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An Unusual Cervical Penetrating Wound Extended to the Right Pleural Dome

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Abstract

The solution of continuity of the tissues of the neck with rupture of the platysma muscle is called a cervical penetrating wound. The authors report a case of an unusual penetrating neck wound extended to the pleural dome by stabbing a psychiatric patient. They describe the diagnostic circumstances, the therapeutic approach and discuss data from the literature. It was a 26-year-old young woman, who was received in ENT for a penetrating neck wound with a stab wound following a suicide attempt. The diagnosis of a penetrating stab wound to the neck extending to the right pleural dome was retained. The exploratory cervicotomy with the extraction of the foreign body found a knife blade penetrating the anterior base of the right side of the neck to the right pleural dome, sparing the noble vasculo-nervous and aero-digestive organs of the neck. The postoperative course was simple and the evolution was favourable. This unusual penetrating wound of the neck is spectacular and remarkable for the absence of involvement of noble organs despite the involvement of the pleural dome. However, it remains a concern in psychiatric patients and requires multidisciplinary management and systemic management in order to avoid recurrence.

Keywords

Knife, Neck, Penetrating Wound, Pleural Dome, Suicide Attempt

1. Introduction

The neck has a complex anatomy made up of blood vessels, aerodigestive and respiratory tracts, nerves, vertebrae, and spinal cord [1]. The solution of continuity of the tissues of the neck with the invasion of the platysma muscle is called penetrating cervical wound [2]. Penetrating neck wounds are part of neck trauma, of which they represent between 5% and 10% [3]. Penetrating cervical

wounds extended to the thorax after a suicide attempt is rare. They constitute 1% to 3% of cervical wounds by an attempted suicide and are life-threatening [4] [5]. They are difficult to treat when located at the base of the neck and extended into the chest cavity. Hemorrhagic and respiratory complications during the extraction of the foreign body are to be feared and represent the interest of this case report. This therapeutic difficulty is linked to the rarity of the lesion, the lack of protocols, and the requirement for multidisciplinary care [6] [7]. Thus, we report the case of a young woman, a victim of deliberate insertion of a knife blade in the neck, following a suicide attempt. The diagnostic and therapeutic approaches to the medico-surgical emergency represented by the penetrating wound of the neck have attracted attention. The result of the management could allow retaining an attitude in front of the penetrating wounds of the neck. No previous study has been carried out on the subject in Benin. The objective of this work was to discuss the diagnostic circumstances, our therapeutic attitude and review the literature.

The authors confirm that the informed consent of the patient and her parents has been obtained for the production of this publication.

2. Medical Observation

It was a 26-year-old, unemployed, single patient who was admitted on 24th October 2019 at 11:17 p.m. in the Emergency Department of the Hubert Koutoukou Maga National Hospital and University Center (HKM-NHUC) for a penetrating neck wound caused by a stab wound. Indeed, approximately 1 hour before admission, the patient was found lying down and conscious in the kitchen, holding in her right hand the handle of the knife implanted in the anterior base of the right side of her neck.

She had a history of psychotic disorders and was non-compliant with treatment. She would never have had a previous suicide attempt and would not use alcohol or drugs.

On admission, the patient was in good general condition and conscious. The blood pressure was 120/80 mmHg, the oxygen saturation was 98%. The temperature was 37.5˚C. The weight was 56 Kg. The height was 1.60 m. The respiratory rate was 24 cycles per minute. The teguments and conjunctiva were well colored. The central carotid pulses were regular and symmetrical at 75 pulses per minute.

Locally, the knife blade was inserted in zone I, low antero cervical, 1 cm above the right sternal notch oblique from front to back, from top to bottom, from the median to the right (**Figure 1**).

The wound was linear at the site of penetration, measuring 5 cm in the longitudinal axis. There was no emphysema, hematoma, or bleeding. The remainder of the physical examination was without particularity.

The biological assessment carried out had objectified a mild normocytic normochromic anemia with a hemoglobin level of 11 g/dL.

The standard radiography cervico-thoracic revealed a radio-opaque image oriented obliquely and directed latero-cervically towards the apex of the right lung without pneumothorax or pneumomediastinum (**Figure 2**).

