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Fatal Head Injuries from Firearms

An Autopsy Study of 270 Cases

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Summary. Autopsy findings in 270 fatal head injuries from firearms are reported, including 243 suicides and 27 homicides. The most frequent weapon used for both groups were shot guns which are easily available in Norway. For suicides the most favored sites were right tempoparietal, frontal, and mouth. Twenty-six percent of the victims from homicides had multiple wounds in their head. Suicide by firearms showed marked male predominance, whereas the sex ratio for homicide was rather equal between the two sexes.

Key words: Autopsy findings – Firearm – Head wounds, from firearms

Zusammenfassung. Es wird über Obduktionsbefunde bei 270 tödlichen Schußverletzungen des Kopfes berichtet, 243 Suizide und 27 Morde. Die am häufigsten benutzte Waffe in jeder Gruppe waren Schrotgewehre. Diese Waffe ist in Norwegen leicht zugänglich. Bei Selbstmorden fanden sich die Einschußstellen am häufigsten an der rechten Schläfe, Stirn oder im Mund. Sechszwanzig Prozent der Opfer eines Mordes hatten multiple Kopfverletzungen. Bezüglich Selbstmord durch Erschießen wurde ein Übergewicht des männlichen Geschlechts festgestellt, während bei Mord die Geschlechtsverteilung ungefähr gleich war.

Schlüsselwörter: Erschießen, Obduktionsbefunde – Kopfverletzungen durch Schuß

According to Norwegian law the possession of weapons apart from shot guns, air guns, and spring-driven weapons requires a special firearm certificate given by the police. As a result of this rather restrictive legislation violence due to firearms play only a small role in the whole spectrum of violence and crime, including suicide. As a personal experience forensic pathologists have their opinion about the most frequent site of injury and which weapons used in firearms fatalities. This may be the reason for the rather low frequency of reports

concerning this problem. Eisele et al. [1] have studied suicidal gun shots in detail and found that in about 75% of the cases, the head was the favored site. The aim of the present study was to investigate fatal head injuries from firearms by means of the autopsy files, including both suicide and homicide.

Material and Methods

The autopsy files from the 10-year period between 1973 and 1982 have been investigated. During this period 7,406 autopsies were performed at the Institute of Forensic Medicine, University of Oslo, Norway. This constitutes about half the legal postmortems in Norway in the actual period. In Norway legal postmortem are ordered by the police. The main part of the material is from Oslo and the neighboring county. Unfortunately, the police's practice in ordering postmortems has not been uniform in the period or in the region investigated. Nevertheless, in this material 906 fatal head injuries were found, including 632 cases from blunt forces reported elsewhere, leaving 274 firearm fatalities for further investigation. Four of these were classified as accidents and were also excluded.

The autopsies were performed by several forensic pathologists. The brain investigation was limited to macroscopic findings only, except in six cases, which underwent full neuropathologic examination. Information concerning weapon type, survival time, etc., were given in the police report. The alcohol analyses were performed at the National Institute of Forensic Toxicology, Oslo. In many cases the files from the clinical department, in which the patients had been treated, were asked for and informative recorded. All information was collected in a computer which later on did much of the mathematical work.

Results

Generally speaking, in 90% of the suicides the head was the favored site, while the corresponding figure for homicide was 57%. Table 1 shows the number of cases for both sexes in each group. As expected, of 270 suicides 97% were males, while the 27 victims from homicides were distributed rather equally between the two sexes. The frequency of alcohol consumption is also given in Table 1. About 30% of the persons killed were under influence of alcohol.

