

## CASE REPORT

Els A. De Letter,<sup>1</sup> M.D. and Michel H. A. Piette, M.D., Ph.D.<sup>1</sup>

# An Unusual Case of Suicide by Means of a Pneumatic Hammer

**REFERENCE:** De Letter EA, Piette MHA. An unusual case of suicide by means of a pneumatic hammer. *J Forensic Sci* 2001;46(4):962-965.

**ABSTRACT:** We describe an extraordinary case of a 49-year-old man who committed suicide by using a pneumatic hammer. As an industrial accident was initially assumed, difficulties in determining the manner of death are discussed. In addition, the ability to perform activity and evidence of a protracted agony in a situation of extensive cerebral destruction are considered. To our knowledge, no such case of suicide has ever been reported.

**KEYWORDS:** forensic science, forensic pathology, suicide, case report, pneumatic hammer, head injury, manner of death, ability to perform physical activity

A 49-year-old man was found dead lying on his right side on the floor of a construction site holding a pneumatic hammer. The victim's head was resting on a cement sack with blood traces behind it. The pneumatic hammer bit was totally driven into the left temporal region of his head. His right hand was partially gripping the bit holder and his left hand was cupping his chin (Fig. 1). A pool of blood was noticed underneath his chin. Blood traces were found on the hammer handle. At the scene, vertical blood spatters were seen up to two meters from the location of the body. No cardiopulmonary resuscitation was performed.

The man was described by family and coworkers as a punctual, hard working man and the father of a model family. He had no psychiatric medical history. His wife was unable to identify any peculiar behaviors aside from an unusually restless night preceding his death. No suicide note was found. According to his employer, where he had been working for about 25 years, the man was right-handed.

### Autopsy Findings

The autopsy, performed two days after death, revealed a well-muscled man of normal build. He weighed 68 kg and was 173 cm tall. During external examination, blood traces were found on the face. Directed blood spatters ("back spatters") were noticed on the left thumb, forefinger and wrist (Fig. 2) as well as on the right wrist and forearm. A black smear trace was seen on the right thumb, fore-

finger, and middle finger. The left temporal region showed a somewhat split-like hole measuring 1 by 2 cm encircled by a skin impression, 5 cm in diameter. The skin impression size matched the rubber protective hood of the hammer surrounding the bit. Except for the cranial lesion, the only finding upon external examination was a slight excoriation on the left shin consistent with a minor fall or hit. No signs of defense were observed.

Internal inspection revealed two fresh small frontal ecchymoses on the galea compatible with a forward fall. In the left temporal region was a depressed fracture (2.5 by 3 cm, with irregular margins). A large track (11 cm long and 15 mm in diameter) extended from the left temporal to the right parieto-occipital lobe (Fig. 3); obvious small contusions were noticed near this large track. The thickness of the temporal and frontal bone was 2 and 6 mm, respectively. The brain weighed 1430 g and showed some subarachnoidal bleeding at the base and at both temporal regions. Moreover, we found blood in the right lateral ventricle, a total destruction of the left basal ganglia and slight edema of the white matter. Additionally, a 3 by 4 mm hemorrhage was observed in the pons. Microscopic evaluation of these brain lesions revealed a beginning inflammatory reaction (evidenced by neutrophilic infiltration) and a few red neurons, indicating some protracted agony.

Both lungs weighed 1245 g. On incision, there was congestion and edema of both lungs; this was confirmed by the histologic examination. Except for a generalized visceral congestion, no pathological disorders of the other organs (macroscopically or histologically) were discovered.

A toxicologic screen for drugs and alcohol was negative. Semi-quantitative analysis of the urine showed glucosuria (++ to +++).

### Technical Data

The pneumatic hammer (Hitachi-type H 55SA 07000.1), including the bit, weighs 11 kg and is 68 cm in length. The bit itself measures 13 cm and has a bore of 15 mm. The apparatus has a power of 1140 W and impacts 50 times per s. The action of the instrument stops automatically when the bit no longer encounters resistance. The pneumatic hammer was tested by an expert and found totally in accordance with the manufacturer's expectations.

### Discussion

This paper reports suicide by means of a pneumatic hammer in a healthy 49-year-old man. The brain contained a large, almost hori-

<sup>1</sup> Ghent University, Department of Forensic Medicine, J. Kluyskensstraat 29, B-9000 Ghent, Belgium.

Received 28 March 2000; and in revised form 5 August 2000 and 8 Sept. 2000; accepted 8 Sept. 2000.



FIG. 1—Man found dead lying on the floor of a construction site, holding a pneumatic hammer.



