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Suicides by sharp force: typical and atypical features

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Abstract A total of 65 consecutive cases of suicide by sharp force were investigated by evaluating the autopsy and prosecution department records. Suicides constituted 17% of all fatalities from sharp force autopsied between 1967 and 1996. Young males and persons with a psychiatric history predominated among the persons who chose this "hard" method of suicide. The most common implements used were knives (62%) and razor blades (15%). Cutting injuries in isolation were present in 26, stab injuries in isolation in 24 and a combination of both in 15 fatalities. The number of injuries per case varied from 1 to 37 but 1/3 showed one injury. More than 85% of the cutting injuries were located at the wrist, elbow crease or neck whereas 79% of the stab injuries involved the ventral aspect of the trunk. Perforation of clothing was present in 16 (52%) out of 31 stab injuries to the trunk. Injuries to more than one body region were observed in 34 (52%) cases. Tentative marks were present in 50 (77%) fatalities and the number varied from 1 to 60 per case. Superficial incisions of the fingers were found in 15% with razor blades constituting the weapon in half of these cases. Deviations from these typical patterns occurred not infrequently. The utter determination of the victim to carry it through or the use of unusual weapons resulted in a few bizarre cases which are outlined briefly.

Key words Incisions · Stab · Sharp force · Suicide · Injury patterns

Introduction

Historically, self-infliction of sharp force is a classical form of suicide: Marcus Antonius, Varus and other military leaders have fallen on their own swords; Seneca, Nero, Lucretia Borgia and others have also used sharp force to commit suicide, some in an effort to save face or to avert persecution from their families. The ritual of harakiri stands in the same tradition in the East (Watanabe et al. 1973).

However, sharp force is a rare method of suicide in modern times, the incidence ranging from 2 to 3% of all suicides in most countries (Watanabe et al. 1973; Karlsson et al. 1988; Reuhl and Lutz 1992; Start et al. 1992; LaHarpe and Dozio 1998). This rare occurrence may be due to the great pain and the bloody and messy scene that are to be anticipated or to the considerable force and the anatomical knowledge required for damage to be affected on essential body structures. The sometimes spectacular phenomenology of this method of suicide has resulted in numerous and also bizarre case reports (e.g. Fekete and Fox 1980; Hasekura et al. 1985; Chadly et al. 1991; Pollak and Ropohl 1992; Betz and Eisenmenger 1995; Moriani et al. 1996; Bohnert et al. 1997; Oshima and Kondo 1997; Ueno et al. 1999) but systematic investigations (Watanabe et al. 1973; Karlsson et al. 1988; Start et al. 1992; Karlsson 1998) are rare.

In this study, special emphasis was laid on the re-evaluation of features which have been described as typical for suicide in the context of differentiation from homicide.

Materials and method

All autopsies performed at the Institute of Legal Medicine, University of Münster, between 1967 and 1996 were searched for fatalities due to sharp force. The cases of suicide were identified and re-examined using the autopsy reports and, in most cases, the prosecution department and police records. The potential for physical activity has been investigated before in a subgroup of these suicides (Karger et al. 1999).

Results

Infliction of sharp force was the cause of death in 376 autopsies. Of these, 299 (80%) represented homicides, 65 (17%) suicides and 11 (3%) were accidental deaths.

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Table 1 Blood alcohol concentrations (*BAC*)

BAC (g/l)	*n*	%
Negative	34	52
0–1	7	11
1–2	3	5
> 2	6	9
Not investigated	15	23

The male to female ratio in the suicides was 51:14 and 48% were 21–40 years of age. A history of mental disorder could be established in 38 (58%) cases and the blood alcohol exceeded 2 g/L in 6 cases (Table 1). A combination with other forms of self-inflicted trauma was found in 11 (17%) cases. In one of these, a woman suffering from paranoia first attempted self-strangulation, then tried to shoot herself (but the cartridge jammed), she then drank detergent containing acid and finally cut her throat inflicting a wound 16 cm in length which transected the oesophagus, trachea and the left carotid artery.

Cutting injuries in isolation were present in 26 (40%) fatalities and the number of severe injuries per case varied from 1 to 37 (Table 2). Cutting injuries were predominantly located at the neck and upper extremities, i.e. flexor side of the wrist (Fig. 1) and elbow (antecubital fossa) (Table 3). In two cases, gaping cuts to the throat were associated with incisions of cervical vertebral bodies.

