

*Thore Karlsson*<sup>1</sup>; *Kari Ormstad*,<sup>1</sup> *M.D., Ph.D.*; and  
*Jovan Rajs*,<sup>1</sup> *M.D., Ph.D.*

## Patterns in Sharp Force Fatalities— A Comprehensive Forensic Medical Study: Part 2. Suicidal Sharp Force Injury in the Stockholm Area 1972–1984

---

**REFERENCE:** Karlsson, T., Ormstad, K., and Rajs, J., "Patterns in Sharp Force Fatalities—A Comprehensive Forensic Medical Study: Part 2. Suicidal Sharp Force Injury in the Stockholm Area 1972–1984," *Journal of Forensic Sciences*, JFSCA, Vol. 33, No. 2, March 1988, pp. 448–461.

**ABSTRACT:** A total of 89 cases of sharp force suicide that had been committed in the Stockholm area in Sweden from 1972 through 1984 were investigated. The series showed a male preponderance, sex ratio 3.3, and among males a shift towards the age group 40 to 49 years of age. An impact of cultural/ethnic factors was indicated by the overrepresentation of Finnish and Hungarian immigrants. A psychiatric diagnosis had been ascribed in 22 cases, and addiction to drugs or alcohol in 23. Previous attempts at self-destruction were recorded in 11 cases, only 1 of which was by sharp force.

Classical indicators of suicidal intent, for example, suicide notes and the presence of hesitation injuries, were found in 28 and 80%, respectively. A preference for certain anatomical locations (throat, precordium, epigastrium, wrists) was confirmed as was the tendency to expose the skin before inflicting suicidal wounds. As compared to homicidal precordial stabs whose entrance wounds usually run vertically, horizontal or upwards/left-slanting stabs are strongly suggestive of suicide. Although cases were encountered where several "rules of thumb" concerning homicidal versus suicidal patterns were violated, our series contained no case of injuries to the backside of the trunk and no case of more than one wound piercing the left ventricle of the heart. Multiple chest wounds transecting costal or sternal bone were however not uncommon, and, along with the use of bizarre tools and objects like wood chisels or pieces of glass, illustrated the determination of suicidal intent.

Toxicological analysis was positive for drugs in 22 and for alcohol in 27 cases. Blood alcohol levels were roughly similar to those found in victims of homicidal sharp force, whereas drug levels tended to be lower or higher in suicides.

**KEYWORDS:** pathology and biology, suicide, stab wounds, comparative analysis

The natural history of suicide has been a matter mostly dealt with by psychiatrists, psychologists, and sociologists. Forensic medicine has contributed with substantial information about completed suicides, and classical textbooks of forensic medicine give valuable guidance on how to differentiate suicidal acts from other forms of violence.

Received for publication 21 Feb. 1987; revised manuscript received 12 May 1987; accepted for publication 1 June 1987.

<sup>1</sup>Medical student, assistant professor, and professor, respectively, Department of Forensic Medicine, Karolinska Institutet, Stockholm, Sweden.

The present work describes a series of persons who have committed suicide by sharp force and gives a comparison with a population of sharp force homicide victims described in a previous paper [1]. The aim of this study is to investigate whether the well-established "rules of thumb" regarding suicidal versus homicidal stab and incised wounds are still true in modern Sweden, and whether other indicators may be of relevance these days. Other authors have studied different groups of suicides (hanging and medicinal drug overdose [2-8]) and our data are compared to theirs.

### Patients and Methods

The study comprises all cases of suicide, committed by means of any sharp object, during the 12-year period from 1973 up to 1984 in the area of Stockholm, Sweden. The population of the region have been defined in a previous paper [1]. A total of 89 deaths has been examined retrospectively, all judged as suicides both by the police and medicolegal experts. All cases were subjected to postmortem examination at the National Institute of Forensic Medicine in Stockholm. Our sources of information were police records, autopsy reports, and results of toxicological analyses. In cases where psychiatric treatment was mentioned, psychiatric records were consulted.

### Results

#### *Incidence*

In the Stockholm area suicide rates have been constant during the period 1972 through 1982, with an annual incidence of 20.2 per 100 000 inhabitants [9]. This is similar to the rates in Sweden as a whole (19.4 per 100 000). Suicides committed by cutting and stabbing constitute approximately 2.2% of these deaths in Sweden and approximately 2.0% in the Stockholm area. Figures regarding various methods of suicide are presented in Table 1.

#### *Seasonal Variation*

Our series shows a significant rise in suicide rates in March and April and low rates in October. The incidence of sharp force homicides, on the contrary, peaks in June, has its low point in July (when most people in Sweden are on vacation) but peaks again in October [1] (Fig. 1).

TABLE 1—Choice of methods of suicide in Sweden 1973–1984 from Ref 9.

