1a). Millimetre-sized bone fragments were present along the projectile tract in the area of the left nose and the left frontal lobe. Blood was noted in both the maxillary and ethmoid sinuses. The projectile rebounded (internal ricochet) on the inner table of the left frontal skull and progressed through the left cerebral hemisphere from anterior to posterior (Fig. 1b). No fracture of the left frontal bone could be detected on PMCT. Pneumocephalus was noted in the left frontal region. Left subdural hematoma and cerebral edema caused midline shift to the right. The final position of the projectile was above the left tentorium (Fig. 2a). There was no exit wound noted on PMCT.

4.2. PMMR

The projectile trajectory was noted traversing the left frontal and parietal lobe causing an irregular, cavitory defect in the brain

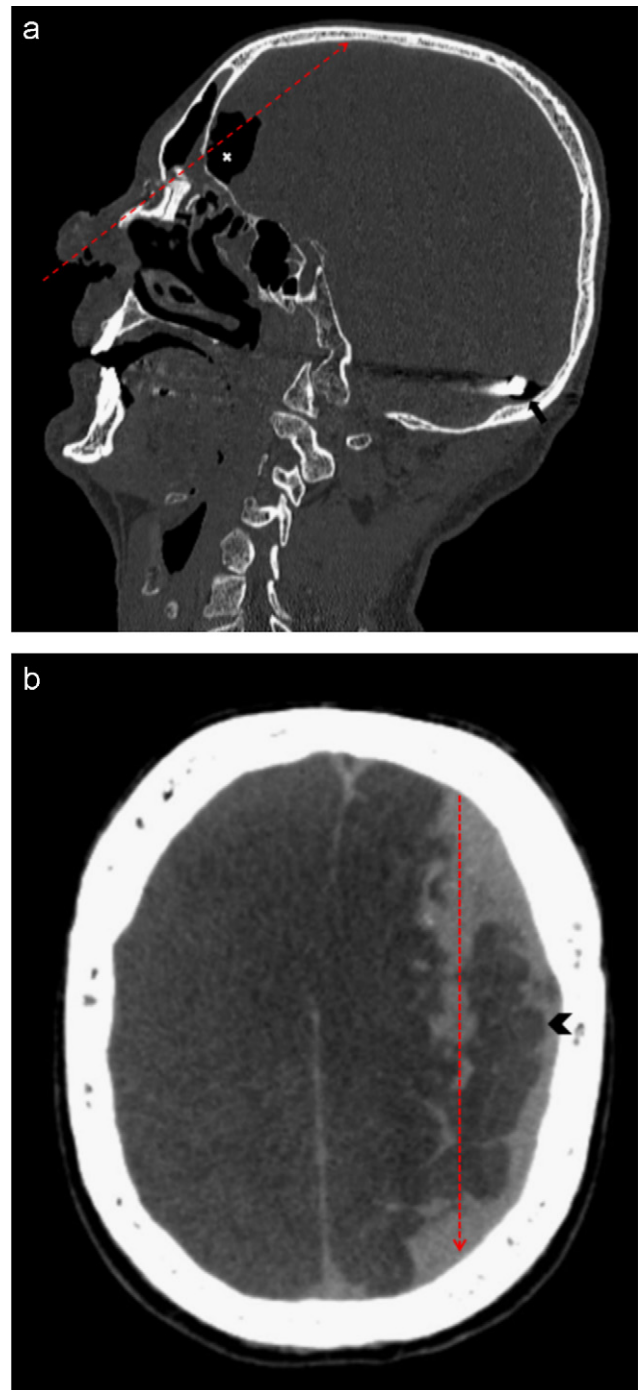


Fig. 1. (a) PMCT images in sagittal with bone window and (b) axial planes with soft tissue window showing the projectile track (dashed red arrow) and the projectile in posterior cranial fossa (black arrow). Note the pneumocephalus as indicated by the white 'x' and the left subdural hematoma (black arrow head) causing midline shift to the right.

tissues which appeared hypointense on both T1W and T2W imaging. There was associated hyperintense signal noted along this tract, seen on both the FLAIR and T2W imaging, in keeping with cortical contusion and edema (Fig. 3a). Both the basal ganglia and thalami displayed high signal on T1W images and low signal on both T2W and FLAIR imaging, in keeping with normal post-mortem changes. Furthermore, focal lesions were also present in the left caudate nucleus, left basal ganglia, left cerebral peduncle and both frontal and temporal lobes, more on the left. These lesions were hypointense on T1W and hyperintense on T2W

Download English Version:

<https://daneshyari.com/en/article/103230>

Download Persian Version:

<https://daneshyari.com/article/103230>

[Daneshyari.com](https://daneshyari.com)