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Homicide by stabbing committed with a "Fantasy Knife"

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ABSTRACT

Homicides by stabbing, especially involving female victims, are quiet common in Italy as they represent about the 25 % of the total amount of homicides.
The case we present is very singular for the type of knife used for committing the homicide, an ornamental weapon classified as "Fantasy Knife" and, as far as we know, this is the first case reported in literature concerning the utilization for criminal purpose of this kind of object.
Herein is illustrated the morphology of the variety of different wounds produced on the victim, compared with the particular shape of the blade, whose utilization in the homicide was definitely confirmed by the genetic analysis.

Introduction

Stabbing is a common manner of committing homicide, accounting for about the 25 % of all homicides in Italy, where it represents the second cause of homicide-related death, the first being represented by firearms [1].

When the forensic pathologist is required to examine the victims of stabbing assaults, the most challenging and insidious task is to interpret the morphology of the wounds (as well as the tearing of the clothes or, in rare occasions, the damages of other objects which may have been inadvertently hit by the blade) in order to provide any sort of information which could be helpful in identifying the weapon utilized in the murder.

Unfortunately, apart from exceptional cases involving strange types of weapons [2,3], usually there are no specific features about the morphology of the wounds that allows us to precisely identify the weapon. Peculiarities of the external wounds actually can be attributed to many factors, such as the amount of force applied, whether twisting of the weapon took place during the withdrawal of the weapon, or whether the weapon had been plunged to the hilt [4], and so the few answers that can be provided are usually limited to the distinction between single- or double-cutting edges and between smooth or serrated blade [5,6]. Even in those cases where it is possible to examine the weapon and compare it with the injuries found on the body, forensic assessment is usually confined to the declaration of consistency or not of the wounds with that particular weapon (as indicated by the presence of a complete or partial hilt mark in the vicinity of the wound),thereby making it impossible to exclude that another similar knife could have been used to kill the victim.

The case we are presenting can be considered unique for the exceptionality of the weapon used in committing the homicide, an ornamental knife classified as a "*Fantasy Knife*".

After a thorough research in world literature consulting primarily PubMed and then the index of the journals specialized in the field of forensic pathology, we have found only a similar case described by Bilo concerning a baby who was injured by a double-blade knife [7]. The blades of this typology of knife are usually not very sharp and this weapons are easy to obtained, (they can even be ordered by internet), for decorative or collection purposes. As far as we know, this is the first case reported in forensic literature concerning the criminal use of this type of weapon. The very peculiar morphology of this knife allowed us to conclude with great certainty that it was used to commit the murder through the analysis of the tearing of the clothes and skin wounds, as subsequently confirmed by the forensic genetic analysis.

Case report

The body of a young, Nigerian prostitute found in a forested area exhibited several stab wounds of different size and shape. At the site inspection it was also noted some linear cuts on the trunk of a tree along with some broken twigs, suggesting that there had been a violent assault in which a knife with a thick blade had been used, but no weapon was found at the scene of the crime.

During the post-mortem examination the first peculiar observation was that there were multiple rounded and triangular doubled-tears to the clothing, which were left at fixed distances [Figs. 1 and 2].

The morphological aspect of a "double-triangle" seen on the clothing was observed also in some of the victim's skin wounds, localized on the right emithorax, on the precordium [Fig. 3] and on the hands (the latter were clearly deduced to be defence-wounds). At autopsy similar injuries were also found on the heart, liver and lungs.

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On other parts of the body the stab-wounds had a completely different shape and variable dimension. On the right side of the trunk [Fig. 4] there was a large wound, 14 cm long, transversally oriented, with rather irregular edges and partial evisceration of ileum, that was produced by a prolonged scrolling of the blade through the skin. At the left side of the thorax and abdomen [Fig. 5] there were nine large stab-wounds, ranging in length from 1,7 to 3,3 cm, with sharp and blunt edges, localized within a relatively restricted area (15 × 11 cm), all of them with transversal direction, so as to suggest a compulsive action of stabbing through multiple hits inflicted in rapid sequence.