Method of Suicide	Victims				Male/Female Ratio
	Males		Females		
	N	%	N	%	
Poisoning (by solids or liquids)	2 277	17	2329	41	0.98
Poisoning (by household gas)	200	1	94	2	2.13
Poisoning (by other gases)	1 680	12	168	3	10.0
Drowning	761	6	1008	18	0.75
Shooting and explosives	2 203	16	55	1	40.0
Jumping from a height	554	4	353	6	1.57
Hanging, strangulation	5 014	37	1356	24	3.70
Sharp force	341	3	93	2	3.67
Other	497	4	276	5	1.80
Total	13 527	100	5732	100	2.36

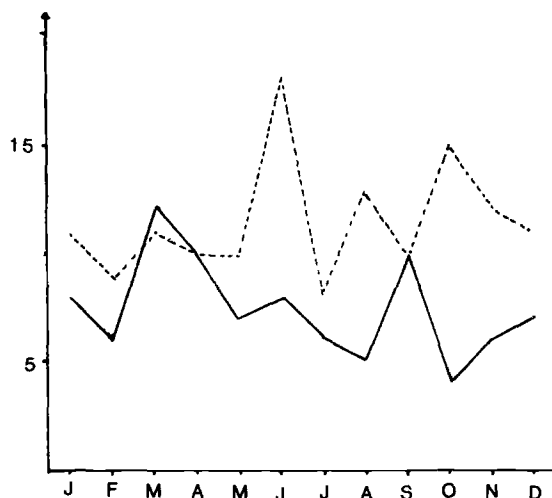


FIG. 1.—Monthly distribution of sharp force suicides (whole line) versus homicides (broken line).

#### *Characteristics of Victims*

In our series of 89 cases, 68 suicide victims were male and 21 female, yielding a male to female ratio of 3.3 (below the age of 50, 3.1 and above 50 years, 3.6). The all over sex ratio when all suicides in Sweden are counted is 2.4 (Table 1). In our series of male suicides, single men in the age group 20 to 60 years constituted no less than 60% ( $N = 34$ ). Among female victims of the same age group singles comprised 47% ( $N = 8$ ). The age distribution is shown in Fig. 2, as compared to data for the entire country and for Stockholm regarding all suicides in 1977. The mean age for male suicide victims was 45.6 years (standard deviation [SD] 13.46 years) and for females 47.3 years (SD 15.36 years). The youngest victims in our series were 2 boys aged 14 and 15 years, respectively.

#### *Nationalities*

The representation in our series of persons belonging to different major ethnic groups is presented in Table 2. The term ethnic group here denotes a population speaking a certain language. Finns were obviously overrepresented, and probably, their distant ethnical relatives the Hungarians, if such low figures allow any conclusion. Five other ethnic groups with a population of 7 000 to 30 000 were represented with 1 suicide victim each.

#### *Suicide-Provoking/Precipitating Factors*

A summary of motives that may have had a causal relationship to the suicide is given in Table 3. In most cases several different factors may have contributed to the self-destructive act. Among single males alcoholism was a common feature: explicit information about alcohol abuse was present in 15 out of 34 cases. Among females, a history of mental and somatic illness was often recorded.

A history of psychiatric illness, other than that related to alcoholism, was obtained in 22 cases (Table 4), among which 9 patients were undergoing treatment at mental hospitals at the time of suicide. In 2 cases the suicide took place within the hospital, the others while on leave. In 6 cases some kind of psychosis had been diagnosed, and affective disorders in 7.

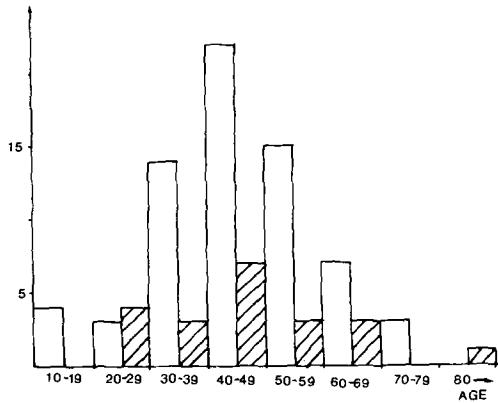
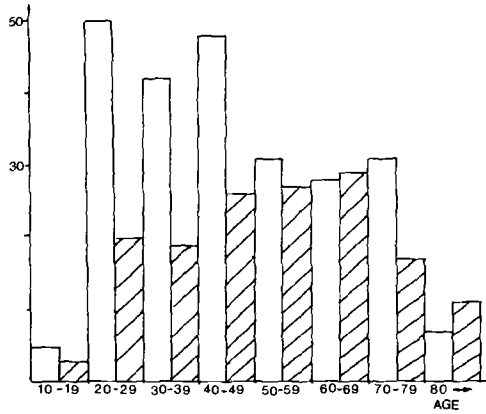
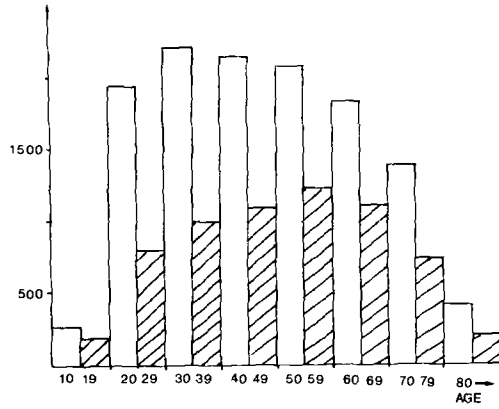


