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ORIGINAL ARTICLE

# Postmortem CT and autopsy findings in nine victims of terrorist attack

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**Abstract**

In a foreign country, a religious terrorist group raided a restaurant, using pipe bombs, sharp-edged weapons, and various types of firearms (handguns, submachine guns, and AK-47 assault rifles) loaded with normal and prohibited bullets to kill foreigner customers, some of whom were Italian tourists. Local pathologists performed forensic autopsies on the bodies, but we were asked to perform additional external examinations, postmortem computed tomography (PMCT) scans, and then a second round of complete autopsies on nine victims (5 females and 4 males). Four victims had slash wounds inflicted by sharp-edged weapons, mostly localized in the head and neck. All but two victims had gunshot wounds. Finally, three casualties had injuries caused by the explosion of improvised explosive devices. In all cases, PMCT was a reliable source of information and provided strategic guide during autopsies, helping identify and describe the injuries and thus reconstruct the events. Therefore, in these cases, we suggest integrating the autopsy findings with the postmortem radiological data.

**Keywords** PMCT · Terrorism · Firearm injuries · Slash wounds · IED

## Introduction

In many Western countries, before the spread of domestic terrorism, pathologists' experience of injuries caused by bombs and unusual melee/ranged weapons was limited to war casualties. In many cases, the weapons used by terrorists (and then the injuries that they can cause) are significantly different from those used on the battlefield: they are often homemade, and they are usually designed to maximize the damage they inflict (e.g., firearms are often loaded with bullets prohibited by international treaties).

In the last two decades, explosives and firearms have been the most common and the most lethal kinds of weapons used in terroristic attacks, respectively [1].

Terrorists tend to use improvised explosive devices (IEDs; such as pipe bombs) filled with miscellaneous objects (such as metallic spheres or glass fragments) that can propel many small fragments of different dimensions over a large area when they explode [2, 3]. Explosions can cause death through blast waves (which can reach pressures up to 30,000 times the atmospheric pressure, perforating gas-filled organs, e.g., the lungs and bowels, and tympanic membranes), fragment penetration/blunt traumas (missiles can be propelled considerably faster than the speed of sound), building collapse, and trauma resulting from body transposition [2–5].

Regarding firearms, the severity of gunshot wounds chiefly depends on the kinetic energy of the bullet, which is proportional to the square of its velocity. However, even low- and

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medium-velocity weapons (such as handguns and submachine guns, which fire at less than 300 and 600 m/s, respectively) can be highly disruptive, especially if loaded with particular kinds of ammunition, such as expanding and fragmenting bullets [6, 7].

Because of the complexity of all these injuries, the forensic analysis of terrorism victims requires a comprehensive approach.

Postmortem computed tomography (PMCT) techniques allow the detection, visualization, and description of complex injuries that have medico-legal relevance and, in many cases, the identification of the cause of death [8–15]. In particular, since they can show the skeletal system and major parenchymal alterations and, in particular, foreign bodies, they are frequently used in the forensic analysis of terrorist attack victims [16–18].

We report and correlate the autopsy and PMCT findings in nine victims of a terrorist attack during which explosives, melee weapons and ranged weapons were used. The aim of this paper was to identify the major lesions associated with this kind of fatality and to describe the advantages offered—according to our experience—by a comprehensive approach based on the combination of autopsy and radiologic findings, especially when—as in our cases—classic autopsy has already been performed in the foreign country in which the terrorist event occurred.

## Presentation of the cases

In a country with low socioeconomical development, a religious terrorist group raided a restaurant, using pipe bombs, sharp-edged weapons, and various types of firearms (handguns, submachine guns, and AK-47 assault rifles) loaded with normal and prohibited bullets to kill foreign customers, among whom were nine Italian tourists. After the attack, the police laid siege to the restaurant and exchanged gunfire with the terrorists, killing many of them. Local pathologists performed forensic autopsies on the bodies and embalmed them with a formaldehyde solution, but we were asked to perform external examinations, PMCT scans and then a second round of complete autopsies on the repatriated bodies of the nine Italian victims (5 females and 4 males) (main findings are

**Table 1** The main findings of the second round of autopsies

| Case | Slash (s) and cut (c) wounds | Gunshot wounds | Injuries caused by IED | PMCT/autopsy concordance (firearm/IED injuries) |
|---|---|---|---|---|
| 1 | • Head (s)<br>• Left shoulder (s)<br>• Forearms and hands (s) | Not found | Not found | - |
| 2 | Not found | • Head | Not found | Full |
| 3 | Not found | • Head | • Back<br>• Limbs | Full |
| 4 | • Head (s) | • Head<br>• Left wrist and hand | Not found | Full |
| 5 | • Head (s)<br>• Right forearm (s)<br>• Hands (c)<br>• Thighs (c) | • Head | Not found | Full |
| 6 | • Head (s)<br>• Neck (s)<br>• Right shoulder (s)<br>• Right hand (s)<br>• Right thigh (s) | Not found | Not found | - |
| 7 | Nnot found | • Head | • Left forearm<br>• Pelvis<br>• Lower limbs | Full |
| 8 | • Head and neck (c) | • Head<br>• Back<br>• Left hand | Nnot found | Full |
| 9 | • Head (c) | • Head | • Pelvis<br>• Lower limbs | Full |

summarized in Table 1). The second forensic autopsies were requested by an Italian public prosecutor who opened an investigation into the terrorist attack to find the causes of the deaths, to extract from the bodies all the foreign bodies (e.g., bullets, metallic objects) that could help the Italian police to identify the weapons used in the attack, and to collect samples of tissues for the genetic identification. We were not authorized to consult the team who performed the first autopsies.

## Methods

In each case, PMCT was performed after the external examination of the body and before the (second) autopsy.

All the examinations were performed on a 128-slice scanner (GE Healthcare, Milwaukee, WI) with the following parameters: slice acquisition 1.25 mm, pitch 0.5, rotation time 0.5 s, tube voltage 120 kVp, tube current-time 400 mAs/rotation. No contrast medium was administered. Image reconstruction was carried out at a slice thickness of 1 mm (0.6 mm increment), with soft tissue and sharp bone kernel. Two- and three-dimensional reformations and reconstructions were obtained using a GE Advantage workstation and the open source PACS software OsiriX (OsiriX foundation, Geneva, Switzerland).

