Post-traumatic Hemothorax: Management in a Limited-medium Structure

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Abstract

Post-traumatic hemothorax is common in young adults in the context of road accidents. Explorations of the lesions may be limited by the technical platform. The objective of our study is to discuss the difficulty of managing post-traumatic hemothorax in a limited-medium structure. This was a 20-month retrospective study (01 May 2018-31 December 2019), involving 38 patients treated for post-traumatic hemothorax, whether or not associated with pneumothorax, in the general surgery department of the CHU Analankinina Toamasina. The hospital frequency was 1.66%, with a mean age of the patients of 31.89 years, and a male predominance (73.68%). The main provider of hemothorax was the civil liability accident (52.63%). Chest X-rays were performed in almost all patients (94.74%). Complications had been found in 4 patients with secondary surgery, with favorable outcomes. The frequency of hemothorax is constantly increasing in Madagascar, where the civil liability accident is the main cause. Chest X-ray remains the most accessible examination to be carried out in emergency. An early and efficient thoracic drainage generally ensures a favorable evolution without after-effects.

Keywords: Hemothorax, Trauma, Madagascar

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Introduction

More than half of all chest traumas can be complicated by hemothorax. The etiological circumstances are diverse and vary from country to country. In Africa, with the prevailing political and socio-economic context, chest wounds are also common, particularly stab wounds, which account for up to 80% of such wounds. In Madagascar, the frequency of post-traumatic hemothorax increases proportionally with the resurgence of violence and crime in the country. the country (Razafimanjato et al, 2020). The prognosis depends on the nature of the lesions and the precocity of management. This period of treatment can be extended when medical imaging is defective. The objective of our study is to discuss the difficulty of managing post-traumatic hemothorax in a limited-medium structure.

Methods

This was a 20-month retrospective study, from May 1, 2018 to December 31, 2019, of the medical records of patients hospitalized and managed for post-traumatic hemothorax

or hemopneumothorax in the general surgery department of the CHU Analankininina Toamasina.

In this study, we included all records of patients hospitalized for post-traumatic hemothorax. Hemothoraxes of non-traumatic etiology were not included. The variables studied were: age, sex, occupation, type of trauma, etiologic circumstance, imaging examinations, type and abundance of hemothorax, associated lesions, treatment, evolution, length of stay.

Results and Discussion

During the study period, we recorded 38 cases of post-traumatic hemothorax with or without pneumothorax out of a total of 2286 hospitalized patients, i.e. a hospital frequency of 1.66%.

The mean age was 31.89 years, with extremes ranging from 17 to 51 years. Male predominance was found with a proportion of 73.68% (n=28), against 26.32% (n=10) for the female gender. The sex ratio was 2.8. People without a permanent job were the most affected with 22 cases, or 57.89% (Table 1). The traumatic context most often encountered was a civil liability accident (CLA) in 52.63% (n=20). Road traffic accidents (MVAs) accounted for 31.58% of cases.

Profession	Headcount (n)	Rate (%)
Unemployed	22	57.89
Civil servant	8	21.05
Worker	2	5.26
Student	4	10.53
Driver	2	5.26
Total	38	100

Table 1. Breakdown by occupation

The type of trauma was a closed chest trauma in more than half of the cases, 57.89% (n=22), compared to 42.11% (n=16) for a penetrating chest wound. The agent responsible for the penetrating wound was a knife in 75% (n=12) and a firearm in 25% (n=4). The wound site was supra-nipple in the majority of cases, 62.50% (n=10), compared to 37.50% (n=6) in the sub-nipple. Chest X-ray was the most common imaging examination, accounting for 94.74% (n=36) of cases (Table 2). A very abundant hemothorax was found in almost half of our patients, 47.37% (n=18). Low-abundance hemothoraxes, generally requiring only simple monitoring, were 15.79% (n=6) (Table 3). Hemothorax was associated with pneumothorax in 12 other patients (31.58%).

Table 2. Imaging examinations performed

Imaging	Headcount (n)	Rate (%)
Chest X-ray	36	94.74
Chest Scanner	4	10.53
Chest ultrasound	2	5.26

Table 3. Quantity of effusion

Spreads	Headcount (n)	Rate (%)
Low abundance	6	15.79
Medium abundance	14	36.84
Great abundance	18	47.37
Total	38	100

Limb trauma were the most frequently observed associated lesions at 50% (n=19). The association of costal fractures was found in 10 patients (26.32%), while no associated intra-abdominal lesions were found (Table 4). Thoracic drainage was performed in 32 patients (84.21%), while simple monitoring was sufficient for 6 patients (15.79%). Only 4 patients (10.53%) had undergone surgery

Table 4. Associated lesions

Lesions	Headcount (n)	Rate (%)
Costal fractures	10	26.32
Limb injuries	19	50
Craniofacial lesions	8	21.05
Abdominal lesions	0	0
Cervical lesions	4	10.53

for hemostasis (n=2; 50%) of intercostal vascular wounds, and for management of infectious complications (n=2; 50%) such as septic shock and pachypleuritis on pyothorax. The approach used was posterolateral thoracotomy in 100% of cases, and the different procedures performed were 02 hemostasis thoracotomies, 01 thoracostomy, and 01 decortication. The postoperative evolution was favorable in 100% of the cases. The average length of hospitalization was 7.47 days, with extremes ranging from 3 to 27 days.