FIG. 2—(Top) age and sex distribution of all suicides in Sweden and in Stockholm 1977 (middle) in comparison with only sharp force suicides in Stockholm (bottom) during the period 1972–1984 (males: white bar; females: striped bar).

TABLE 2—Relative representation of various ethnic groups in the total population of Sweden 1980 and in the present series of sharp force suicide victims.

Ethnic Group	Victims (Present Series)		Total Representation of Ethnic Groups in Sweden 1980 <sup>a</sup>		Ratio, % Victims/% of Population
	N	%	N	%	
Swedish	73	82	7 730 000	93	0.9
Finnish	10	11	240 000	3	3.8
Hungarian	2	2	10 000	0.1	16.6
Other	5	6	338 000	4	1.5
Total	89	99	8 317 937	100.0	...

<sup>a</sup>Data compiled from J. Widegren *Svensk Invandrapolitik*, Stockholm 1980 [10].

TABLE 3—Apparent motives for committing suicide by sharp force injury, Stockholm 1973-1984.

Motive	Males		Females	
	N	%	N	%
Known mental illness	14	20	8	38
Known serious somatic illness (cancer, blindness, lung disease, hyperthyreosis)	6	9	5	23
Emotional loss (divorce, death of partner)	7	10	0	...
Problems related to career or studies	2	3	0	...
Economic problems	1	1	0	...
Fear of social disgrace	2	3	0	...
Unknown, no motive found	36	53	8	38
among these, known alcoholics	15	22	1	5
Total	68	100	21	100

The mental illness was considered part of, or a result of, a drug abuse syndrome in 4 cases, and in 1 case each the diagnoses "neurasthenia" and "neurotic crisis" had been given. Three patients who had but a few treatment sessions with the mental health services had not been definitely diagnosed.

The duration of mental illness, that is, the interval between diagnosis and suicide, was several years in the majority of cases. In 15 cases the patient had been to his/her last treatment session less than 1 week before death.

Some kind of addiction was known in 11 cases; alcoholism in 7, combined alcoholism and medicinal drug addiction in 2, and medicinal drug abuse in another 2 among the 22 suicide victims with known mental disease.

At least eleven victims (12%), nine of whom had been given a psychiatric diagnosis, had attempted self-destruction within six months before death, and in five cases within eight days. One woman who was suffering from a puerperal psychosis had tried to kill herself on two occasions during the last fortnight before she succeeded. The most frequently chosen method in these eleven parasuicides was drug overdose. Sharp force injury or attempted hanging occurred in one case each.

#### Scene Investigation

Suicide notes had been left in 25 cases (28%), among these only 4 written by females (19% of all female victims) as compared to 21 (31%) by males.

TABLE 4—*Psychiatric history in 89 persons who committed suicide by sharp force.*

Diagnosis	Males	Females	Duration	Total
<i>Psychosis</i>				
Schizoaffective psychosis	2	...	10 yrs + 10 yrs	6 (7) <sup>a</sup>
Paranoid psychosis and depression	...	1	12 yrs	
Reactive schizophrenia	2	...	1 yr + a few weeks	
Postpartum psychosis	...	1	a few weeks	
<i>Affective disorders</i>				
Endogenous melancholia	4	...	15, 5, 6 yrs + a few weeks	7 (8)
Involitional melancholia	...	1	10 yrs	
Affective melancholia	1	1	13 yrs + 15 yrs	
<i>Drug-related mental illness</i>				
Drug dependency with paranoid psychosis	...	1	10 yrs	6 (7)
Drug dependency with neurosis and a "borderline personality"	...	1	8 yrs	
Psychosis with epilepsy	1	...	25 yrs	
Korsakoff's psychosis	1	...	25 yrs	
Neurotic crisis	...	1	4 yrs	
Neurasthenia	1	...	a few weeks	
<i>Mental illness without definite diagnosis</i>				
Unknown diagnosis	2	...	a few weeks	3 (3)
Unknown diagnosis (observation, alcoholism)	1	...	a few weeks	
<i>Alcoholism</i>	15	1	unknown	16 (18)
Total number with psychiatric history	30 (44)	8 (39)		38 (43)
<i>Unknown or no obvious mental illness</i>				
	38 (56)	13 (61)		51 (57)
Total	68 (100)	21 (100)		89 (100)

<sup>a</sup>Numbers in parentheses are percentages.