The age distribution is given in Table 2. The figures for suicide are distributed rather equally between 20 and 70 years. The number of cases for both groups in each year of the 10-year period is shown in Table 3. The total number of suicides in Norway has risen from 8.7 pr. 100,000 in 1973 to 12.5 pr. 100,000 in 1980, which is reflected in the rising figures for suicide by firearms in the same

Group	Sex distribution			Alcohol consumption (% > 0.5‰)
	F	M	F + M	
Homicide	11	16	27	35
Suicide	7	236	243	33
Total	18	252	270	34

Table 1. Number of cases for both suicide and homicide according to sex, and the number of persons under influence of alcohol (in %)

Table 2. Number of cases in each age group

Age group (years)	Suicide	Homicide
0-10	0	2
11-20	27	2
21-30	46	7
31-40	35	6
41-50	44	5
51-60	44	3
61-70	32	2
71-80	12	0
81-90	3	0
Total	243	27

Table 3. Number of suicides and homicides in each year of the period investigated

Year	Suicide	Homicide
1973	9	4
1974	20	0
1975	16	0
1976	18	4
1977	35	3
1978	21	4
1979	26	3
1980	29	4
1981	30	5
1982	39	4
Total	243	27

Table 4. The most frequent sites of wound in the head

Site of wound	Sui- cide	%	Homi- cide	%
Right tempoparietal	81	33	6	22
Left tempoparietal	15	6	1	4
Frontal	37	15	2	7
Occipital	7	3	8	30
Mouth	60	25	0	0
Submental	27	11	1	4
Other/unknown	16	7	2	7
Multiple	0	0	7	26
Total	243	100	27	100

Type	Sui- cide	%	Homi- cide	%
Shot gun	97	40	11	41
Pistol/revolver	52	21	10	37
Saloon. rifle	29	12	2	7
Automatic weapon	5	2	4	15
Other rifles	19	7	0	0
Others/unknown	41	17	0	0
Total	243	100	27	100

Table 5. The most frequent guns used in both suicide and homicide

period. The allover homicide rates have also been increasing during the last few years, although not as much. The figures given in Table 3 concerning this problem are small; no conclusion can be drawn.

The sites for firearm wounds are listed in Table 4. For suicide the three most favored sites are right tempoparietal, mouth, and frontal, which together accounted for 73% of all sites in the head. Twenty-six percent of the victims from homicide had more than one site in their head. Among victims of one shot, occipital and right tempoparietal are the most frequent sites.

For both suicide and homicide the shooting was related to shot guns (Table 5) in high numbers (40% for both). Close-range weapons (pistol/revolver) accounted for 27% of the all weapons used in homicide.

Only 14 persons (5%) survived for some time after the shot had been fired. Of these, nine were dead within 5 h. Six of the survivors underwent full neuropathologic examination. Two of them had shown more or less normal behavior for some time; one with a midfrontal lesion from a pistol had managed to hang himself afterward.

Discussion

Most of the data presented above are self-explanatory, but I like to comment on a few of the findings. These results contain no new revolutionary discoveries, but provide data concerning head site, type of weapon, etc., in both suicide and homicide. Most forensic pathologists seem to have their personal opinion about these data, but it is of importance every now and then to stop and really investigate if this personal experience is based on numerical data. Such data are of great value in the daily routine and may serve as a guideline in cases with little information about the circumstances connected with the shooting.

Firearm fatalities account for about 25% of all the suicides in Norway. Eisele et al. [1] found that head wounds were the favored site for 75% of 223 cases with suicidal gun shot. In the present study, the corresponding figure is 90%. On the other hand, the number decreases to 58% for homicide.

As shown by Eisele et al. [1], about 40% of suicidal shots in the head are in the right tempoparietal region. It is also remarkable that 26% of the victims

from homicides had multiple wounds in their heads, none of the suicides had more than one. The dominating weapon used for both suicide and homicide was shot gun. This is in keeping with a corresponding report from Denmark [2], which has almost the same restrictive weapon law as Norway. However, procurement of a shot gun is easy for an adult.

The sex distribution for both suicide and homicide is also well known and expected. Only seven women committed suicide by a shot in their head as compared to 236 males.

As pointed out in the Introduction, the use of firearms plays a minor role in connection with both suicide and homicide in Norway as compared to many of the western countries. This may in part be due to the rather restrictive weapon law in Norway. One way to decrease the problem further would be to introduce a firearm certificate also for shot guns.

References

1. Eisele JW, Reay DT, Crook A (1981) Sites of suicidal gun-shot wounds. *J Forensic Sci* 26:480–485
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