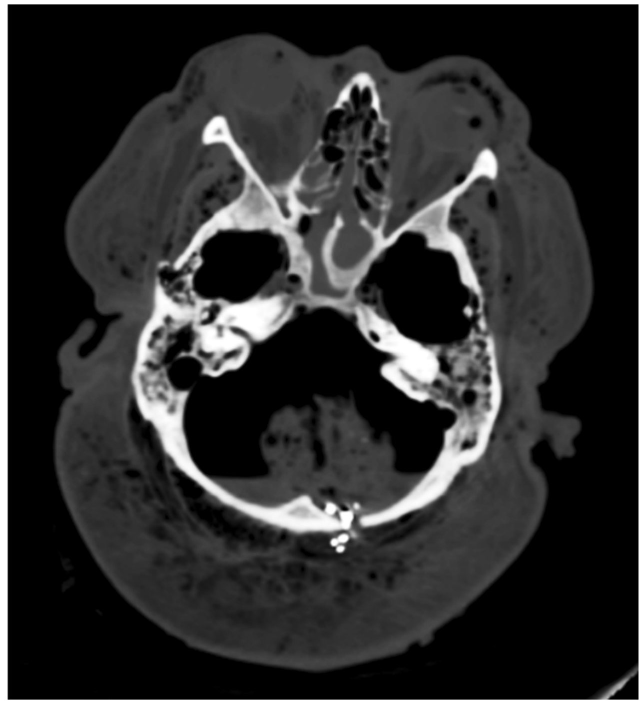


**Fig. 2** The image shows an entry wound with inward conic shape surrounded by metallic fragments in the left occipital bone (entry wound)

The images were analyzed by a board-certified radiologist with more than 10 years of experience in forensic imaging.

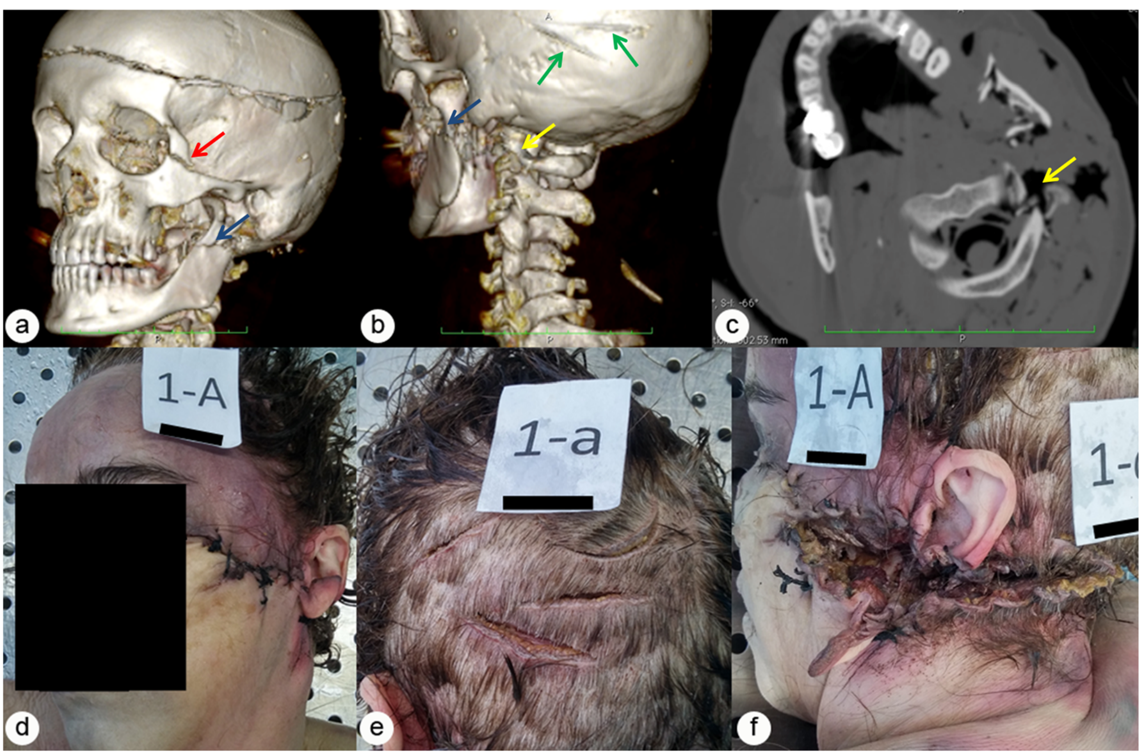



**Fig. 1** **a**, **b** 3D volume rendering of the head and neck. **c** Axial image at the level of the neck. Image a shows fractures of the left lateral orbital wall, left zygomatic bone (red arrow), left hemimandible (blue arrows), and multifragmentary fractures of C1 (yellow arrows). The 3D volume rendering image in **b** shows incisions in the external cranial table (green arrows). **d**–**f** Corresponding digital images

The radiologist had previously been informed of the external examination findings.

## Case 1

Woman (age: 51 years, height: 171 cm, weight: 69 kg).

External examination revealed multiple parallel slash wounds in the occipital area (the deepest of which corresponded to the atlanto-occipital joint); a 15-cm-long slash wound extending from the left lateral orbital wall to the left hemimandible; multiple slash wounds on the left shoulder, both forearms and the dorsal region of the left hand; and amputation of the second finger and subamputation of the third finger of the right hand.

The PMCT images showed a fracture of the left lateral orbital wall with involvement of the ipsilateral ocular bulb and left zygomatic bone, of the left hemimandible (with bone fragments near the left external and internal carotid arteries, that appeared injured), and multifragmentary fractures of C1 (with injury of the left vertebral artery) (Fig. 1). The second finger of the right hand was amputated, and the third finger of the right hand was partially amputated.

The second autopsy did not reveal any significant adjunctive findings. Moreover, PMCT was superior to autopsy for defining maxilla-facial bone lesions.

## Case 2

Man (age: 45 years, height: 185 cm, weight: 147 kg).

External examination revealed a gunshot entry wound in the left occipital bone and a gunshot exit wound under the right orbit.

PMCT imaging showed a 6-mm-wide hole surrounded by metallic fragments in the left occipital bone (2.5 cm from the middle line) (Fig. 2) and fractures of the postero-superior walls of the orbits.

The second autopsy did not reveal any significant adjunctive findings. Moreover, PMCT was superior to autopsy for defining bone lesions.