Most sharp force suicides had taken place at the victim's home (Table 5). This type of suicide was more often committed at home and in the bathroom by females than among males.

The weapons or tools used are listed in Table 6. Common household knives were used in approximately one third of the cases and other "tool" knives in another third. Razor blades, which accounted for nearly the entire remaining third, were more often used by males than by females. In some cases (usually females without known mental illness), the hastiness of self-destructive action was enhanced by the use of pieces of broken glass and plastic or wood chisels. At the opposite extreme we have also encountered a case of a well planned and professionally performed suicide by a physician, who under local anaesthesia had prepared his right femoral artery and achieved a fatal hemorrhage from a neat longitudinal incision of the vessel wall.

#### *Patterns of Wounding*

The distribution of wounds in sharp force suicides is illustrated in Fig. 3 and Table 7. As can be seen, there are certain anatomic regions where no suicidal injuries have been found: face, shoulders, and the backside of the trunk. Extremity injuries dominated in males, throat injuries were seen more often in females (34:16%), while the trunk was equally in-

TABLE 5—*Location for performance of suicidal sharp force violence, Stockholm 1973-1984.*

Location for Suicidal Act	Males		Females	
	N	%	N	%
In the victim's home <sup>a</sup>	44	65	17	81
Bathroom	16	24	7	33
Elsewhere	28	41	10	48
In hospitals	1	1	2	10
Outside home	23	33	2	10
Indoors	8	11	1	5
Outdoors	15	22	1	5
Total	68	100	21	100

<sup>a</sup>Home denotes the place where nights usually are spent; hospitals and institutions are called "home" if the victim had lived and slept there for a long time.

TABLE 6—*Types of weapons or tools used to inflict suicidal sharp force injuries, Stockholm area 1973-1984.*

Type of Instrument Used	Males		Females		Total	
	N	%	N	%	N	%
Household knives	22	30	8	35	30	31
Other types of knives	17	23	4	17	21	22
Razor blades	25	34	4	17	29	30
Scalpels	4	5	1	4	5	5
Pieces of broken glass or plastic, wood chisels	3	4	3	13	6	6
Scissors	0	0	1	4	1	1
Unknown	3	4	2	9	5	5
Total	74	99	23	96	97	100

jured in both sexes. Very few deep wounds were located on the legs. The wrists, anterior aspect of the elbow region, the pit of the stomach, the throat, and the precordium were the most common locations for suicidal stab and incised wounds. Tentative superficial wounds inflicted immediately before the fatal deep slash or stab wound were found in 71 cases (80%) in our series. Thus, in no less than 18 cases (20%) tentative wounds were absent. Blood vessels in arms or legs had been severed in 40 cases. In 4 of these a solitary lesion of the radial or ulnar artery at wrist level had led to fatal hemorrhage. Thirty-four stab wounds had pierced the thoracic wall, among which twenty-six passed through the intercostal spaces. In four cases ribs were virtually transected, in one the sternal bone was pierced, and in three cases ribs were incised, but not cut through. In the former five instances it was assumed that the suicidal victim had practically "thrown himself" upon the knife. Only in 3 of 34 cases did the knife seem to have been stopped by the ribs and another area had been chosen for a second thrust.

The greatest number of injuries in a single case of suicidal stabbing was 31. This occurred in a 28-year-old female, who according to behavior, clinical findings, and postmortem microscopy was probably suffering from thyrotoxicosis. The greatest number of injuries in a

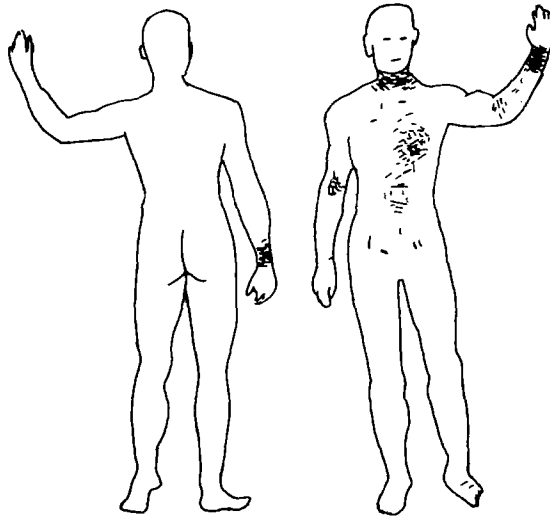


FIG. 3—Schematic superimposed presentation of wound localization in 89 victims of suicidal sharp force violence.

TABLE 7—Anatomical localization of suicidal sharp force injuries, Stockholm area 1973–1984.