FIG. 2—Directed blood spatters (“back spatters”) on left hand and wrist.

zontal track from the left temporal to the right parieto-occipital region. Consistent with this brain trauma, we found signs of brain edema and some subarachnoidal and ventricular bleeding, as well as a Duret hemorrhage-like lesion in the pons. Additionally, histologic analysis revealed a few red neurons and a slight inflammatory reaction with granulocytes, indicating some survival time; these observations were obvious in the pons, in particular. While earlier research indicated that polymorphonuclear (PMN) leukocytic infiltration occurs about 2 h following the trauma (1), more recent investigations have demonstrated these findings as early as within one hour after injury (2,3). In our case, a certain period of survival and protracted agony are further substantiated by the glucosuria and obvious pulmonary congestion and edema of both lungs.

Depending on the severity of the cranial lesions, the subject's capacity to perform physical activity (such as moving a few steps) is nonetheless limited. The blood spatter with vertical impact found at the scene (up to 2 m from the location of the body), suggests that the man kept on walking a few steps after drilling his head.

To our knowledge, no case of suicide using a pneumatic hammer has been published. A literature review revealed two cases of suicide using an electric drill (4,5); one of these survived and is in good clinical condition (5). A number of case reports of persons who committed suicide using different types of saws have been published (e.g., 6–8). There is one report of this type of suicide attempt in which a person survived after neurosurgery (9). Most of these victims had known psychiatric disorders such as



FIG. 3—Large track in the brain, from the left temporal to the right parieto-occipital lobe.

schizophrenia (6,7). A recent case of death caused by a chain saw prompted considerable debate between the police officers and the forensic pathologists about whether the death was homicide, suicide, or accident (10). In our pneumatic hammer case, the death was initially considered to be an industrial accident by the labor inspector. Nonetheless, a medico-legal investigation was started.

The thin temporal bone (2 mm in thickness) provided only minimal resistance to the pneumatic hammer. Still, even after having tested the apparatus, the engineer could hardly believe our conclusion, viz. that in the absence of any suspicious criminal intervention, the medico-legal findings were consistent with suicide. In addition, the fact that the deceased was known to be a socially normal functioning man and father of a model family made the hypothesis of suicide very difficult to believe for his family and friends. When a mentally fit person commits suicide using such a tool, it implies a great strength of will.

In conclusion, we have described a peculiar case of a man who committed suicide using an unusually heavy tool, a pneumatic hammer. On the basis of the macroscopic and histologic findings, a limited capacity for physical activity and some survival time after the lethal brain trauma should be taken into account.

#### Acknowledgments

The authors gratefully thank Mrs. Mary C. DeLetter, Ph.D., RN, for her critical reading of the manuscript. We also wish to thank Mrs. Thérèse De Vuyst and Mr. Richard Sundahl for their assistance with the English grammar.

#### References

1. Oehmichen M, Raff G. Timing of cortical contusion. Correlation between histomorphologic alterations and post-traumatic interval. *Z Rechtsmed* 1980;84:79–94.
2. McD Anderson R, Opeskin K. Timing of early changes in brain trauma. *Am J Forensic Med Pathol* 1998;19:1–9.
3. Løberg EM, Torvik A. Brain contusions: the time sequence of the histological changes. *Med Sci Law* 1989;29:109–15.
4. Navarro Celma JA, Mir Marin MA, Aso Escario J, Castellano Arroyo M. Description d'une suicide au moyen dun foreuse électrique. *Acta Med Leg Soc (Liège)* 1989;39:247–9.
5. Kelly AJ, Pople I, Cummins BH. Unusual craniocerebral penetrating injury by a power drill: case report. *Surg Neurol* 1992;38:471–2.
6. Betz P, Eisenmenger W. Unusual suicides with electric saws. *Forensic Sci Int* 1995;75:173–9.
7. Clark SP, Delahun B, Thomson KJ, Fernando TL. Suicide by band saw. *Am J Forensic Med Pathol* 1989;10:332–4.
8. Segerberg-Konttinen M. Suicide by the use of a chain saw. *J Forensic Sci* 1984;29:1249–52.
9. Rainov NG, Burkert WL. An unusual suicide attempt using a circular saw. *Int J Legal Med* 1994;106:223–4.
10. Reuhl J, Bratzke H. Death caused by a chain saw—homicide, suicide or accident? A case report with a literature review (with 11 illustrations). *Forensic Sci Int* 1999;105:45–59.

Additional information and reprint requests:

Michel H.A. Piette  
Ghent University—Department of Forensic Medicine  
J. Kluykensstraat 29  
B-9000 Gent  
Belgium  
Tel: +32 9 264 92 91  
Fax: +32 9 264 94 95  
e-mail: [Michel.Piette@rug.ac.be](mailto:Michel.Piette@rug.ac.be)