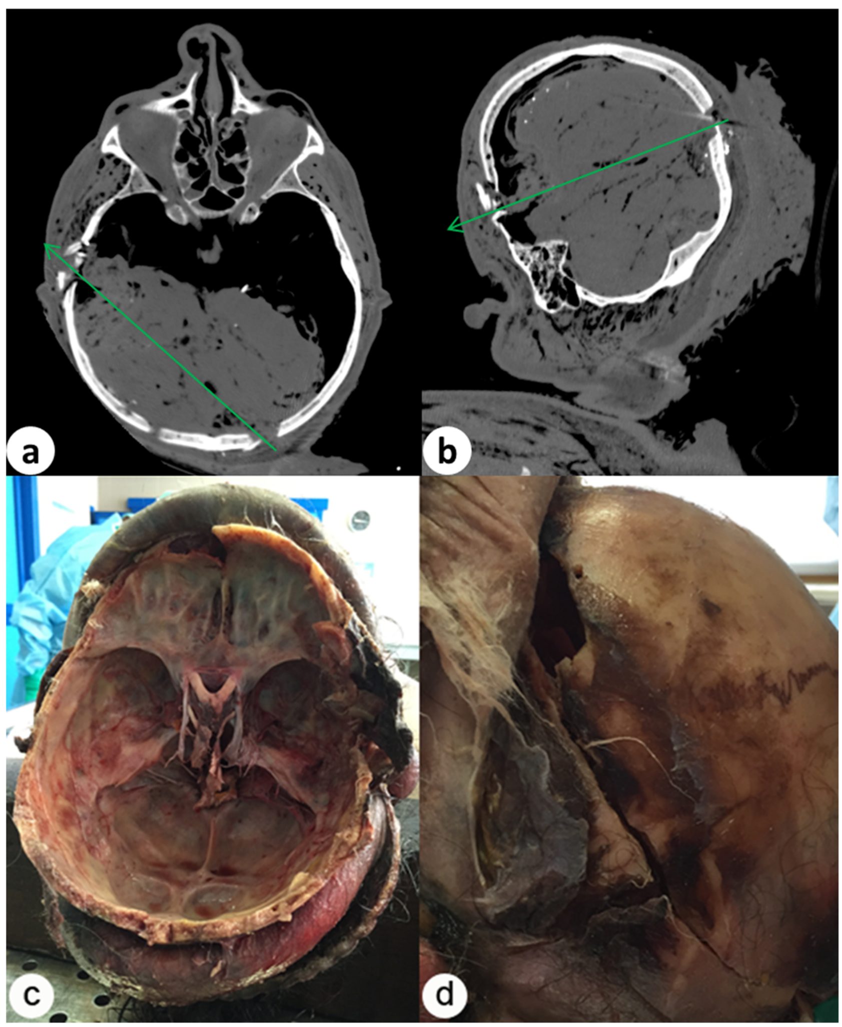



**Fig. 3** **a, b** 2D MPR reconstructions of the head, axial (**a**) and oblique coronal (**b**) view. The images show two holes in the left posterior parietal bone (entrance wound with inward conical shape) and the right temporoparietal area (exit wound with outward conical shape). The green arrow shows the direction of the projectile. **c**, **d** Corresponding digital images

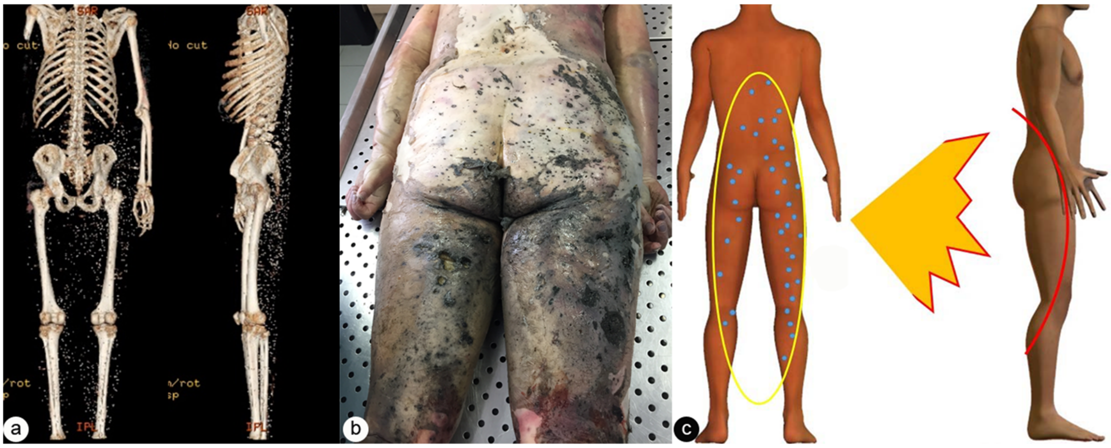


**Fig. 4** **a** 3D volume rendering images with anterior (left) and lateral (right) views. The images show multiple foreign bodies in the posterior part of the body and the four limbs. **b** Corresponding digital image. **c** Graphic reconstruction of the position of the body in relation to the explosive source

## Case 3

Man (age: 56 years, height: 181 cm, weight: 98 kg).

External examination revealed a gunshot entry wound in the left posterior parietal bone and a gunshot exit wound in the right temporoparietal area, and diffuse abraded areas characterized by several small penetrating wounds on the back and the posterior parts of the limbs. Inside each penetrating injury, we found a 1-mm-wide metallic sphere.

The PMCT scan showed two holes in the left posterior parietal bone (bullet entrance hole with inward conical shape) and in the right temporoparietal area (bullet exit hole with outward conical shape) (Fig. 3) and multiple foreign bodies in the posterior part of the body and all four limbs (Fig. 4).

The second autopsy did not reveal any significant adjunctive findings. Moreover, PMCT was superior to autopsy for defining bone fractures and depicting the exact locations and distribution of foreign bodies.

## Case 4

Woman (age: 55 years, height: 168 cm, weight: 66 kg).

External examination revealed two short slash wounds in the left side of the forehead, gunshot entry wounds in the occipital region, the left wrist and the dorsal part of the left hand, and a gunshot exit wound in the ventral part of the left hand.

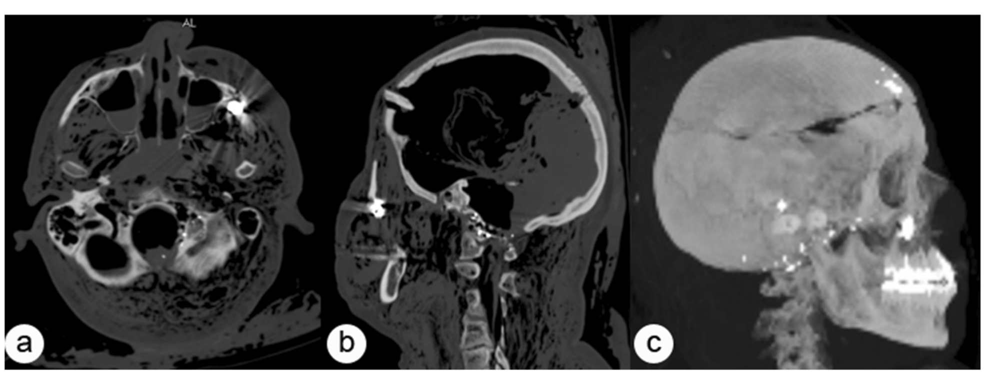
The PMCT scan showed a fracture extending from the left lateral mass of C1 to the left occipital condyle; a bullet near the antero-lateral wall of the maxillary sinus surrounded by metal fragments; two large metal fragments above the left frontal bone and under the mastoid process (Fig. 5); a bullet in the left wrist (Fig. 6); and fractures of the left hand (second metacarpus and middle third of the proximal phalanx) surrounded by bone and bullet fragments (Fig. 7).

The second autopsy did not reveal any significant adjunctive findings. Moreover, PMCT was superior to autopsy for defining cervical fractures and was fundamental to identifying the presence, distribution, and locations of foreign bodies.

## Case 5

Woman (age: 32 years, height: 170 cm, weight: 62 kg). She was pregnant.