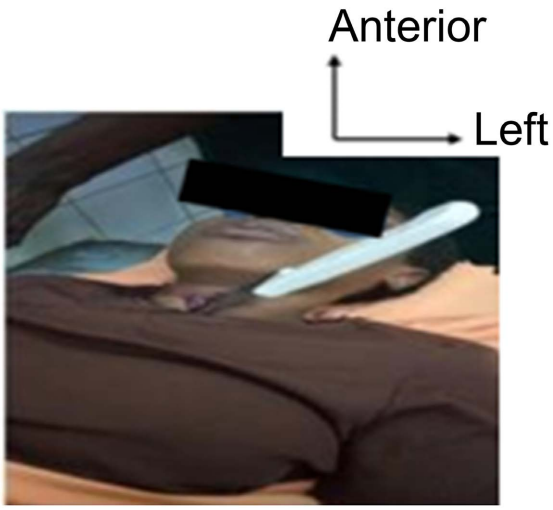

Figure 1. Patient with the knife at the base of the neck on admission.

Figure 2. Front view cervico-thoracic X-ray.

A cervical Doppler ultrasound showed the integrity of the jugulo-carotid vessels rights near the weapon (**Figure 3**).

Treatment began with a venous approach, a supply of solutes (Saline serum 9 per 1000, Ringer Lactate serum), analgesics and antibiotics. Serotherapy and tetanus vaccine therapy were combined. In an emergency, an exploratory cervicotomy under general anesthesia after orotracheal intubation was performed (**Figure 4**). We realized a three (03) cm incision with enlargement of the blade impact wound, then a retrograde extraction of the latter following a depth of 11 cm.

Preoperatively, we discovered a wound with perforation of the infrahyoid muscles, shaving the lower edge of the right thyroid lobe and passing inside the vascular axis to penetrate the right pleural dome by 0.5 cm. major axis. She had been sutured with Vicryl 2-0*. The entire cervical wound had been cleaned with saline serum and povidone-iodine, and then sutured in three (03) planes. There

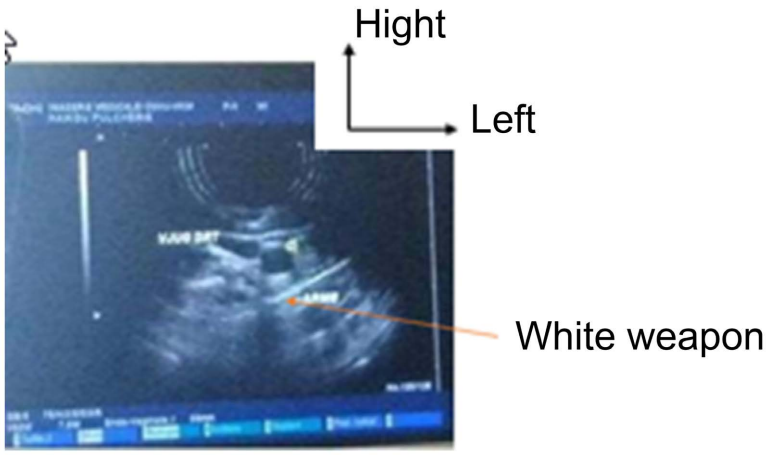

Figure 3. Cervical Doppler ultrasound of the patient.

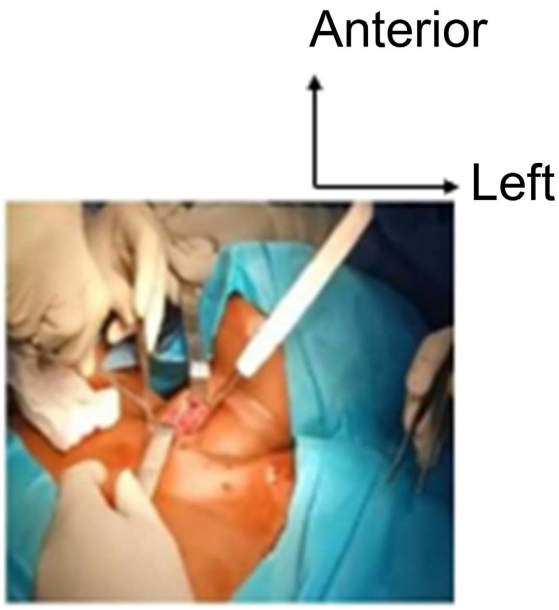

Figure 4. Exploratory cervicotomy by incision enlargement of the wound next to the knife blade.

was no intraoperative coagulation disorder. A chest drain was placed in the 5th right intercostal space along the axillary line. The postoperative course was simple. The patient had stayed in the ENT-CCF Department for 10 days, then 16 days in psychiatric hospitalization.