The death of the victim was obviously due to the laceration of the left ventricle of the heart and to the hemorrhagic shock produced by the multiple wounds.

After some weeks, the murderer was identified and the weapon used for committing the homicide was discovered inside his car. It was a particular knife, sold for ornamental purpose, commonly referred as "*Fantasy Knife*" [Fig. 6]. The main feature of this weapon was represented by a large thick double blade (respectively 14 and 10 cm); on both the edges of the proximal part of the blade there were some various little appendices and on the lower edge of the handle there was another pointed but not sharp, blade.

Having the knife, it was possible to verify that the blade perfectly matched with the tears of the clothing, but it was not possible to perform a similar assessment of the skin wounds due to the relevant post-mortem alterations, developed even if the body was preserved in a refrigerator cell. Despite this fact, it was however clear that the morphological features of the skin wounds and the injury to the inner organs corresponded well with the peculiar blade of the knife as subsequently demonstrated by genetic analysis.

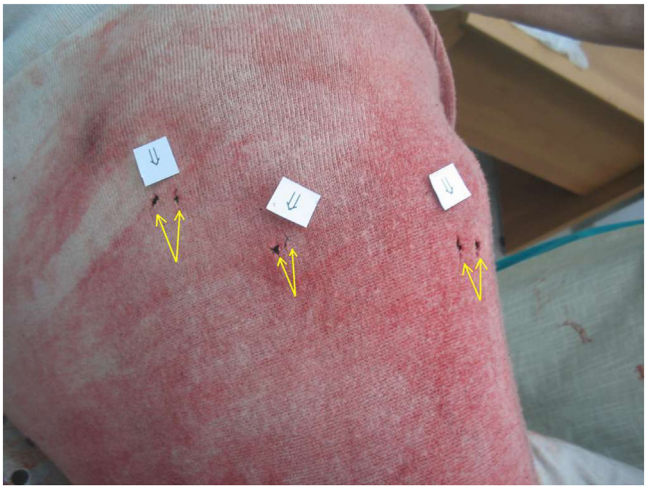

Fig. 1. Tears to the clothing.

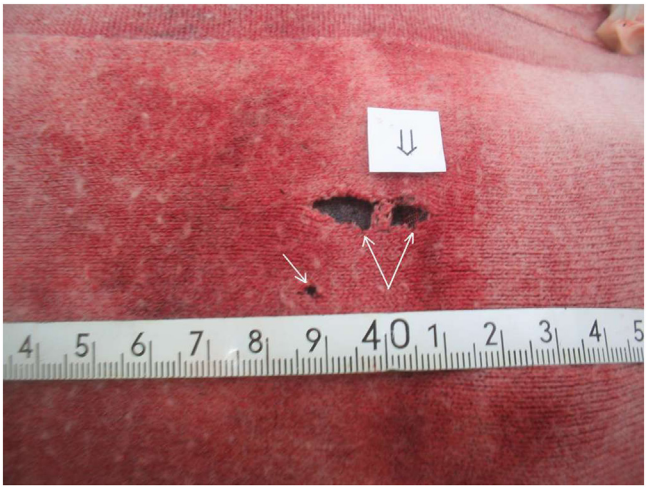

Fig. 2. Tears to the clothing (larger detail).

Fig. 4. Large wound on the right side of the abdomen.

Fig. 3. Skin wounds on the precordium.