**Fig. 5** **a**–**c** 2D oblique axial (**a**) and sagittal (**b**) reconstructions of the head and 3D maximum intensity projection (MIP) image of the head (**c**). The images show a hole in the left occipital bone, a bullet fragment near the antero-lateral wall of the maxillary sinus (**a**, **b**, **c**) and multiple metallic fragments linearly distributed in the posterior cranial fossa, thus allowing tracking of the bullet trajectory



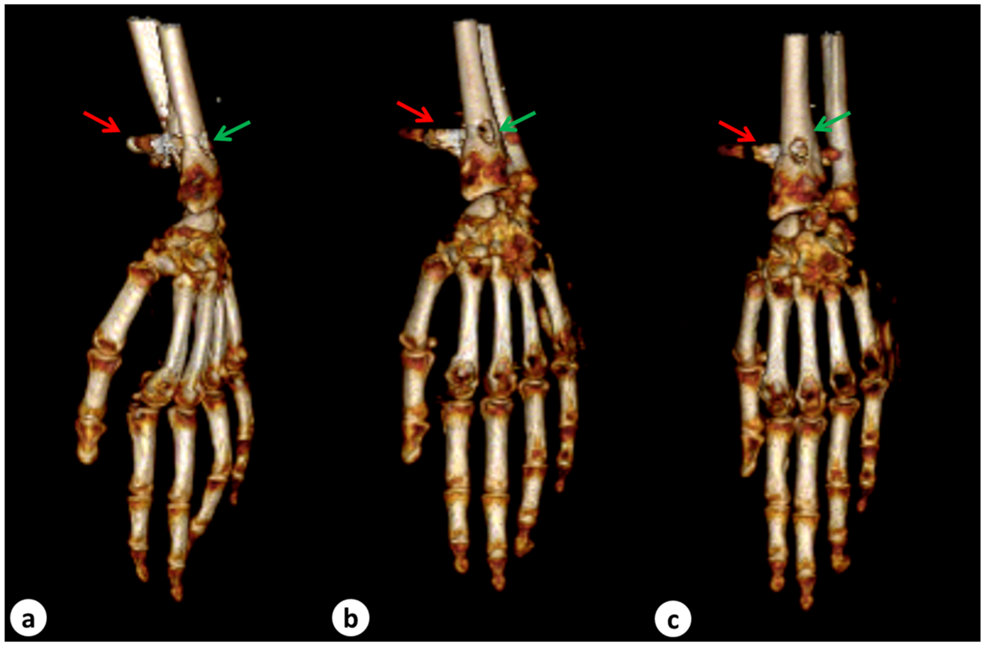



**Fig. 6** **a**–**c** 3D volume rendering reconstructions of the left wrist-hand. The images show a fragment of projectile in the soft tissue of the volar side of the wrist (red arrows) and a circular defect in the distal third of the radius (green arrows)

External examination revealed multiple slash wounds in the area of the scalp corresponding to the right parietal bone, in right temporal region, and in right mandibular area; multiple bruises on the face; a gunshot entry wound in the left cheek, with a gunshot exit wound under the left ear; a 4-cm-long slash wound in the dorsal part of the right forearm; multiple short cut wounds in the dorsal parts of the hands; multiple cut wounds in the thighs; and multiple bruises on the knees. The fetus was uninjured.

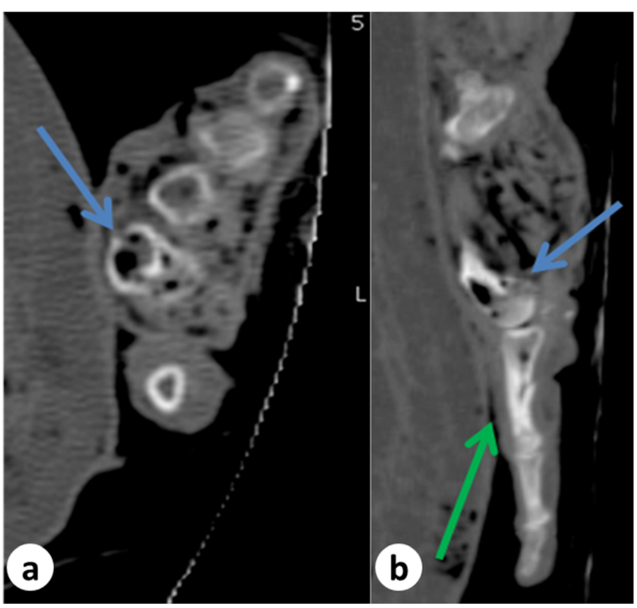



**Fig. 7** **a**, **b** 2D MPR reconstructions of the left hand. The images show a fracture of the basis of the II metacarpus (blue arrows) and of the proximal phalanx of the second finger (green arrow)

The PMCT scan showed a multifragmentary fracture of the right cranial vault extending to the temporal pyramid and mandibular ramus and a multifragmentary fracture of the left mandibular angle, near which there are multiple fragments of projectile (green arrows) and a bullet in the left periauricular soft tissues (Fig. 8).

The second autopsy did not reveal any significant adjunctive findings. Moreover, PMCT was superior to autopsy for defining bone lesions.

## Case 6

Woman (age: 54 years, height: 167 cm, weight: 64 kg).

External examination revealed an 8-cm-long slash wound extending from the right fronto-temporal area to the retroauricolar region and a 9-cm-long slash wound in the right supraauricular area (crossing each other and forming an "X"); a transverse 9-cm-long slash wound extending from the right mandibular angle to the chin; a 6-cm-long slash wound in the right posterior laterocervical area; multiple slash wounds in the right shoulder; a 6-cm-long slash wound in the dorsal part of the right hand; and a 7-cm-long slash wound in the right thigh.

The PMCT scan showed fractures of the right mastoid process, tympanic cavity, and occipital bone (Fig. 9); multiple left mandibular fractures with dislocation of the fragments (Fig. 10); and multiple fractures of the thyroid cartilage.

The autopsy confirmed the radiological findings.

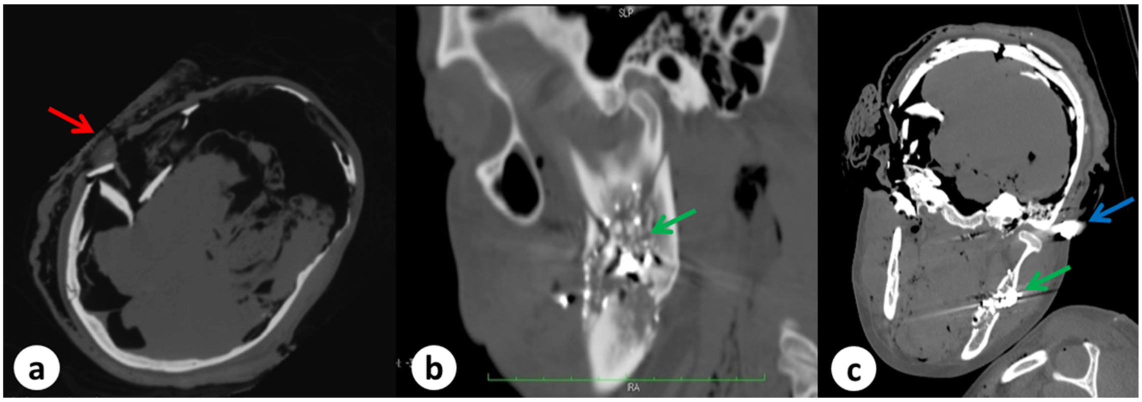



**Fig. 8** **a**–**c** 2D MPR reconstructions of the head. The images show multiple fractures of the right cranial vault (red arrow), multifragmentary fracture of the left mandibular angle, near which there are multiple fragments of projectile (green arrows) and a bullet in the left periauricular soft tissues (blue arrow)

The second autopsy did not reveal any significant adjunctive findings. Moreover, PMCT was superior to autopsy for defining bone lesions.