Postoperative treatment consisted of analgesics, non-steroidal anti-inflammatory drugs, antibiotics and thrombolytics. The thoracic drain was removed on the third postoperative day after the completion of the cervico-thoracic control radiograph, which was unremarkable. The suture thread was removed on the tenth postoperative day. Psychiatric treatment consisted of antidepressants, non-barbiturate anticonvulsants and antipsychotics.

Clinical and paraclinical monitoring over two years noted a favorable evolution (**Figure 5**).

Figure 5. Scar cervical at 02 years postoperative.

3. Discussion

In this observation, the subject was female. However, several authors have found that cervical stab wounds in the context of a suicide attempt were more frequent in female subjects. Nwawolo *et al.* in Lagos in 2017 obtained a sex ratio of 6.8:1 [8]. Gilyoma *et al.* in Tanzania in 2014 reported a sex ratio of 2.4:1 [9]. Men tend to use more violent methods like bladed weapons. On the other hand, women would tend to use milder means such as drugs to commit suicide [10] [11]. This could be explained by women's lower desire to die than men [3] [4]. Men may have more difficulty admitting to issues that expose their weaknesses [12]. The choice of the bladed weapon by the patient in this study could reflect a desire to quickly end her life.

In the case study, the age was 26 years old. According to several studies, the most vulnerable groups are adolescents and young adults. Sandju *et al.* in Toronto in 2010 saw a 29-year-old patient [13]. Weale *et al.* in Durban in 2019 treated a 27-year-old patient [7]. In Nigeria, the average age was 30 years [14] [15] [16]. The same was true in Congo Brazzaville [17]. However, there were cases at older ages. This is the case of Sgardello *et al.* in Switzerland in 2019 who described a self-inflicted cervical wound in a 52-year-old woman [18]. Adeyi *et al.* in Lagos in 2010 reported a suicidal neck wound in a 55-year-old gentleman [15]. These penetrating cervical wounds seemed to be more frequent in certain social strata. Amani *et al.* in Tunis in 2013 in a study noted that the age is between 14 and 26 years [19]. From these listed cases, it emerges that the young population predominates. This observation can be explained by the fact that adolescents and young adults are subject to psychopathologies because they have not yet reached a certain maturity to bear experiences and realities of life [10]. On the other hand, young people are more exposed to scourges, such as drug addiction, which are factors favoring suicides [10] [14]. Authors speak of an as-

sociation between aggressiveness, impulsivity and suicidal behavior which is stronger in young individuals and which decreases with age [3] [4] [12]. In the present study, the patient had a history of psychopathology maintained by multiple socio-cultural conditions such as school failure and unemployment. In this clinical case, the penetrating wound of the neck extended to the pleural dome had occurred in an attempt at autolysis. According to the literature, Cervical wounds with involvement of the pleural dome are found in most cases in patients with penetrating wounds at the base of the neck after a suicide attempt [4] [7] [20] [21].

In the present study, the reason for consultation was the knife implanted in the neck. This is one of the main reasons for penetrating cervical wounds after attempted suicide [11] [20] [22]. Other reasons reported by the authors were hemoptysis and dyspnea [7] [23]. In the study, the time before admission to the emergency department of the hospital was approximately one (01) hour. This is similar to the duration noticed by Weale *et al.* in South Africa in 2019 [7]. Kaufeld *et al.* in Germany in 2016 had a shorter admission time of fifteen (15) minutes [24]. However, some authors have recorded longer delays. Sanju *et al.* in Toronto in Canada had recorded delays of four (04) days [13], Adeyi *et al.* in Nigeria had had cases arriving in consultation after twelve (12) hours to four (04) days after the suicide attempt [15]. There is a contrast between lesion severity and mortality [1] [25]. Among the psychotic disorders of young subjects, the risk of suicide is always present in a depressive phase [7] [20]. A prompt primary clinical examination should be performed, consisting of checking and treating disorders of the airways and blood circulation. It is not easy to make a decision about exploring the neck [5]. According to Alao *et al.* in New York in 2021, the local examination should very quickly appreciate any deformity and hematomas which can contribute to an imminent obstruction of the airways [26]. The local examination revealed the presence of a knife blade stuck in the neck with an entry hole located approximately one (01) cm above the sternal notch in the right paramedian. It was zone 1 according to the classification of Monson and Selata, which exposed cervico-thoracic vessels, the trachea, the right lobe of the thyroid gland, and the carotid artery [2] [26]. The diagnosis of a penetrating neck wound is clinical and relatively easy. It is a wound that has deeply penetrated the platysma muscle of the neck [5]. Above all, it poses a problem of lesion diagnosis and therapeutic attitude. Their potential seriousness makes them a concern for the ENT surgeon [1]. For Misiak *et al.* in Poland in 2016, the knife blade retained in the neck can at the same time play the role of local hemostasis [25]. The linear wound of the knife blade penetration site measured five (05) cm in the longitudinal axis (**Figure 1**), yet the depth was eleven (11) cm. Some authors thought that there is a weak correlation between the location of the external wound and the lesions of the internal structures [27]. These factors challenged the whole basis of the traditional zonal approach, according to which the majority of vital structures are located in the anterior triangle of the neck [28]. We adopted the non-zonal or selective approach to penetrating neck stab wounds,