Anatomical Localization of Wounds	Number of Wounds	Males		Females		Total	
		N	%	N	%	N	%
Extremities only, total	one or several	33	48	7	34	40	45
Extremities	one single <sup>a</sup>	5	7	1	5	6	7
Extremities	several	28	41	6	29	34	38
Extremities + throat	several	6	9	2	10	8	9
Throat only	several	3	4	5	24	8	9
Throat + abdomen	several	2	3	0	0	2	2
Only abdomen or thorax	one single <sup>a</sup>	7	10	2	10	9	10
Abdomen and/or thorax	several	7	10	2	10	9	10
Abdomen + extremities and/or thorax	several	7	10	2	10	9	10
Abdomen + extremities + thorax and/or throat	several	3	4	1	5	4	4
Total		68	98	21	103	89	99

<sup>a</sup>In these cases no tentative wounds were observed.

limited area—the precordium—was 15, of which 10 pierced the chest wall and 1 penetrated the anterior wall of the heart.

Among the 33 cases exhibiting thoracic abdominal wounds or both, cardiac injuries occurred in 20. Table 8 gives a description of the 20 suicidal cardiac injuries from this series as compared to 20 nonselected homicidal cardiac stab wounds. An interesting difference be-



TABLE 8—Comparison of 20 suicidal and 20 homicidal stab wounds affecting the heart.

	Suicide	Homicide
DIRECTION OF THE LONG AXIS OF THE WOUNDS' OPENING IN THE SKIN		
Slanting upwards to the right	2	10
Vertical	2	5
Slanting upwards to the left	5	3
Horizontal	11	2
	20%	75%
	80%	25%
INJURED PART OF THE HEART		
Right ventricle	6	9
Right atrium	1	-
Left ventricle	10	7
Left atrium	-	1
Double channels from one skin wound affecting right + left ventricle	...	1
Wounds ending blindly in the myocardium, no connection into cardiac lumina	3	2

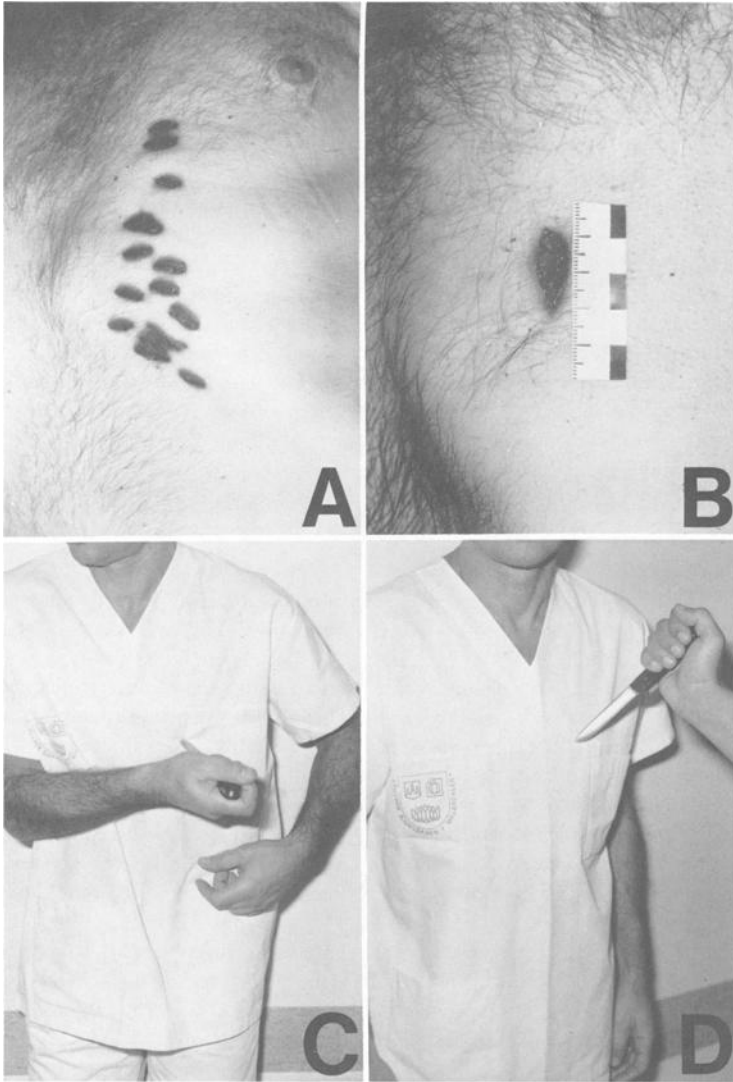
tween the direction of the surface wound in suicidal versus homicidal stabbing is seen, which is probably due to the fact that in most cases the knife is held by the right hand of the "perpetrator," which leads to 2 biomechanically different processes (Fig. 4). According to our data, a transverse or upwards/left slanting incision, that is, parallel to the ribs, speaks in favor of suicide whereas a longitudinal or upwards/right slanting incision should raise suspicion of homicide. Only 5 of 20 cases of homicidal stab wounds in the precordium were oriented parallel to the ribs. Reconstruction demonstrated that in some of these cases a female, right-handed assailant inflicted the wound holding the knife in an awkward grip, wrist hyperextended. Among the 20 suicidal stab wounds affecting the heart, the left ventricle was pierced in 10 cases, the right one in 6 and the right atrium in 1. In 7 cases 2 heart injuries were found, among which in 1 case both wounds having pierced the right ventricle. In 6 cases the other stab wound had ended blindly in the myocardium. In no case had the lumen of the left ventricle been reached by more than 1 wound. In 4 cases 1 stab wound had transixed the entire heart.