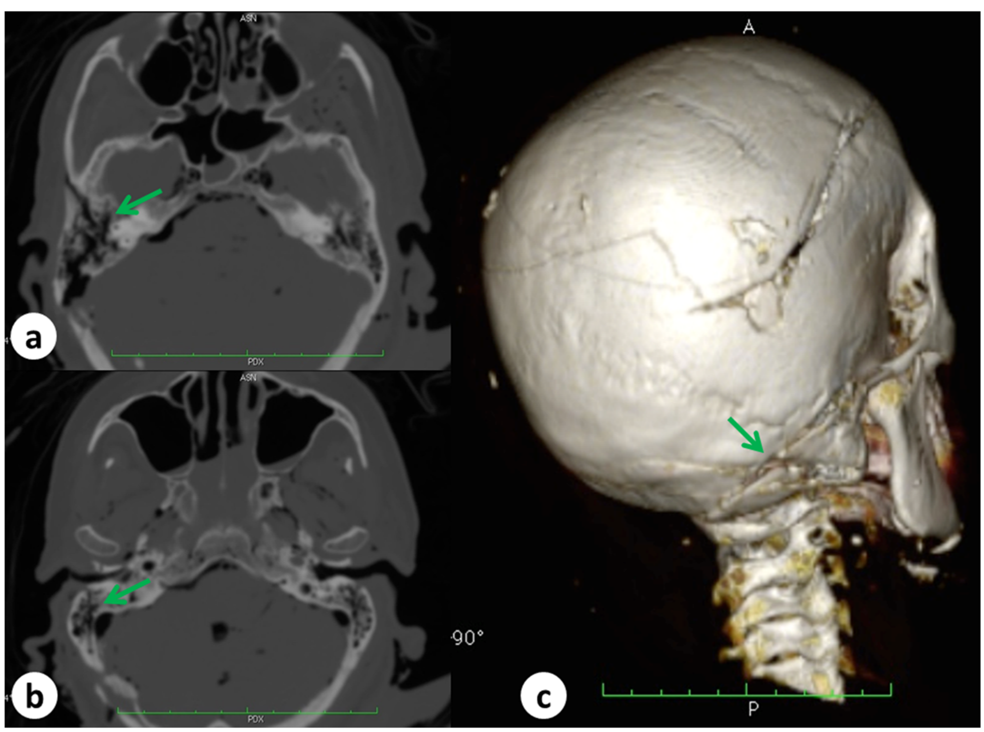
## Case 7

Woman (age: 33 years, height: 179 cm, weight: 86 kg).

External examination revealed gunshot entry wounds in the right frontoparietal region, in the left temporoparietal region and in the right occipital area, and a bullet in the superficial tissues of the left external malleolar region. Upon incising the subcutaneous adipose tissue of the medial side of the left forearm, of the posterior part of the pelvis, of the posterior part of the right thigh, and of the lateral side of the left knee several spherical metallic fragments were found.

The PMCT scan showed a bullet entrance hole in the right frontoparietal bone; a fracture in the left temporoparietal region of the skull surrounded by metallic (bullet) fragments; a bullet entrance hole in the right paramedian part of the occipital bone surrounded by fragments of an undefined nature; fractures of the cranial base and ethmoid bone (Fig. 11); fractures of the left distal fibula and a fragmented bullet in the left calcaneus (Fig. 12); some metal fragments in the medial side of the left forearm, the posterior part of the

**Fig. 9** **a**–**c** 2D MPR axial reconstructions of the head at the level of sphenoid (**a**,, **b**) and 3D volume rendering reconstruction of the head posterior view (**c**). The images show multiple fractures of the right mastoid process, extending to the right occipital bone (green arrows)



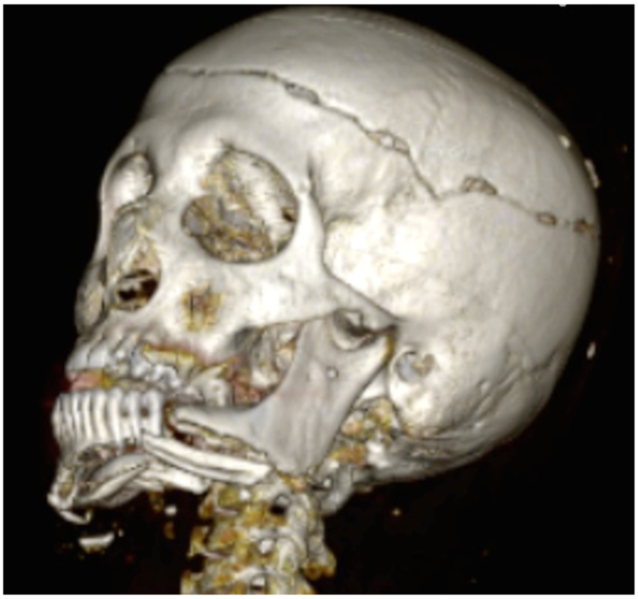


**Fig. 10** 3D volume rendering reconstruction of the head. The image shows multiple left mandibular fractures with dislocation of the fragments

pelvis, the posterior part of the right thigh, and the lateral side of the left knee (Fig. 4).

The second autopsy did not reveal any significant adjunctive findings. Moreover, PMCT was superior to autopsy for defining cervical fractures and was fundamental for identifying the presence, distribution, and locations of foreign bodies.

## Case 8

Man (age: 47 years, height: 185 cm, weight 110 kg).

External examination revealed gunshot entry wounds above the external acoustic meatus, in the right zygomatic bone, in the mandibular region, in the back (at D4-D5 level), and in the left hand; a 9-cm-long cut wound in the vertex region and two parallel cut wounds (8 cm and 9 cm long) in the occipital area; and three parallel cut wounds in the neck.

