

## E47 A Silent Suicide

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**Learning Overview:** The goal of this presentation is to show an unusual case of suicide by crossbow bolt, in which radiological tools, alongside a complete autopsy, proved useful in reconstructing the intracorporeal trail of the arrow.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by focusing on the radiological strategic role for the reconstruction of the injury pattern in order to plan an approach to the autopsy.

Despite being common in the past, now lethal crossbow injuries are a rarity in the forensic field and refer mainly to accidents; homicidal events are less frequently reported, whereas suicides are only seldom encountered.<sup>1-8</sup> The head and chest are the areas predominantly involved; although cases regarding the perforation of the neck or abdomen, or combined injuries, are also described.<sup>9-13</sup> This case is a full-thickness chest injury caused by a bolt shot from a crossbow with suicidal intent.

A 48-year-old man was found dead in the fields surrounding his family house, with a three-bladed crossbow bolt protruding from his back. Near the corpse, an unloaded Skorpion Guillotine-X compound crossbow was retrieved. His relatives declared they had not heard the crossbow shot, and that they started looking for him only hours after he left the house, but when he was found, it was too late. During house inspection, the local police force discovered other crossbow bolts and a handwritten farewell letter. The postmortem Computed Tomography (CT) scan, along with a complete autopsy, allowed reconstruction of the intracorporeal path of the dart. The bolt entered the body, fracturing the xiphoid process; then, it proceeded on the sagittal plane, perforating the pericardial sac and the right ventricle, with subsequent hemopericardium and right hemothorax perforation. Ultimately, after going through the esophagus and the aorta, it caused the myelic fracture of T11.

This case is interesting from several points of view. First, the suicidal tool of choice, a crossbow: today, crossbows are mainly employed for sport or hunting because they are accurate and easy to use even without practice; their penetration power, due to the kinetic energy and the relatively high speed of the flying bolt, often exceeds that of firearms. Ballistic tests have demonstrated that sharp bolts can often puncture up to 80–90cm of living matter, and even penetrate bone (in this case, the arrow broke through a vertebra).<sup>14</sup> However, in many countries, including Italy, crossbows are considered by the law as “sports equipment,” meaning that, unlike firearms, anyone of legal age (18 years of age in Italy) can buy and own one without needing a specific license. In the literature, the chest is the second preferred target in both suicidal and homicidal shots, after the head; in our case, however, it is remarkable that the bolt pierced the full thickness of the chest. Unlike gunshot wounds, the characteristics of such lesions depend on the type of arrow, in particular the tips used, rather than on the type of weapon; and entrance and exit wounds could be virtually indistinguishable from distant gunshot wounds, if the arrow has been removed from the victim.<sup>15</sup> According to current literature, a three-blade tip produces stab and puncture wounds; thus, a three-pointed star-shape lesion, with clear-cut and blood-infiltrated edges, is generally found, as in this case, in which both gross examination and histology revealed perilesional hemorrhage (without relevant inflammatory infiltrate) where the arrow had passed through.

From a forensic point of view, crossbow-related deaths, especially suicides, may represent a rarity and a challenge. In such cases, the CT scan has proven to be useful because it allows easy reconstruction of the intracorporeal path of the arrow while it still is *in situ*, avoiding the risk of altering it; this risk, on the other hand, is tangible during autopsy, because the arrow must be removed or cut. Cases like the one here described highlight concerns regarding the accessibility of such weapons, which are accurate and easy to use even without practice, and, thus, should perhaps not be considered only as sports equipment.

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### **Crossbow Injury, Suicide, Forensic Radiology**