Traumatic etiology is the main cause of hemothorax. It is reported that 40 to 60% of chest trauma is complicated by hemothorax (Camara et al, 2014). The frequency of these posttraumatic hemothoraxes varies from one country to another, but is constantly increasing, especially in Madagascar as in most African countries, due to socio-economic factors, political instability and the resurgence of local violence and crime. Moreover, this increase is also linked to the increase in the frequency of public road accidents (Camara et al, 2014; Razafimanjato et al, 2020). In two studies carried out 6 years apart in the thoracic surgery department of Donka hospital in Guinea, the hospital frequency increased from 3.33% in 2008 (Barry, 2006) to 9.25% in 2014 (Camara et al, 2014). In our series, the low hospital frequency found (1.66%), is only explained by the fact that our service is a general surgery service, taking care of several other non-thoracic surgical pathologies, and that our center is the only reference center in the eastern region of Madagascar for visceral, pediatric and thoracic surgical pathologies. The average age of our patients was 31.89 years, with extremes ranging from 17 to 51 years. These figures are quite similar to those found by several African authors (Camara et al, 2014; Djigne, 2006), reflecting the predilection for chest trauma in young adults, with an observed tendency towards violence and risk behaviors such as hyperactivity, aggressiveness, contact sports, car racing, etc.

Male dominance is widely reported in the literature (Camara et al, 2014; Rajaonera et al, 2016). It is also observed in our study, with a sex ratio of 2.8. Indeed, the more violent and aggressive man favours traumatic pathologies. Moreover, in Africa, the majority of men are

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manual workers, with a high risk of occupational accidents. In the series of Camara et al, in Guinea, 37.84% of patients were workers (Camara et al, 2014).

The occupational categories most affected, however, vary according to the authors (Camara et al, 2014; Razafimanjato et al, 2020; Djigne, 2006). In our series, the category "without a permanent job" was the most represented with 57.89%. This phenomenon is explained by the high unemployment rate observed in Madagascar, associated with the low schooling rate of the general population.

These different factors are more marked in the provinces, particularly in Toamasina, and are The creation of informal work, which is a source of socio-economic insecurity reflected in high levels of local crime. Faced with this crime, the judicial system is overwhelmed, and a loss of confidence in the justice system can be observed among the local population, with a high proportion of popular vindictiveness. Thus, CRA was the most frequent etiological circumstance in our study, with 52.63%, followed by MVA with 31.58%. According to several authors, MVA represents the main provider of post-traumatic hemothorax (Camara et al, 2014; Hama et al, 2017).

In our series, closed chest trauma was more frequent than penetrating wounds. These results are comparable to those found in the literature (Hama et al, 2017). In Africa, stab wounds are the most frequent thoracic wounds, with a proportion of up to 80% (Cador & Lonjon, 1997). Ouadnouni et al. even reported a proportion of 98% across all chest wounds (Ouadnouni et al, 2014). These results are similar to those found by our team with a proportion of 75%.

Chest X-rays were the most frequently performed imaging examination in our study (94.74% of cases). It is the first-line examination for thoracic pathology, easy to use and with a high degree of accuracy. of realization, easy to access, and not expensive. It allows the diagnosis of hemothorax or hemopneumothorax to be made, an initial assessment of the associated lesions (costal, parenchymal, mediastinal, etc.), and the prioritization of other paraclinical examinations (Razafimanjato et al, 2020). For minimal or encysted effusions, pleural ultrasound is more indicated, with better sensitivity and specificity. It also has the advantage of being simple, fast, and non-invasive, while being within the reach of the Malagasy population. The scanner on the other hand is expensive, and is prescribed only occasionally, given the severity of the initial clinical picture and the appearance of progressive complications. It is important to emphasize that paraclinical examinations should in no case delay an urgent therapeutic procedure (Ouadnouni et al, 2014).

The association with a pneumothorax is quite frequent, especially in the case of penetrating trauma. 80% of these traumas are associated with a hemopneumothorax (Desjardins, 1998). In our series, 31.58% of patients had a hemopneumothorax. Post-traumatic hemothoraxes often occur in the context of multiple traumas or polytrauma. Different authors report that limb trauma is the most common injury.

Conclusion

In Africa, the frequency of post-traumatic hemothorax is constantly increasing. In the eastern region of Madagascar, the predominant traumatic etiology is ARC, with a high proportion of penetrating wounds, especially those caused by stabbing. This phenomenon is linked to the resurgence of local crime, with growing insecurity against a backdrop of political instability. The diagnosis of hemothorax is usually obtained by Chest X-ray, which is a test accessible to the population and available in all hospitals on the island. Early management of any posttraumatic hemothorax is recommended to ensure a favorable evolution without complications. Effective chest drainage combined with medical treatment is sufficient in the majority of cases to obtain a cure, without after-effects.

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