

CASE REPORT

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Delayed death after attempted suicide by hanging

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Abstract In cases of hanging death usually occurs immediately after strangulation and is caused by ischemic cerebral damage due to neck compression in some cases in combination with respiratory obstruction. We report on a case of delayed death 4 days after an attempted suicide by hanging where the individual was conscious and showed no neurological abnormalities. The cause of death was a cerebral infarction following a traumatic thrombosis of the subtotally ruptured carotid arteries.

Key words Hanging · Delayed death

Introduction

A recent analysis of suicides showed that the most frequent method was by hanging [14]. The clinical findings in survivors of a suicide attempt by strangulation are mostly described in neuropsychiatry and internal medicine [2, 5]. However, cases of delayed death are rare but morphological findings may be of considerable interest for the forensic pathologist. We report on a 58-year-old man who died of a cerebral infarction due to traumatic thromboses of the carotid arteries 4 days after a hanging attempt.

Case report

A 58-year-old man tried to hang himself with a thin cord fixed to a branch of a tree. As he jumped into the loop the cord tore and he fell from a height of 3 m and sustained fractures of the calcaneus bones on both sides. Immediately after the unsuccessful attempt he was able to ask for medical assistance, and he was brought to a surgical department. On admission the patient was awake and conscious and there were no abnormal neurological findings. After 4 days he developed a hemiplegia and died a few hours later of central regulation failure.



Fig. 1 Crust-covered ligature mark on the neck, 4 days after an attempted suicide by hanging

Autopsy findings

Crust-covered ligature mark on the neck up to 3 mm wide (Fig. 1). Diffuse haematoma in the subcutaneous soft tissue in the region of the cord mark, cervical haemorrhage at the periosteal-clavicular origin of the sternoideomastoid muscles as described by Keil et al. [15]. Submucosal haemorrhages of the epiglottis, no fracture of the hyoid bone or the laryngeal skeleton. Incomplete rupture of both common carotid arteries. Mixed post-traumatic thrombosis with a stratified central part and a fresh agglutinative peripheral part (Fig. 2). Diffuse encephalomalacia, haemorrhagic alveolar and interstitial lung edema. Fractures of the calcaneus bones on both sides.



Fig.2 Posttraumatic occlusive parietal thrombosis of the right common carotid artery

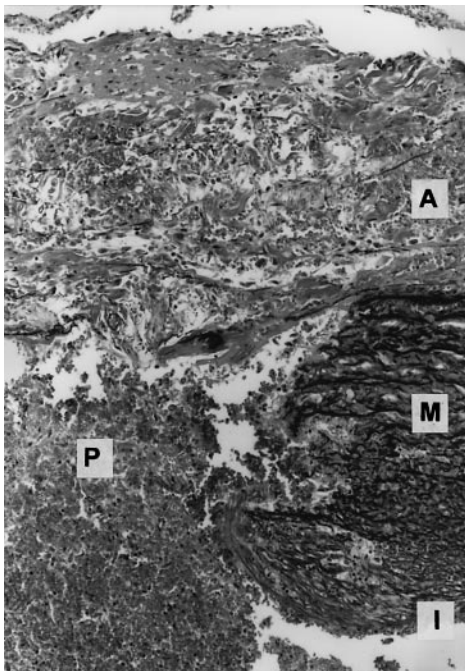


Fig.3 Damaged arterial wall with breach of intima (I) and media (M). Diffuse intramural haemorrhages extending to the adventitia (A), parietal thrombosis (P), no evidence of cellular reaction between thrombus and endothelium, erythrocytes densely packed in the centre, peripheral fissures and "sinous" cavities ($\times 150$)

Histological findings

Intimal-medial laceration of the carotid artery with fibrin and blood in the crevice of the rupture, intramural leucocytic infiltration, numerous pycnotic white blood cells and some mononuclear cells at the wound edge of the damaged artery wall. Stratified thrombus with agglomerated erythrocytes in the centre, no signs of cellular reaction between thrombus and endothelium (Fig.3). Fi-

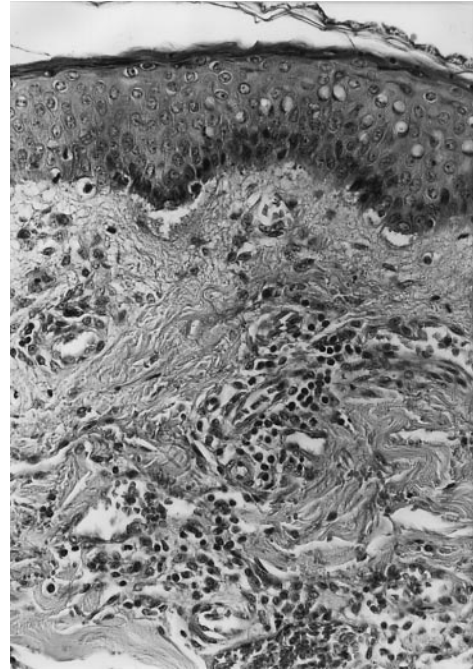


Fig.4 Section through the ligature mark with mild mixed cellular infiltration in the corium ($\times 150$)

brin covered lesion of the superficial epidermis in sections from the ligature mark, mild leukocytic and mononuclear infiltrates in the corium (Fig.4). Diffuse haemorrhages in the neck tissue with no evidence of haemosiderin deposits. Epiperiosteal and subperiosteal extravasations at the clavicular origin of the sternocleidomastoid muscles.

Discussion

Delayed death after hanging is a rare event. Maxeiner [19] reported that in only 6 out of 130 cases death occurred after survival periods ranging from 18 h to 4 days. However in all cases the patients remained unconscious after an initial successful reanimation and died of severe cerebral damage. In a few cases reported the capability to act was maintained over a short time period after a failed hanging attempt [3–9, 12, 23]. Death is usually caused by cerebral hypoxia due to compression of the cervical arteries. There are only a few case reports of thrombosis of the carotid artery secondary to traumatic lesions of the artery wall such as intramural bleeding [7], dissection of the medial layer [11, 21] or horizontal rupture of intima, media and adventitia [22]. Intimal ruptures of the carotids due to strangulation have been systematically investigated by various authors. The frequency of such lesions lay between 5% and 20% [1, 17, 18, 24, 26–28]. Rare cases of survived hanging after a suspension duration of 5–10 min [8] and up to 15 min [29] and cases of combined suicides have been reported [6]. Unsuccessful hanging was mostly followed and terminated by gunshots [16, 25]. The morphological sign of hypoxic brain damage is disseminated ganglionic cell destruction which becomes evident after a

survival time of at least 2–3 h. After 8 h parenchymal necrosis can be visible [13].

When compared to other reports of delayed death after attempted hanging there are some noteworthy differences in our case: the individual was conscious after the unsuccessful hanging attempt and showed no neurological symptoms over a period of 4 days. Death was the result of a thrombosis of the carotid artery due to a massive traumatic lesion of the vessel walls and not due to brain hypoxia induced by direct neck compression. A subtotal rupture of the carotid artery is assumed to be a rare event after hanging and is more frequently caused by blunt neck trauma, extreme overstretching [20] or whiplash-injuries [10]. The morphological features of a traumatic thrombosis are essential for determining the age of the lesion and for the question of a possible causal relationship between the hanging attempt and death.

In our case the histological findings of the damaged artery are in concordance with a wound age of a few days. The clinical course can be explained by a thrombus growth which led to the occlusion of the carotid arteries and thus to the acute hemiplegia and death 4 days after the hanging attempt.

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