where the entire neck was assessed as a single entity. The results of the biological assessment showed a mild normocytic normochromic anemia and moderate thrombocytopenia, there were no coagulation difficulties during the operation. Biological assessment in the context of a penetrating neck wound is of interest for hemodynamic evaluation and preoperative assessment [5] [20]. In this study, cervico-thoracic radiography was performed on a hemodynamically stable patient. The authors recommend that before its realization, it is necessary to take into account the availability, the possibility of being carried out according to whether the patient is hemodynamically stable or not and the medico-legal aspect [7] [12] [21] [26].

The patient's cervical Doppler ultrasound showed the integrity of the right jugulo-carotid vessels near the weapon. It was requested at the first intention because it is the most accessible and the most available in our context. It is requested in an investigation report of a vascular lesion that manifests itself by a hematoma and can allow a postoperative control to evaluate the flow rate of the vascular flow [2] [5].

Two therapeutic attitudes coexist. These are the interventionist and the wait-and-see [29]. Waiters give priority to the so-called conservative attitude, guided by clinical examination and complementary examinations, leading to selective exploration or careful monitoring of the patient in a well-equipped hospital center [30]. The interventionists only perform a cervicotomy in the event of strong clinical and paraclinical suspicion of a visceral lesion, time being precious to resolve the emergency [13] [31]. Our therapeutic approach was rather interventionist given the modesty of the technical platform. In addition, the edged weapon was still in place. There were potential risks of aggravation of pre-existing lesions, sealed by the weapon itself, which could be revealed by hemorrhage at the time of the extraction of the foreign body [2] [32]. In this present study, the patient's skin opposite the lamina was normal, on palpation, there was no subcutaneous crepitus, the carotid pulses were normal and cervical sensitivity was preserved. These data from the clinical examination had made it possible to orient the management. Wang *et al.* in 2019 in China had advocated immediate exploration of the neck when the patient presented with airway involvement, significant subcutaneous emphysema, air bubbles in the wound, and profuse active bleeding [2]. The controversy between these attitudes finds its reason in the fact that a certain number of surgical explorations come back blank [12]. However, the absence of cervical lesions, but rather the wound of the right pleural dome, during the surgical exploration of our clinical case made it an exceptional and unusual case. The postoperative follow-up and the evolution were favorable on the surgical and psychiatric levels, during a follow-up over 02 years. From a surgical point of view, the fear of complications could be explained by the axis and direction of the knife, particularly in relation to the base of the neck [33]. At the psychiatric level, long-term monitoring was required as an essential element because after the acting out, the recovery phase could occur [31]. It is during this recovery phase that caregivers should remain vigilant from a psy-

chiatric point of view because the risk of recurrence is not negligible [29].

4. Conclusion

This penetrating wound of the neck is unusual because of the wounding agent, which is a knife, and the absence of lesion of the great vessels despite the attack on the right pleural dome. Diagnosis requires clinical examination. However, this type of lesion remains worrying because of its potential seriousness. The penetrating wound of the neck remains a medico-surgical emergency. The management requires at least the cervico-facial surgeon, the Cardio-Thoracic surgeon, the anesthesiologist, the radiologist, and the psychiatrist. Family care should not be overlooked in order to avoid recurrences.

Confirm

The authors confirm that the informed consent of the patient and her parents has been obtained for the production of this publication.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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