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Management of thoracoabdominal impalement in a 12 weeks-pregnant woman: a case report from the Democratic Republic of the Congo

Prise en charge d'un empalement thoraco-abdominal chez une femme enceinte de 12 semaines : une observation clinique en République démocratique du Congo

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Summary

Thoracoabdominal impalement during pregnancy is a rare, challenging, and spectacular form of trauma associated with delicate considerations. This life-threatening condition requires urgent optimal management for maternal and fetal rescue. The quality of the prehospital transportation, perioperative management, and postoperative care will determine the outcomes. We present the case of a 20-year-old woman with a 12-weeks pregnancy, victim of thoracic and abdominal impalement following a fall from a tree branch in a remote area in the Democratic Republic of the Congo.

Keywords: Thoracoabdominal, impalement, pregnancy, trauma, thoracic surgery

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Résumé

L'empalement thoraco-abdominal au cours de la grossesse est une forme rare de traumatisme, complexe et dramatique, associée à des considérations particulières. Cette affection à pronostic vital engagé, nécessite une prise en charge optimale et urgente pour sauvetage maternel et fœtal. De la qualité du transport pré hospitalier, de la prise en charge péri-opératoire et des soins postopératoires, dépend l'issue de patients. Nous présentons le cas d'une gestante de 20 ans, porteuse d'une grossesse de 12 semaines d'aménorrhée, victime d'un empalement thoraco-abdominal consécutif à une chute d'une branche d'arbre dans une zone rurale de la RD Congo.

Mots-clés : empalement, grossesse, traumatisme, chirurgie thoracique, Thoracoabdominal
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Introduction

Thoracoabdominal trauma during pregnancy is a rare accident associated with a poor prognosis. From varying etiology, the overall mortality from these traumas in various regions of the world remains high (1-3). Impalement, which is one of the rare and spectacular forms, given its origin, severity, hemodynamic disorders, and associated organ damage, requires management in an appropriate care structure, with dedicated staff, and a specialized team. Thoracoabdominal impalement is extremely uncomfortable for the patient, imposing delicate perioperative management for the surgical and anesthetic team. The involvement of solid and vital organs, the risk of short-term hemorrhage, and the risk of infection are important factors influencing the prognosis of these patients (3-5). The pregnancy condition adds concerns to this life-threatening event regarding fetal outcomes (6). The surgical modality is discussed after a rapid imaging assessment. Depending on the patient's environment,the treatment will require a thorough assessment of hemodynamic, respiratory, and biological parameters. We present the case of a woman at 12 weeks of pregnancy victim of impalement with thoracic and abdominal defects following a fall on a tree branch in a remote area in in the Democratic Republic of the Congo (DRC).

Clinical observation

We describe the case of a 20-years old woman carrying a 12-week pregnancy, referred to a general hospital in Kinshasa from a remote area in DR Congo, for a thoracoabdominal transfixing foreign body following a fall from a tree. The accident occurs when she was looking for wood in the forest. She lost control while climbing on a tree and felt, impaling herself directly on a tree branch before falling to the ground. She was taken to the village medical center, and after a brief examination, she was transported by motorcycle to The Province's General Hospital with the tree branch on the right flank. She received a transfusion of total blood and then was referred by ambulance to another General Hospital at about a 5-hours' drive. When admitted, she had a tree branch at the right flank without active bleeding from the defect (figure 1). The initial assessment found a blood Pressure of 90/65 mmHg with mean arterial Pressure of 70 mmHg, a pulse of 120 bpm, RR of 25 c/min, and SpO_2 of 94 % at room air. The chest X-Ray showed a hemopneumothorax that motivates the decision of drainage.

Figure 1. Image taken before the surgery, showing the patient with a wood stick from the back in the thorax to the abdomen in the front.

Preoperatively, she received one unit of Total blood for transfusion. In the operating room, the

patient installation was made possible by assembling two operating tables, to leave the stick between the tables and keep the patient in the supine position. Following endotracheal intubation with Suxamethonium, the surgery was performed under general anesthesia with Ketamine. She was maintained with an infusion of Ketamine, Fentanyl, and Pancuronium. She was continuously ventilated during the procedure without incident. The penetrating object was a branch of approximately 75 cm long and 10 cm for the diameter and the lesion presented with a significant hepatic and diaphragmatic defect without the involvement of the pulmonary parenchyma. The tree branch was extracted from the right thoracic side by thoraco-phreno-laparotomy. The surgery duration was 4hours, and the patient was transferred to the intensive care unit (ICU) on mechanical ventilation. She received Morphine, spasmolytics, and Acetaminophen for pain management as well as Omeprazole, and antibiotics (Ceftriaxone and metronidazole). A tocolysis was performed during the preoperative, the surgery, and the postoperative period. During the postoperative course in the ICU, she presented fever adequately managed, and the patient was transferred to the ward. She was discharged from the intensive care later the day of the procedure, without showing any complications (figure 2).