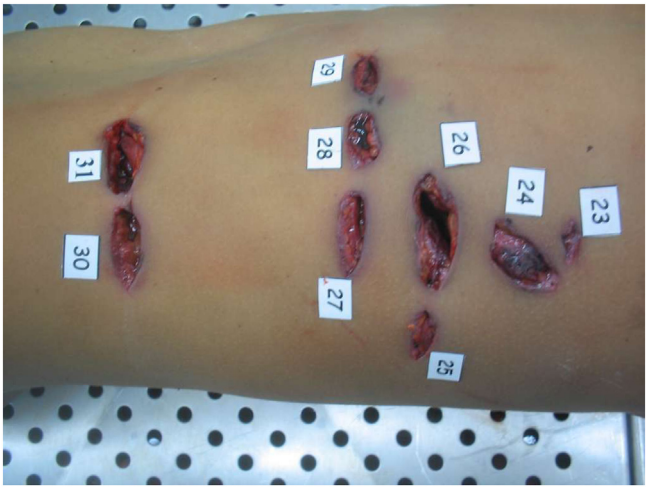

Fig. 5. The wounds on the left side of the trunk.

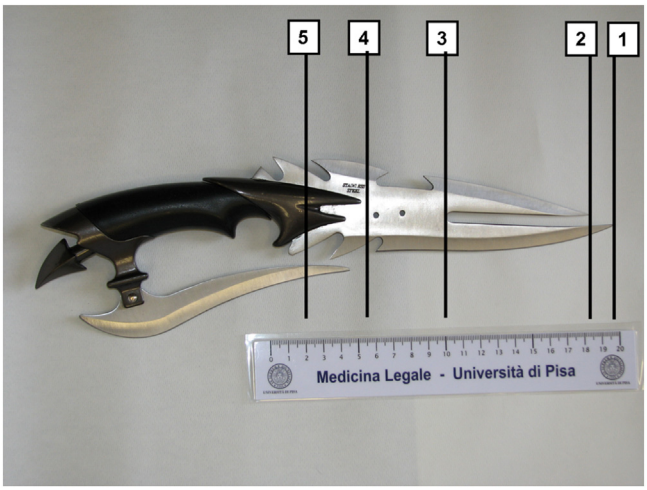

Fig. 6. The knife.

In fact, although there were no visible bloodstains on the knife, thorough research revealed the presence of microscopic traces of blood in the virtual space between the handle and the blade by The Kastle–Meyer test and then confirmed with ABAcard® HemaTrace. The genetic analysis proved that the DNA profile of this blood was completely identical to the victim's, providing the definitive proof that this was the knife that had been used to perpetrate the homicide.

The blood was collected using 4N6FLOQSwabs™ COPAN. DNA extraction was carried out with QIAamp DNA Investigator Kit-QIAGEN, according to specific protocols. PCR amplification was performed with AmpFlSTR Profiler Plus and AmpFlSTR Cofiler PCR Amplification Kit - Perkin Elmer Applied Biosystems. The typing was achieved using an ABI PRISM 310 - Applied Biosystems genetic analyzer. Signal intensities exceeding 50 RFU were regarded as valid.

The evaluated thirteen different STRs loci (Combined DNA Index System -CODIS) were CSF1PO, F13A01, F13B, FES/FPS, FGA, LPL, TH01, TPOX, VWA, D3S1358, D5S818, D7S820, D8S1179, D13S317, D16S539, D18S51, and D21S11.

In a complete DNA profile match with the victim's, all thirteen STR loci examined. The random match probability was calculated to be on the order of 1 in 166 quadrillion when compared to a Caucasian population database.

The positive comparison was essential in confirming the real use of that weapon in the homicide, otherwise, it would have been substantially impossible to suppose the real features of the knife solely based upon variable shape and sizes of the multiple injuries, which could have even given suggestion to the use of multiple knives to commit the homicide.