The PMCT scan showed a hole in the right zygomatic bone corresponding to a bullet entrance hole in the lateral wall of

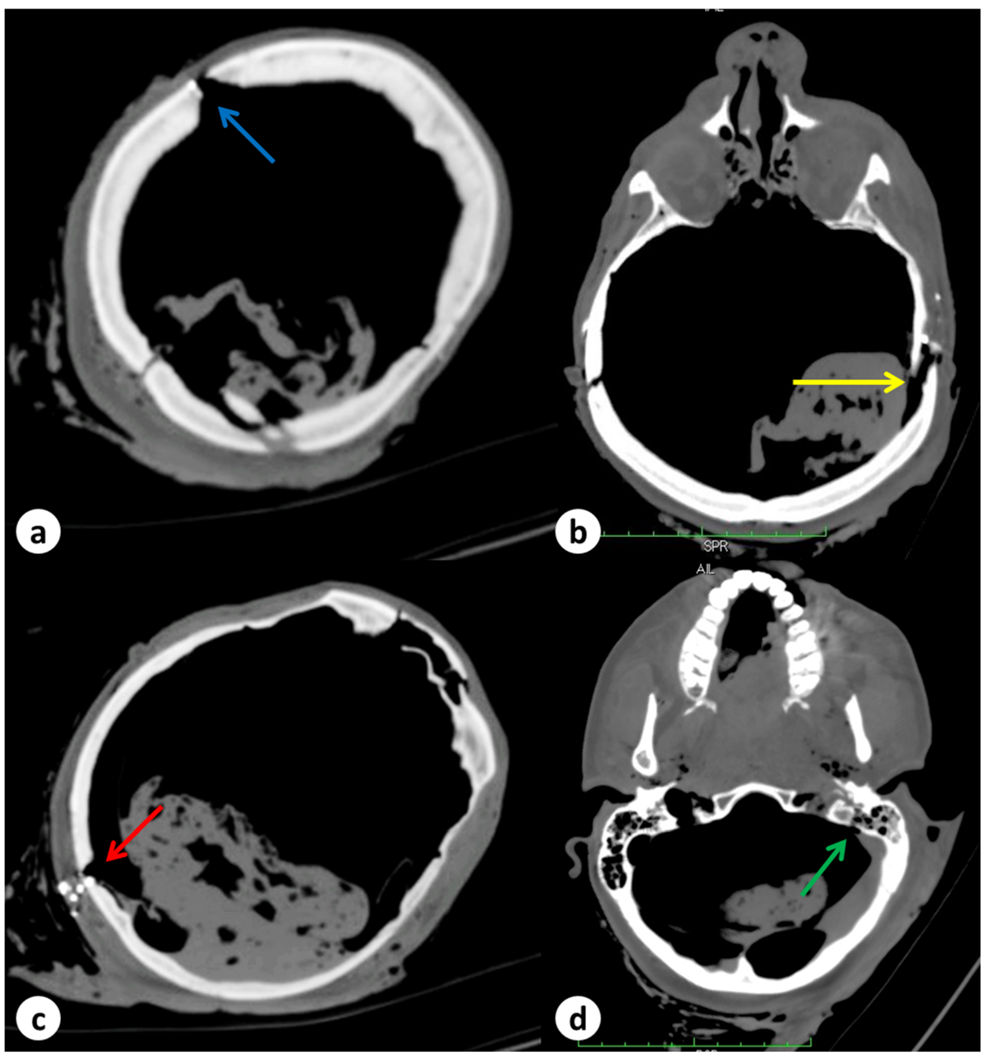



**Fig. 11** **a**–**d** 2D MPR reconstructions of the head. The images show a hole in the right frontoparietal bone (blue arrow in **a**); metallic fragments near the fractured left parietal and temporal bones (yellow arrow in **b**); a hole in the right paramedian part of the occipital bone surrounded by fragments (red arrow in **c**); fractures of the cranial base (green arrow in **d**)


**Fig. 12** 2D MPR reconstruction of the left ankle. The image shows fractures of the left distal fibula (blue arrow) and a fragmented bullet in the left calcaneus (red arrow)

the right orbit; a fragmented bullet in the petrous part of the right temporal bone (Fig. 13); an expanding bullet near the right hemimandible; a bullet in the superficial tissues of the posterior neck at the C7-D1 level (Fig. 14); a fragmented bullet in the soft tissues of the left hand (Fig. 15).

The second autopsy did not reveal any significant adjunctive findings. Moreover, PMCT was superior to autopsy for defining bone lesions and was fundamental for identifying the presence and locations of foreign bodies.

## Case 9

Man (age: 39 years, height: 181 cm, weight: 123 kg).

External examination revealed gunshot entry wounds in the right paramedian parieto-occipital and left temporo-parietal areas; two 2.5-cm-long cut wounds in the right forehead; and multiple metallic spheres in the pelvis and lower limbs.

The PMCT scan showed two bullet entrance holes respectively in the right and left parietal bone surrounded by hyperdense spots, a large metallic fragment in the clivus (Fig. 16), and several metal fragments in the pelvic area and lower limbs (Fig. 4).

The second autopsy did not reveal any significant adjunctive findings. Moreover, PMCT was superior to autopsy for defining bone lesions and was fundamental for identifying the presence, locations, and distribution of foreign bodies.

## Discussion

In this work, after initial autopsies performed in the foreign country in which the terrorist attack took place, the bodies of the nine Italian victims were reanalyzed with a comprehensive approach involving an external examination, whole-body PMCT imaging, and a second forensic autopsy.

Consistent with previous evidence [19–21], postautopsy PMCT offered new insights into case management, provided guidance for selective and focused dissection for the retrieval of foreign bodies, and allowed an accurate depiction of lesions (particularly fractures). Moreover, PMCT scans of these victims of terrorism were able to provide important data about the dynamics of the events and the types of weapons used. Consistent with global data on terrorism [1], the aggressors used several types of weapons: IEDs, firearms, and melee weapons. Since the types of injuries and contribution of imaging techniques could differ for each class of weapons, we have divided the discussion into weapon-specific sections.

### Melee weapon injuries

In our study population, cases 5, 8, and 9 had superficial (cut) wounds and cases 1, 4, 5, and 6 had slash wounds, mostly localized in the head and neck, inflicted by sharp-edged weapons. In case 1, the traumatic force was sufficient to mark the skull vault, and in cases 5 and 6, it was so intense that the skull and facial bones were extensively fractured, as shown by 2D and 3D reconstructions (Fig. 1).

In cases 1 and 5, the numerous and deep wounds to the hands can be classified as “active defense wounds” because of their depth and position (suggestive of attempts to actively stop the aggression), while in cases 1 and 6, wounds on the dorsal parts of the forearms can be considered “passive defense wounds” because they suggest attempts to shield the body [22].

In general, sharp-edged weapons, such as axes or swords, tend to cause slash wounds since they have heavy blades [23]. In our cases, many of the chop wounds we found corresponded to underlying fractures, that were precisely depicted by PMCT. Moreover, the wounds were generally linear, but some of them appeared U-shaped, as is clearly visible in Fig. 1, indicating that the blade entered the skin at an oblique angle [23].

