Work-related death due to a carotid artery injury: a case report

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Abstract

Work-related deaths represent an important social problem which interests workers from all over the world. This paper presents an unusual occupational death occurred in Brescia (Northern-Italy) involving a young man who was working with a press machine. The man arrived unconscious at the Emergency Room presenting a severe bleeding from the nose and the oral cavity and a small wound to the neck. An autopsy was performed in order to verify the cause of death. The autopsy revealed an extensive haemorrhages of neck’s soft tissues and muscles, the laceration of the trachea and the presence of a metal fragment in soft tissues close to the right carotid, which resulted lacerated. The worker death was caused by a haemorrhagic shock and the recovered metal fragment.

KEY WORDS: autopsy, occupational fatalities, workplace, work-related fatal injuries.

Introduction

Nowadays, work-related deaths represent an important public health problem which interests workers from all over the world. This paper presents a fatal occupational case occurred in Brescia, one of the most important industrial district in Northern Italy with an occupational rate significantly elevated. A recent analysis of Eurostat, the statistical office of the European Union, regarding work-relating deaths in Europe, showed that the number of occupational accidents in Italy is much higher than the European average. In contrast with other Italian Counties, Brescia showed a great number of victims by work-related fatal injuries even if the trend has been registering a continuous decrease in the last years, as reported by the National Institute for the Insurance against Accidents at Work (INAIL), in 2012.

An unusual case of occupational death involving a young man who was working with an automatic press-machine has been reported in this paper. The knowledge of the cause of death, resulting from the autopsy, let assume the dynamics and the details of fatal incidents. The complete reconstruction of the event allows to distinguish between the lack of machinery safety and worker’s liability. Moreover, the determination of occupational death’s cause and dynamics reveals the necessity to improve safeguards for machinery and protecting workers against the risk of future accidental injuries and fatalities.

Case report

A 35-year-old man was working in a metal working factory in Brescia; his job consisted of controlling an automatic machine capable of cutting, bending, piercing and punching steel sheets. The machine was punching a steel plate, the worker suddenly started screaming and shouting for help, holding his hand around his neck. He was seen by his co-workers staggering and bleeding severely from his nose and mouth, a few seconds before collapsing. The emergency team arrived promptly by air ambulance and tried to resuscitate him but the worker died during the transfer to the ER. The medical report stated severe blood loss from nose and oral cavity (estimate about 900 ml of blood) and a small wound to the neck. As decided by the Prosecutor, an autopsy was performed in order to clarify the cause of death.

Autopsy findings

The external examination revealed a 4 x 1 cm rectangular, bruised area in the mediastinum region, due to defibrillation and a 8 x 3 mm oval shaped hole surrounded by a 3 mm eccentric bruised abrasion ring located at the base of the neck, slightly left sided, about 1 cm above the jugular notch. The characteristics of the neck wound closely resembled a gunshot lesion (Figure 1). After the removal of the cutaneous planes and the rib shield, an extensive haemorrhage of the muscles and
the soft tissues was seen at the base of the neck (Figures 2, 3).

The wound track passed through the left peri-tracheal muscles to the other side, lacerated the anterior and lateral right surface of trachea, approximately 11 cm from the lower opening of the larynx and ended at the soft tissues close to the right common carotid artery, which resulted lacerated. The carotid laceration, sited about 5 cm above the aortic arch, interested half of the circumference of the vessel. In this laceration, a 15 x 5 mm slightly curved, cylindrical metal fragment was found (Figures 4-6).

The section also revealed blood into the lumen of the larynx, trachea and bronchi.

Discussion

The autopsy findings allowed to know the cause of death and to provide the reconstruction of the fatal event’s dynamics. The worker died because of a hemorrhagic shock due to the penetration of a foreign
metallic body into the neck leading to the laceration of the carotid artery. This explains the rapid loose of consciousness and the severe bleeding from mouth and nose registered by the emergency team that was due to the intra-tracheal hemorrhage. The metal fragment was confirmed to be the punch tip missing from the machine controlled by the victim. Regarding the reconstruction of the fatal event, the most plausible hypothesis is that the punch detached itself from the machine after pressure and the break was due to a non-perpendicular position of the steel sheet during punching. However, it was not possible to establish whether the metal sheet has been positioned incorrectly or if it has moved during processing. Comparing this case with those in the literature, it can be said that males are the most affected by occupational death (1-9). This data is necessarily connected to the higher men occupational rate comparing to women and is also related to the more dangerous types of work performed by the male sex. Regarding the age other international studies reported a young age among workers with occupational injuries, such as in this case (9-12). In many studies (1, 2, 13-19), construction has to be considered one of the most dangerous working categories, while mechanical factories represented the second or the third place where occupation deaths occurred. This date has been confirmed in 2014 by an analysis of Eurostat, the statistical office of the European Union, which revealed that the deaths during manufacturing were in third place, after construction and transportation. From autopsies carried out from 1982 to 2015, occupational deaths occurred in the 19.2% of cases in mechanical factories, hence in a high percentage. This data must necessarily be linked to the fact that Brescia County is one of the most industrialized areas in Northern Italy with an occupational rate significantly elevated. Regarding regions involved in the incident, the head is considered the site of the commonest type of injury among occupational fatalities (1, 2, 20, 21); this suggests the importance to wear a helmet and safety belts as a kind of protection in order to prevent similar working accidents. In Italy, these security rules are obligatory from the 90’s. In literature, only one very similar case, published in 1986 involving the punching machine, has been published: that worker was setting up a drill press while a piece of the punch broke off and hit the machinist in the chest (22). This case report testifies that even if about 30 years have been passed from the accident published by Katanick et al. and the press-machine have been technologically ameliorated, there is still a permanent risk and the operators should always keep a safety high level. Moreover, punching machines’ workers have the obligation to wear a helmet, as well as keeping headphones for noise. However, any kind of protections for the cervical region or the chest are not yet used. The neck, especially in worked works where glass or metal fragments can start, is exposed and is a vulnerable area, because of the absence of skeletal protecting structures and the presence of vascular structures, whose lesions may necessarily lead to instantaneous death. In conclusion, it’s very important to understand the cause of occupational death in order to detect the workplace risks, find out if there are some responsibilities of the job giver, improve protection devices and, in particular, to ameliorate the occupational surveillance system; an adequate surveillance and a health employees’ formation are also essential to improve safety and to obtain a global improvement in working conditions.

References

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