For this reason we must consider the fact that this particular blade could produce wounds of different morphology and length in accordance to the angle and, principally, the depth of penetration, as we can see on Fig. 6:

1) If the blade penetrates from level 1 to level 2 the only injuring effect is connected to the distal part of the longer blade, which in turn produces a unique wound with a triangular shape due to the presence of a non-cutting edge.
2) If the knife penetrates from level 2 to level 3 the two blades penetrate together through the skin and produce two different wounds, with gradually increasing length. Relating to the fact that the two blades face one another from the non-cutting edge, the resultant wounds have a double triangular shape, starting from the base, with a constant distance that corresponds to the narrow space between the two branches of the blade.
3) From level 3 to level 4 also the proximal part of the blade penetrates through the skin producing a unique wound with a length approximately correspondent to the width of this part of the blade.
4) From level 4 to level 5 the shape of the wound (or wounds) is extremely variable when considering the contact to the skin from the lateral appendices of the blade and the possible contact with the third blade.

Discussion

The morphological interpretation of the injuries produced by a knife or other cutting weapon can be extremely useful for judicial purpose, although we must keep in mind the possible pitfalls of abstract deductions about the identification of the type of weapon based solely upon the morphology of the wounds.

It is widely known, for example, that stab wounds produced by the same knife can vary in size and shape, depending on the morphology of the blade, the body region that has been stabbed, the depth of insertion, as well as the angle of insertion and withdrawal [8]. On the other hand, in case of stabbing, the pathologist can usually only give comment as to that the appearance and configuration of the wounds are consistent with a particular weapon, while sharp-edged instruments cannot be usually distinguished by incised wounds of varying lengths and depths [9].

Despite that, it is essential in case of stabbing, to perform a careful examination of the stab wounds on the cadaver, (as well as those upon the bodies of surviving victims [10]), in order to acquire as much information as possible to identify the specific features of the weapon, the main characteristics consisting of the length of the main parts of the wounds, features or formatted blade tips, the aspect of tip impact, in addition to traces left by the blunt back edge. This can be done with the help assistance of microscopic observation and micrometrical measurement [11].It is evident that not only the thorough analysis of skin wound, but also the careful inspection of the damage to clothing can assure other fundamental source of information about the characteristics the weapon of cause [12,13].

The forensic analysis of wounds and damaged clothing must be performed not only for the purpose of identifying the type of weapon used, but also, in more generally assessing the distinction between suicidal or homicidal events [14,15] and, in the latter hypothesis, the mode of perpetrating the criminal assault. Many efforts,have, in fact, been made to obtain useful information about the reconstruction of the "crime dynamic" by counting the number of wounds and evaluating the force necessary to produce the stab wounds [16,17],as well as through the use of sophisticated instruments and software [18,19].

In some rare homicide case, the knife is left on the crime scene or is later discovered by investigators. In these cases the forensic pathologist who has the possibility to examine the knife that has been presumptively used for carryng out the homicide, must carefully note and measure the main features of the weapon regarding to their effects on the morphology of the wounds: the length, width and thickness of the blade, whether it is a single or double-edged and smooth or serrated, the degree of taper from tip to hilt, the features of the handle, crossguard and ricasso (if present), and the characteristics of the back edge, in addition to any grooving, serration or indentation of the blade as well as its sharpness, especially at the tip [20].

Furthermore, the unknown directionality of the blade and the possibility of twisting, sliding or turning of the knife after having penetrated the skin, as well as the recurrence of more hit to the same wound, can further modify the morphology of the injuries in an unpredictable way.

In the end, we must also consider that the experimental tests performed on artificial substrate provide different results than the wounds on the skin due to the elastic properties of human tissue, so that every inference about the homicidal manner of performing the lethal assault must be expressed very carefully.

This autoptic case is to be considered almost unique due to the typology of weapon used to perform the homicidal assault, since due to the lack of (as far as we know) identical report in world literature.

Despite the exceptionality of this case, we must consider that the ease of acquiring particular knives, with variable and complex morphology, could increase the chances of facing other similar cases, which in turn could prove to be challenging for forensic pathologists.

The eventuality of this sort of homicidal assault also must be kept in mind when the morphology of the wounds is atypical and variable and therefore incongruent with the use of a traditional weapon of choice.