### Firearm injuries

All the victims, except for cases 1 and 6, had gunshot wounds. The terrorists used firearms that shot at different velocities: handguns, submachine guns, and AK-47 s. Velocity, along with the mass of the bullet, is the most important determinant of the destructive power of the firearm; for example, an AK-

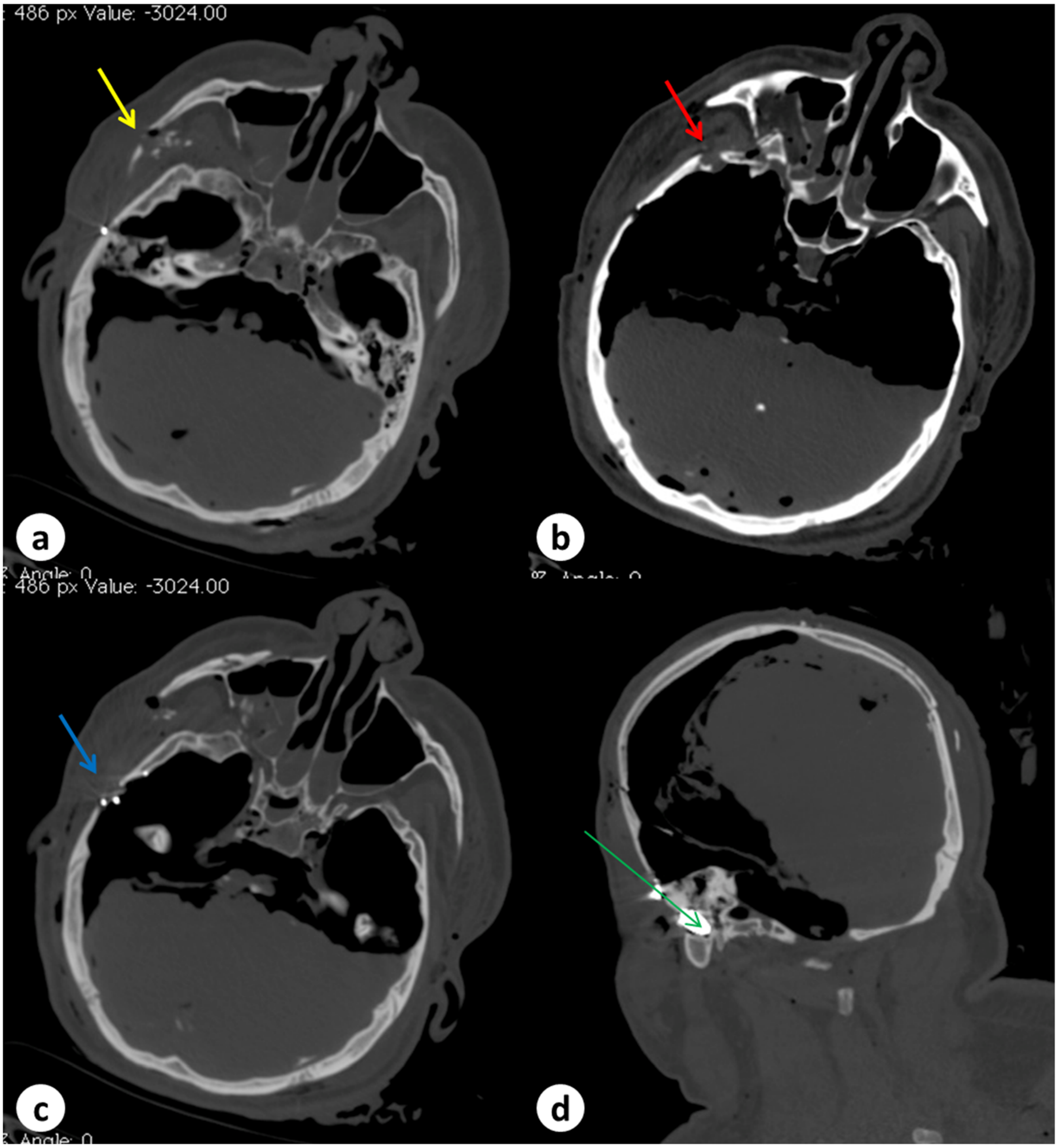



**Fig. 13** **a**–**d** 2D MPR reconstructions of the head. The images show a hole in the right zygomatic bone (yellow arrow in **a**) and a hole in the lateral wall of the right orbit (red arrow in **b**), interpreted as entry wounds of a projectile; a fragmented bullet in the petrous part of the temporal bone (blue arrow in **c**). In the image **d**, the possible trajectory of a fragmented projectile of image **c** is indicated by a green arrow

47 is a 7.62 × 39 mm assault rifle that fires bullets at an initial velocity of 720 m/s and can inflict devastating neurovascular and tissue injuries, such as fragmentation of the bones and disintegration of the organs that are not particularly elastic (like the liver and spleen) [6, 24–26]. However, even low-velocity guns can easily be lethal, especially if loaded with ammunition prohibited by international treaties (such as the expanding and fragmenting bullets used in the cases presented here) [27, 28].

In our cases, consistent with previous evidence [3, 29, 30], PMCT imaging permitted the detection of all firearm and blast injuries and was instrumental in locating foreign bodies such as bullets (or parts of them) that had not been found/removed during the first autopsies (Figs. 5, 6, 12, 14). Moreover, by analyzing PMCT images and then the disposition of bone and metal fragments deposited during cavitation, it was possible to reconstruct the bullet track [31]. In particular, in the cases of firearm-induced brain injuries, this approach provided decisive indications of the direction of the bullets, allowing differentiation between entry and exit wounds. In fact, in the skull, these wounds are conical in shape, with the base of the cone in the inner table of the skull (entry wounds) or in the external table (exit wounds) (Fig. 3) [32]. Furthermore, as mentioned above, in some cases, PMCT images showed bullets that were