Stab injuries in isolation were present in 24 (37%) fatalities and the number of stabs per case varied considerably (Table 2). The left chest was the preferential target area (Table 3) and complete transection of ribs occurred in three cases.

Special emphasis was laid on the clothing worn by the 31 persons who had stab injuries to the trunk. Of these 16 (52%) persons had perforated the fabric while only 9 had pulled the clothing aside to expose the skin and reliable information was not available in the remaining 6 cases. Multiple textile perforations were present in a number of cases as well as stabbing through several layers of clothing and in a sweater, 18 perforations were counted.

Combinations of cutting and stab injuries occurred in 15 cases (Table 2). Injuries to more than one body region were present in 34 (52%) cases including 11 cases where cutting injuries to the throat and upper extremity were combined.

Tentative marks (hesitation injuries) in the form of superficial cutting or stab injuries were present in 50 (77%) cases. In 42 of these, the tentative marks and the fatal injury were located in close proximity (Fig. 2) while different body regions were involved in the remaining 8 cases. The number of such marks per case varied from 1 to approx. 60 and showed a positive correlation to the number of severe injuries. In the 15 cases lacking tentative marks, 11 fatalities had a single injury only (Table 4).

The most common implements used were knives (Table 5). The implement was found in situ in six cases and the hand was still gripping the weapon in two cases (cadaveric spasm). In ten cases, superficial cutting injuries from a clumsy hold of the weapon were found at the flexor side of the fingers of one or both hands and razor blades had been used in five of these.

Bizarre cases included the following:

1. A 63-year-old woman used a large circular saw to inflict multiple deep tear/cutting injuries. Both shoulder blades showed deep incisions and both femoral heads, the oesophagus, trachea and one carotid artery and jugular vein were transected. A history of mental depression was present.

2. A 46-year-old man who was not medically trained dissected and finally transected his iliacoiliac bypass after application of a local anaesthetic spray, using a small carpet knife and a pair of scissors.

3. A 45-year-old man amputated his penis and bled to death. Tentative marks were also present at the throat. He suffered from chronic alcohol addiction and depression.

4. A 48-year-old woman stabbed herself in the left chest with a large kitchen knife with a 24 cm blade and threw herself onto the bed to drive the protruding hilt of the

Table 2 The number of severe injuries per suicide

	Number of injuries						
	1	2	3	4–9	10–20	>20	Total
Total cases	24 (37%)	10 (15%)	13 (20%)	9 (14%)	6 (9%)	3 (5%)	(100%)
Cuts	11	5	6	3	1	0	26
Stabs	13	3	5	1	2	0	24
Cuts and stabs	0	2	2	5	3	3	15

Table 3 The sites of wounding. The sums exceed the total of 65 cases because more than one body region was attacked in 34 cases. "Other" represents four unusual cutting injuries to the penis, groin, thigh and ankle

	Neck	Chest		Abdomen	Upper extremity	Other	Total
		Right	Left				
Total	32 (30%)	4 (4%)	29 (27%)	10 (9%)	27 (26%)	4 (4%)	106
Cuts	22 (39%)	0	2 (3.5%)	2 (3.5%)	27 (47%)	4 (7%)	57
Stabs	10 (21%)	4 (8%)	27 (55%)	8 (16%)	0	0	49

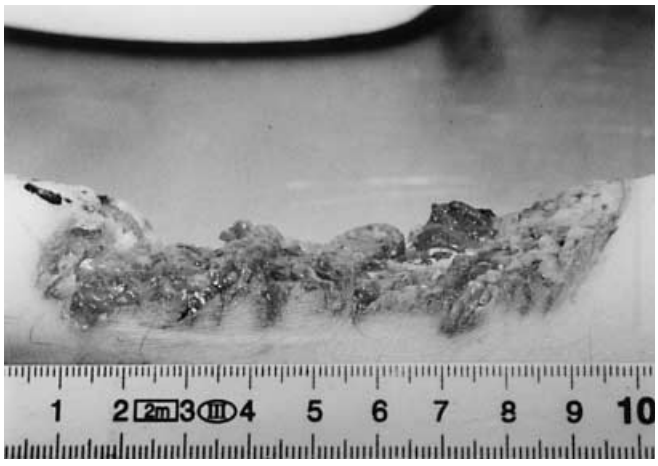

Fig. 1 Numerous suicidal cutting injuries of the flexor side of the left wrist from a razor blade in a 60-year-old man suffering from chronic schizophrenia. Several tails of single incisions can be recognised extending from the wound edge. At least 30 such tails were counted. This resulted in a massive tissue defect including transection of the tendons and both arteries and incisions in bone