### Toxicology

Toxicological analyses were performed in 76 cases of 89. Among these, 20 analyses only were for alcohol; the remaining 56 cases had also been tested for various drugs. Tests for blood alcohol were positive ( $> 0.03$  g/dL) in 27 cases (33% of those tested). The highest concentration found was 0.27 g/dL in blood and 0.38 g/dL in urine. Only in 13 cases had both urinary and blood alcohol concentrations been determined, and in 9 of these the urinary alcohol level was higher than that found in blood. Analyses for drugs were positive in 22 cases (39% of those tested). Most commonly found were benzodiazepines (7 cases, 0.3 to 11- $\mu$ g/g urine), salicylates (4 cases, 0.7 to 26- $\mu$ g/g liver tissue), and phentiazines (3 cases, 0.3 to 3.6-mg/100 g liver tissue). Two cases showed amphetamines to be present (1 to 23- $\mu$ g/100 g blood).

### Causes of Death

In most cases the heart or some major artery or vein had been damaged, leading to fatal hemorrhage or cardiac tamponade. In no case was air embolism the immediate cause of death. Delayed death as a result of infection or other complications did not occur.



**FIG. 4**—Precordial region showing multiple horizontal stabs in a case of suicide (a) and a single vertical stab in a case of homicide (b). Natural grip of knife in suicide (c) and homicide (d). Note the direction of the blade of the knife.

Our series also contains cases in which sharp force injury was the last, and successful, attempt to end life. In 1 case, a 49-year-old alcoholic female, who earlier had expressed a death wish, was found in her flat behind locked doors and windows. Examination of the scene indicated that she had first tried to hang herself in a twisted bedsheet tied to the electric wire of a ceiling lamp. The noose broke, and she fell down; then she stabbed herself unsuccessfully in the chest with a piece of glass from the shattered lamp globe. Finally she fetched a knife from a kitchen drawer and threw herself upon it, leaving its handle protruding from her chest.

### *Clothing*

Information regarding the victims' clothing at the time of suicidal stabbing was available in 69 of 89 instances. In 65 of these 69 cases (94%) the injured area had been exposed, in the remaining 4 cases (6%) the stabbing instrument had pierced the clothes covering the injured part.

One male, 53 years of age, who had suffered from a depressive/hypochondric condition and was irrefutably convinced that he had severe heart disease plus cancer, committed suicide by stabbing himself repeatedly in the chest with a carving knife while fully clothed; that is, the knife had perforated his buttoned overcoat, necktie, shirt, and undershirt. Immediately before committing suicide he had tried to kill his wife.

The presence in four cases of several factors, regarded as being suggestive of homicide rather than suicide (for instance stab wound passing through clothes, ribs, sternal bone, or the entire heart, or when wounds were scattered over many different locations) had caused the police to be suspicious. These cases were thoroughly investigated by us in cooperation with the police and it was found that all the above-mentioned "peculiarities" could even be found in one single case of suicide.

### **Discussion**

A reluctance to injure oneself with sharp instruments for self-destructive purposes and the availability of potential instruments is evident since only 2% of Swedish suicides are committed by sharp force injury.

The male dominance in our series of sharp instrument suicides is significantly more pronounced than in the total suicides in Sweden. This also confirms the widely held notion that women are less apt to choose this manner of ending their lives. The choice of method is likely to be influenced by cultural factors, and certain differences among ethnic groups are suggested by our series (Table 2). Because of the limited number of cases the data should be regarded as semiquantitative, but the apparently higher incidence of Finns and Hungarians resorting to this suicidal means is noteworthy. Interestingly, Finns were also relatively over-represented among perpetrators of homicidal sharp force injury in the Stockholm area during the same period [1].

Despite profound differences in cultural background, folklore, and religion, a Japanese study on sharp force suicides has given results strikingly similar to ours. Watanabe et al. [2] reported that 167 of 216 victims were male ( $\sigma: \text{♀} = 3.4$ ) and that suicide by stabbing/cutting constituted 2% of all suicides.