Declaration of Competing Interest

All authors deny any financial and personal relationships with other people or organizations that could inappropriately influence their work.

In particular they deny employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding.

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References

[1] Data from Eures-Ansa edite online at the site web: www.eures.it.
[2] C. Cialella, C. Caringi, M. Aromatario, Wounds inflicted by survival-knives, For. Sci. Int. 126 (2002) 82–87.
[3] B. Karger, J. Niemeyer, B. Brinkmann, Suicides by sharp force: typical and atypical features, Int. J. Leg. Med. 113 (5) (2000) 259–262.
[4] A. Menon, T. Kanchan, F.N.P. Monteiro, N.G. Rao, Atypical wound of entry and unusual presentation in a fatal stab injury, J. For. Leg. Med. 15 (2008) 524–526.
[5] T.J.U. Thompson, J. Inglis, Differentiation of serrated and non-serrated blades from stab marks in bone, Int. J. Leg. Med. 123 (2009) 129–135.
[6] D.J. Pounder, F.D. Reeder, Striation pattern in serrated blade stabs to cartilage, For. Sci. Int. 208 (2011) 91–94.
[7] R.A.C. Bilo, A.P. Oranje, T. Shwayder, C.J. Hobbs, Evaluating suspicious skin findings in children, Cutaneous Manifestations of Child Abuse and Their Differential Diagnosis, Springer, Berlin, Heidelberg, 2013.
[8] D. Dolinak, E. Matshes, E. Law, Sharp force injuries, Forensic Pathology: Principles and Practice, Academic Press, London, 2005, pp. 143–162.
[9] M.J. Shkrum, D.A. Ramsay, Penetration Trauma: Sharp Force Injuries in: Forensic Pathology of Trauma: Common Problems for the Pathologist, Humana Press, 2007, pp. 357–404.
[10] U. Schmidt, Sharp force injuries in “clinical” forensic medicine, For. Sci. Int. 195 (1–3) (2010) 1–5.
[11] R. Sitienė, A. Zakaras, A. Pauliukevičius, G. Kiselius, Morphologic, experimental-comparative investigation as an identification of the injuring instrument method, For Sci Int 167 (2007) 255–260.
[12] N.N. Daéid, M. Cassidy, S. McHugh, An investigation into the correlation of knife damage in clothing and the lengths of skin wounds, For. Sci. Int. 179 (2008) 107–110.
[13] D.L. Monahan, H.K.J. Harding, Damage to clothing cuts and tears, J. Forensic Sci. 35 (2007) 110–115.
[14] T. Karlsson, Homicidal and suicidal sharp force fatalities in Stockholm, Sweden. Orientation of entrance wounds in stabs gives information in the classification, For. Sci. Int. 93 (1) (1998) 21–32.
[15] T. Karlsson, Multivariate analysis (’forensiometrics’)-a new tool in forensic medicine. Differentiation between sharp force homicide and suicide, For. Sci. Int. 94 (3) (1998) 183–200.
[16] M.A. Green, Stab wounds dynamics – a recording technique for use in medico-legal investigations, J. Forensic Sci. Soc. 18 (1978) 161–163.
[17] B. Knight, The dynamics of stab wounds, Forensic Sci. 6 (1975) 249–255.
[18] E.K.J. Chadwick, A.C. Nicol, J.V. Lane, T.G.F. Gray, Biomechanics of knife stab attacks, For. Sci. Int. 105 (1) (1999) 35–44.
[19] P.T.O. Callaghan, M.D. Jones, D.S. James, S. Leadbeatter, C.A. Holt, L.D.M. Nokes, Dynamics of stab wounds: force required for penetration of various cadaver human tissues, For. Sci. Int. 104 (1999) 173–178.
[20] B. Knight, The characteristics of stab wounds, Forensic Pathology, 2nd ed, Arnold, London, 1996, pp. 139–150.