Fig. 2 Tentative marks close to deeper cutting injuries of the neck in a 60-year-old woman

Table 4 The sites of wounding and the form of sharp force in 11 cases of suicide showing a single injury only, i.e. one severe (fatal) injury without hesitation marks

Form, site	Cases
Stab, left chest	6
Stab, right chest	2
Stab, neck	1
Cut, abdomen	1
Cut, wrist	1

weapon in further. She was finally found in a forward slumped position still grasping the hilt with her right hand while the tip of the blade was visible under the skin at the back. The total wound tract measured 23 cm.

5. A 39-year-old man stabbed himself in the left side of his chest and then further hammered in the hilt of the knife with a brick.

Table 5 The implements used in the 65 cases. Several persons used more than one implement. The 44 knives included 20 kitchen knives, 16 small knives for various purposes, 4 pocket knives, 2 stilettos and 2 sheath knives. The "various" implements were: 2 daggers, 2 scalpels, 2 blades of electric razors, 1 circular saw, 1 cannula and 1 paper knife

Implement	*n*	%
Knife	44	62
Razor blade	11	15
Scissors	4	6
Razor knife	3	4
Various	9	13
Total	71	

Discussion

The homicide to suicide ratio (4.5:1), the male to female ratio (3.5:1), the high incidence of mental disorders and the typical setting of being at home and using a household knife or a tool instead of a combat weapon are in accordance with previous studies (Watanabe et al. 1973; Karlsson et al. 1988; Start et al. 1992; Karlsson 1998).

A single suicidal injury was present in more than 1/3 of the cases. This frequency is similar to that of approximately 40% in homicides (Ormstad et al. 1986; Hunt and Cowling 1991; Rouse 1994). On the other hand, a large number of injuries also does not indicate homicide; the maximum number of suicidal wounds was 37 in this series and more than 100 injuries have been reported (Marx 1923; Lieske et al. 1987).

Typical sites of wounding could be established if cutting and stab injuries are differentiated. Cutting injuries clearly dominated at the wrist and elbow (running mostly transverse but sometimes also parallel to the long axis of the arm) and at the neck. The majority of the stab wounds to the left chest were aligned horizontally (23 out of 27) which is in contrast to the more vertically aligned stabs found in homicides (Karlsson et al. 1988). The stabs to the abdomen can possibly be regarded as attempted stabs to the heart since they always entered in the upper abdomen and the tracts were usually upwards, thus reaching the thoracic cavity. Suicidal stab wounds to extremities or to the skull did not occur in this series but have been reported before (Fekete and Fox 1980; Start et al. 1992; Madea and Schmidt 1993). Tentative marks are typical for suicide and their high incidence is in accordance with previous investigations (Vanezis and West 1983; Karlsson et al. 1988; Start et al. 1992).

Perforation of clothing covering the entrance wound has been interpreted as an indication for homicide since suicides allegedly pull the clothing aside to expose the skin (e.g. Puppe 1908; Strassmann 1931; Karlsson et al. 1988; Karlsson 1998). In the stab injuries to the trunk in this series, however, the frequency of such perforations was more than 50%. Case histories have also reported perforations of clothing (Lieske et al. 1987; Madea and Schmidt 1993; Bohnert et al. 1997) and Start et al. (1992) observed this

finding in 8 out of 28 (28%) suicidal self-stabbings. Consequently, exposure of the skin can be interpreted as indicative of suicide but similar to gunshot suicides (Karger et al. 1997), perforation of clothing in stab wound fatalities does not indicate homicide. This is true despite the considerable resistance of textiles to sharp force (Fazekas et al. 1972; Knight 1975; Kaatsch et al. 1993).

So in conclusion, some features which have been reported to be typical for sharp force suicides actually are not: Multiple deep wounds as well as one isolated injury can occur, cuts to the throat can incise the vertebral bones, clothing is frequently perforated, the hand can still grip the weapon and superficial cutting injuries at the fingers can imitate defensive-type injuries. There can be no substitute for a meticulous attention to detail in the course of the autopsy and the examination of the scene of death.

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ANNOUNCEMENT

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