The age distribution for male suicide victims found in this series differs from that usually reported [3], that is, an incidence increasing up to approximately 50 years of age which thereafter remains fairly constant. In the present series, relatively few older men have committed suicide by sharp force, 35% were more than 50 years old (Fig. 2c). When compared to the age-related total number of suicides in Sweden (Fig. 2a) we also find that relatively few males in the age group 20 to 30 years chose sharp force as a method of suicide.

Despite the "all-or-none" character of hanging as compared to self-inflicted sharp force injury, these two easily available methods of suicide bear several similarities in terms of determination and dramatic effect. Thus, we have found a comparison of our data to current knowledge on hanging to be of interest. In his study from London, Bowen [4] found that among 188 suicides by suspension, 156 victims were male ( $\sigma: \text{♀} = 4.9$ ) and 59% were more than 50 years old. Another British series [5] of 277 suicidal hangings gave a male:female ratio of 5.0, and Fiedorczuk [6] reported a ratio of 5.2 among 199 suicides by hanging in Poland.

As opposed to stabbing and hanging, a traditionally "feminine" way of deliberately ending one's life is poisoning. This seems to be true still in Britain as well as in Sweden. Patel [7] reported that in a series of 216 suicides by sedative/hypnotic drug overdose the male:female

ratio was 0.65, and our Table 1 shows that, except for gas poisoning, this ratio in Sweden was only slightly higher (0.98). Thus, sharp force injury is an infrequent way of committing suicide in both sexes, but its pattern of use is more similar to that of hanging than to that of drug overdose. As methods for parasuicide, that is, without true self-destructive intent, but merely as a "cry for help," both sharp force and deliberate poisoning seem to be most common in younger females, whereas middle-aged males are the most likely candidates for completed sharp instrument suicide. The explanation to this is probably that a stab or an incised wound can be directed and graded, and the degree of danger can be roughly predicted. A population of sharp force suicides is therefore likely to represent a hard core of mature men determined to die and thus is different from the younger females who inflict minor injuries as a "cry for help" and without self-destructive intent.

The impact of mental illness on the decision to commit suicide is difficult to evaluate, and it may be argued that the suicidal act per se is a pathognomonic sign of profound psychiatric disturbance. If known psychiatric diagnoses and known abuse of alcohol, narcotics, and medicinal drugs are considered together, the resultant group amounts to 43% of our series. Among these suicide victims, 9 persons (10%) were currently under psychiatric treatment at a mental hospital at the time of their death. In Davison and Marshall's series [5] on hanging, 6.6% of the suicides were committed inside a mental hospital. It is a well-known experience that persons who have previously committed parasuicide are at an increased risk of deliberately ending their own life. We found that at least 11 victims (12%) had a history of previous parasuicide, 2 of which were by drastic methods like hanging and stabbing. Bowen's series contained the same incidence of parasuicides, that is, 12% of victims who finally hanged themselves [4]. Both these series demonstrate a tendency to opt for different methods—only 1 case of previous sharp force injury versus 9 cases of drug overdose in our series, and 4 cases of wrist slashing among 188 suicides by hanging.

A central question in the medicolegal investigation of fatal injuries is whether the case represents suicidal or homicidal violence. As already mentioned, a previous history of parasuicide suggests deliberate self-destruction, and another strong indication is the presence of a suicide note. However, in most cases no such message is found. In the present series, a written declaration of suicidal intent was found in 25 cases (28%), and Davison and Marshall [5] reported that suicide notes had been left in only 11.4% of the 105 suicidal hangings reviewed by them. The question of suicide versus homicide is far more relevant in cases of sharp force injury than in hanging, possibly because the scene—blood, knife, and body with injuries—looks more openly dramatic. However, the absence of a suicide note should not automatically be taken as an indication of homicide.

The relative representation of various sharp or pointed instruments used to inflict the suicidal injuries reflects their overall availability. Razor blades, kitchen knives, and other types of "tool" knives dominate (Table 6) while "weapons" like stylets, bayonets, and flash knives are not represented in our series. Similar findings were reported by Watanabe et al. [2] in whose series the three above-mentioned types of instruments accounted for 78% of the suicides investigated.

It has previously been suggested that in suicidal stabbings access to the heart generally is sought from below the costal arch or from the pit of the stomach, and that "any site even slightly removed from this "elective" situation should arouse suspicion of homicide" [11]. However, it is evident that suicidal stabs may be directed at almost any site on the anterior aspect of the trunk, although preferentially at the precordium or the epigastrium. Self-inflicted cut-throat injuries are a rarity in Sweden, which has also been known for homicidal sharp force injury to this region [1]. One conceivable explanation could be that in Sweden slaughtering of domestic cattle is performed industrially by means of electricity or slaughtering mask and not by cut-throat exsanguination. Our data indicate that horizontal or rib-parallel stab wounds in the precordium are suggestive of suicide, whereas wounds whose long axis runs vertically speak in favor of homicide. The "suicidal" pattern may be due to the perpetrator's intent to avoid anatomic obstacles like ribs and thus to seek access to his heart

via the intercostal spaces while clutching the knife in his right or both hands, edge pointing more or less horizontally. In the case of homicidal attack, on the contrary, the stabbing instrument cannot be as carefully aimed, and furthermore, the "natural" grip of a knife in the hand of an assailant is such that the back of the blade faces upwards, edge downwards.