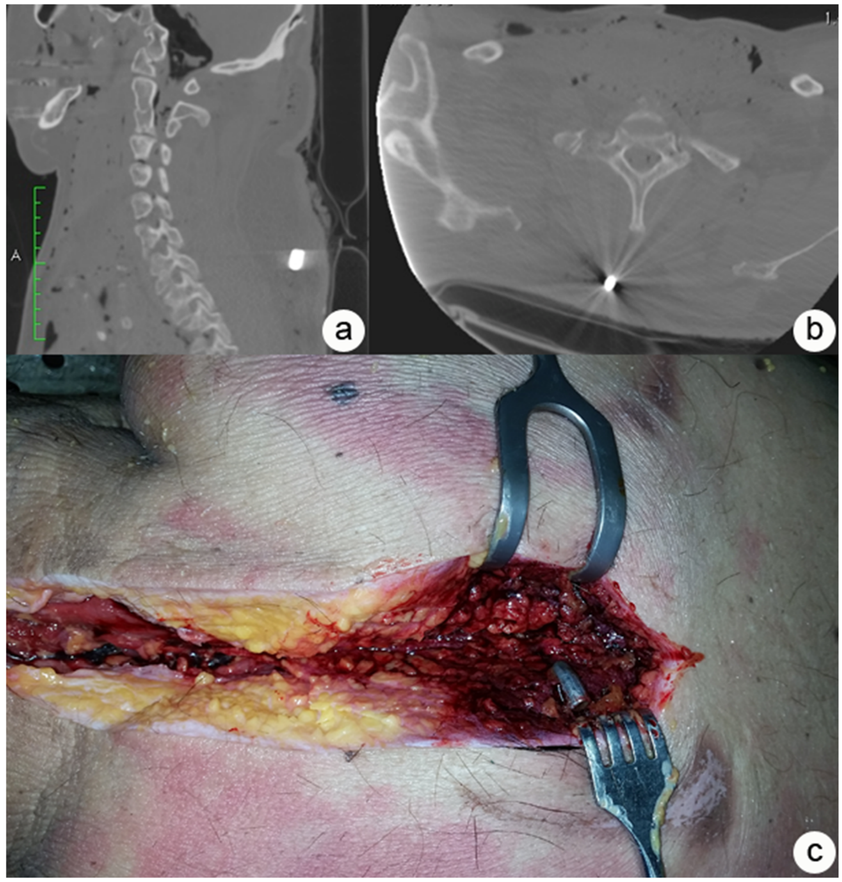



**Fig. 14** **a**, **b** 2D oblique sagittal (**a**) and axial (**b**) reconstruction of the neck. The images show a bullet in the superficial tissues of the posterior neck at the level of C7-D1. **c** Corresponding digital image

hidden in areas that are not usually dissected during an autopsy (such as the face, limbs and paravertebral soft tissues), thus allowing us to find them while minimizing the length of incisions in areas such as the face, the integrity of which should always be preserved, when possible, for the benefit of the victim's relatives (Fig. 5). However, the main reason all the bullets should be extracted is that the information about the ammunition and firearms used during the terrorist attack can be valuable to national and international counterterrorism agencies (for example, to track the suppliers of the terrorist groups).

### Improvised explosive devices injuries

Finally, PMCT was used to locate hyperintense foreign bodies other than bullet fragments: in cases 3, 7, and 9, scans revealed "constellations" of miscellaneous objects (Fig. 4). These objects were the low-energy shrapnel released by the IEDs and the (spherical) metallic bodies that are often added to these bombs by terrorists to increase their destructive potential [3]. It can be inferred that the spherical metallic bodies came from the IEDs (rather than from the scene of the explosion) because they were (several) spheres of the same shape and dimension (as can be observed more in detail in Fig. 4). The explosion of IEDs in a confined space generally—as in these cases—has devasting consequences, since the energy released by the explosion is "reflected" and thus can be increased four- to eightfold [3, 5]. In our cases, by assisting in the description of the morphology, depth of penetration, locations, and distribution of the objects released by IEDs, PMCT contributed to determining their origin and nature and reconstructing the dynamics of the events. For example, combining postmortem imaging and autopsy findings, it was noted that blast injuries tended to be grouped in the victims' backs and the posterior regions of the heads and limbs. This evidence led to the conclusion that the IEDs were probably launched towards the victims. Furthermore, using PMCT enabled the determination, in relative terms, of how far from the IED the three victims were: PMCT 3D volume rendering images showed that the depth of penetration and the concentration and number of hyperdense (metallic) bodies were higher in case 3 than in case 9 or 7, making it likely that case 3 was closer to the IED than the other two victims.

## Conclusions

PMCT imaging has been shown to be a valuable method in forensic investigations of victims of terrorist attacks. Terrorist

**Fig. 15** 3D volume rendering of the left hand. The image shows a fragmented bullet in the soft tissues of the hand

attacks usually involve the use of several kinds of weapons that are often unusual and thus can cause unusual (and complex) injuries. Moreover, in these cases, forensic autopsies are generally performed in the country in which the attack occurred, and when—after a variable time period—the bodies are returned to their countries of origin, second forensic examinations are generally requested. A multidisciplinary approach including PMCT can play a strategic role in collecting as much data as possible. No limitation should be placed on the use of technological resources [33, 34], particularly PMCT imaging, as any evidence can be valuable for both the reconstruction of the events and, through a comparison of the intelligence information and the types of weapons and ammunition used, the identification of the suppliers of terrorist groups. Moreover, in our cases, all the significant features found at the (second) autopsy had been previously observed at PMCT, proving the excellent sensitivity of PMCT. Hence, we suggest performing PMCT imaging on all victims of terrorist attacks, even those who were already autopsied.

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## Compliance with ethical standards

**Conflicts of interest/Competing interests** The authors declare that they have no conflict of interest.

**Consent to participate** Not required.

**Ethics approval** Not required since the data is completely anonymous with no personal information being collected.

**Consent for publication** These cases have been dismissed by the local Court, and consent for publication has been provided by the public prosecutor.

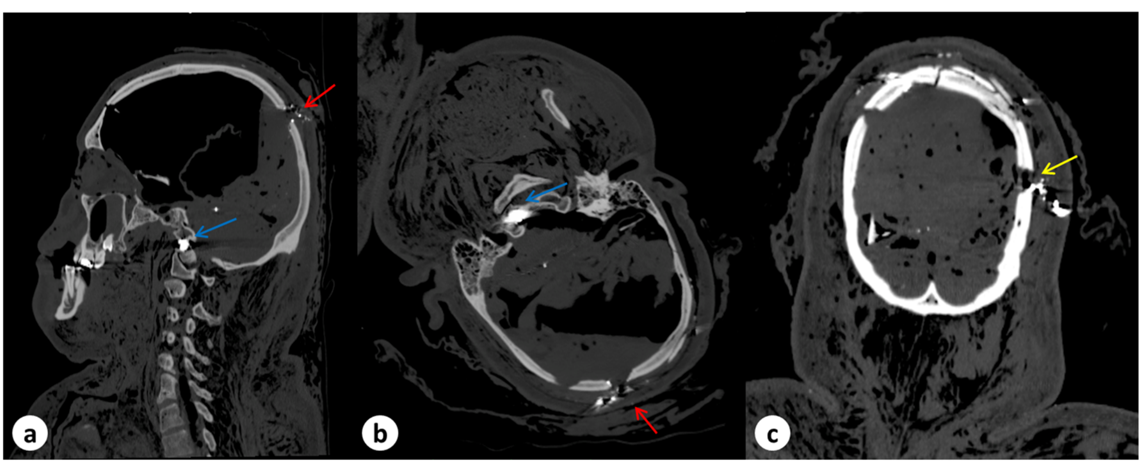


**Fig. 16** **a**–**c** 2D MPR reconstructions of the head. The images show a hole in the right parietal bone surrounded by hyperdense spots (red arrow in **a** and **b**) the supposed entry wound and a large metallic fragment of projectile in the clivus (blue arrow in **a** and **b**). The image **c** shows a hole in the left parietal bone, interpreted as a different entry wound (yellow arrow in **c**)

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