According to our series more than one stab wound piercing the left cardiac ventricle is uncommon in sharp force suicide. This may be due to an immediately incapacitating effect of one such injury, which precludes further self-destructive activity. The existence of tentative wounds is regarded as strongly suggestive of suicide. Nevertheless, in the present series, tentative wounds were absent in no less than 20%. Vanezis and West [8] have reported that in a series from London tentative wounds were absent in 14 out of 29 self-inflicted stabbings. Thus, the tentative wounds per se are highly suggestive of suicide, but absence of such injuries does not exclude suicide or give any other guidance. Among 34 stab wounds penetrating the thoracic wall no less than 8 involved transection of bone or cartilage. One reason why ribs seem to offer so little protection may be—as experienced butchers have told us—"warm bones yield far less resistance to the knife than cold ones." Thus, the force needed to cut a bone at autopsy may exceed that needed to do the same to a living person.

A single transverse cut through on an otherwise healthy blood vessel at the wrist is reported to be harmless, since a completely severed vessel will contract and thereby limit the blood loss [12]. Yet our series contains 4 cases out of 40 (Table 7) where a fatal hemorrhage had taken place even when the only injury was a complete transection of a peripheral artery in a young, nonalcoholic person.

## Conclusion

When compared to our previously published series of homicidal sharp force violence [1], the present series shows a slightly shifted pattern of toxicological data. Among homicide victims tested, 72.4% were positive for blood alcohol and 18% for drugs, whereas alcohol was detected in 33% and drugs in 39% of suicides. The range of blood alcohol concentrations was roughly similar in the two series, while drug concentrations showed greater variations, that is, tended to be lower (therapeutic) or higher in the suicide victims. In the cases of massive overdose the poisoning may be regarded as another, but slower acting, measure of self-destructive action.

Our observations regarding the victim's clothing are similar to the opinion given in most medicolegal texts, that is, that local unbuttoning, pulling up, or other exposure of the injured part is an indication of suicide rather than homicide. However, the present series contains cases where several layers of clothes have been pierced repeatedly, and we have also seen cases of homicidal chest stabbing where the victim's shirt and sweater were undamaged, probably as a result of textile disarray during the fight preceding the fatal injury.

## References

- [1] Ormstad, K., Karlsson, T., Enkler, L., and Rajs, J., "Patterns in Sharp Force Fatalities—A Comprehensive Forensic Medical Study," *Journal of Forensic Sciences*, Vol. 31, No. 2, April 1986, pp. 529-542.
- [2] Watanabe, T., Kobayashi, Y., and Hata, S., "Harakiri and Suicide by Sharp Instruments in Japan," *Forensic Science*, Vol. 2, 1973, pp. 191-199.
- [3] Kreitman, N., "Die Epidemiologie von Suizid und Parasuizid," *Nervenarzt*, Vol. 51, 1980, pp. 131-138.
- [4] Bowen, D., "Hanging—A Review," *Forensic Science International*, Vol. 20, 1982, pp. 247-249.
- [5] Davison, A. and Marshall, T., "Hanging in Northern Ireland—A Survey," *Medicine, Science and the Law*, Vol. 26, No. 1, 1986, pp. 23-28.
- [6] Fiedorczuk, Z., "Die Analyse von Todesfällen infolge Erhängens," *Arch. Med. Sadowej*, Vol. 33, 1983, pp. 205-210.
- [7] Patel, N. S., "Pathology of Suicide," *Medicine, Science and the Law*, Vol. 13, No. 2, 1973, pp. 103-109.

- [8] Vanezis, P. and West, I. E., "Tentative Injuries in Self Stabbing," *Forensic Science International*, Vol. 21, 1983, pp. 65-67.
- [9] Causes of death 1972-1984, Official Statistics of Sweden, National Central Bureau of Statistics, Stockholm, yearly publication, 1972-1984.
- [10] Widegren, I., *Svensk invandrapolitik*, Stockholm, 1980.
- [11] Simpson, K., *Forensic Medicine*, 8th ed., Edward Arnold Ltd., London, 1979, pp. 64-73.
- [12] Sigrist, Th. and Dirnhofer, R., "Zum Suizid durch Pulsaderschnitte des Handgelenkes," *Zeitschrift für Rechtsmedizin*, Vol. 81, 1983, pp. 159-164.

Address requests for reprints or additional information to  
Kari Ormstad, M.D., Ph.D.  
Department of Forensic Medicine  
Karolinska Institutet  
S-104 01 Stockholm  
Sweden