Figure 2. Image taken after the surgery showing the patient walking in the hospital during recovery, without the stick

Discussion

Thoracoabdominal impalement describes a traumatic lesion due to the abnormal presence of penetrating, long and solid objects involving the thoracic, and the abdominal cavity with diaphragmatic involvement (1). Author describes classically impalements caused by falls, blasts, impalement after an accident in construction areas, in a traffic accident, and impalement following sexual malpractice (2-5). Depending on its localization, the lesion may involve vital organs such as the heart, lung, liver, kidney, or thoracic vessels; however, most of the time; vital structures are displaced rather than transfixed. Also, pregnancy is adding considerable risks to the patient prognostic (6). Prehospital management is crucial for better outcomes and includes rapid transportation to the adequate care environment, assessment of major damage that may be caused by the impaling object, and rapid surgery to remove the impaling object and repair the subsequent lesions. Non-expert attempts to remove the impaling object have not been

recommended by authors (4,7). Depending on the lesioncomplexity, perioperative care may involve complex management strategies including patient positioning, blood management strategies, and challenging anesthetic management for the surgical procedures. The surgical removal of the impaling object under general anesthesia is influenced by the pulmonary lesion and may require pulmonary isolation. Rapid sequence intubation is the rule due to the combined risk of pregnancy, and emergency. In this case report, rapid sequence orotracheal intubation helped to control airways. The team preferred to drain first the hemothorax before the surgery, for patient stabilization and hemodynamic status improvement before the procedure. In these patients, hemothorax and tamponade may occur after the initial defect and worsen the short-term outcomes. Wide surgical openings are generally preferred to follow the penetrating object trajectories with implications on hemodynamic and pain management. In this patient, a phreno-thoraco-laparotomy was performed to assess possible undiagnosed organ lesions. The patient was stable during all the procedures and was woken up after the surgical closure without major complications.

An additional factor raising concern in this case that may worsen the prognostic and the global scenario was the pregnancy with a possible fetal defect. Trauma during pregnancy is a leading cause of maternal death worldwide, requiring a multidisciplinary approach. Although impalement injury is considered rare among the general population, it presents a high incidence during pregnancy. Pregnancy limiting women's mobility will shorten reactivity during falls, increasing the risk of impalement. Pregnancy age will determine the patient management plan and the initial treatment should prioritize the mother's care and allow oxygen delivery optimization to avoid fetal hypoxia. Tocolysis adapted to pregnancy age is the rule to avoid loss of pregnancy and prematurity.

This case report is also presenting the complex management of emergencies, major trauma, and surgery in low resources environment widely discussed in African Cohorts (8-9). Challenging prehospital management in the African context, difficult and delayed medical transportation of severe and delicate trauma, in this case, first by motorcycle and then by the provincial hospital ambulance, and tertiaryhospital management with limited resources might have impacted the possible surgery benefit and the outcomes. Preoperative care in low-resource conditions needs to be strongly addressed with comprehensive, local, and regional effective strategies as mentioned by previous larges studies (8-9). Country health institutions and regulations need to design a specific plan, based on the growing population density, education, and specific training considering the reality encountered daily in African urban and remote areas. Most of the governmental institutions and health systemsin the Sub-Saharan African region have been in place for a long time and may show limitations with the growing population. Also, while the majority of specialists stay in urban centers, remote areas lack skilled health care providers forcing the patients often to travel for long distances with non-adapted transportation methods. Interestingly, the procedure was successful as well as the postoperative management, and the patient was discharged after a short stay in the intensive care for mother and fetal monitoring and postoperative management. She was discharged with a stable pregnancy.

In conclusion, this case report presents a challenging situation where a complex trauma during pregnancy was well-managed in a limited resources environment. Better preparation in the health care system and surgery in remote areas would have shown the difference in terms of the health care organization, training expertise, and prehospital management.

Declarations

Financial disclosures or funding
None

Conflict of interest
The authors deny any conflicts of interest.

Informed consent
Informed consent was obtained from the patient and use of patient data for publication purposes. The patient information was de-identified for publication.

Author's contributions
DMM, JDP, and JPMI performed the initial case review and manuscript preparation, literature review, and editing of subsequent revisions. DMM, JDP, JPMI, JGM, and MSK, JNN contributed to the decision-making, literature review, and editing of the manuscript. All authors wrote and approved the final and revised version of the manuscript.

Data availability
The data supporting the findings of this case report are available from the authors.

References

1. Thiam O, Konate I, Gueye ML, Toure AO, Seck M, Cisse M, *et al.* Traumatic diaphragmatic injuries: epidemiological, diagnostic and therapeutic aspects. *SpringerPlus* 2016; **5** (1):1614.
2. Berg RJ, Karamanos E, Inaba K, Okoye 0, Teixeira PG, Demetriades D, *et al.* The persistent diagnostic challenge of thoracoabdominal stab wounds. *The journal of trauma and acute care surgery* 2014; **76** (2):418-423.
3. Byard RW. A forensic evaluation of impalement injuries. *Med Sci Law* 2018; **58**:85-92.
4. Ugoletti L, Zizzo M, Castro Ruiz C, Pavesi E, Biolchini F, Annesi V, *et al.* Gluteal, abdominal, and thoracic multiple impalement injuries: A case report on the management of a complex polytrauma. *Medicine* 2019;**98** (22): e15824.
5. Karger B, Teige K, Bojanowski T. Bizarre impalement fatalities—where is the implement?
Journal of Forensic Science 2002; **47**:389-391.
6. Moffat SE, Goldberg B, Kong VY, Da Costa J-P, Smith MTD, Bruce JM, *et al.* Trauma in pregnancy at a major trauma center in South Africa. *S Afr Med J*;**110** (7): 667-670.
7. Missliwetz J. Fatal impalement injuries after falls at construction sites. *Am J Forensic MedPathol* 1995; **16** (1):81-83.
8. Biccard BM, Madiba TE, Kluyts HL, Munlemvo DM, Madzimbamuto FD, Basenero A, *et al.* Perioperative patient outcomes in the African Surgical Outcomes Study: a 7-day prospective observational cohort study. *Lancet* 2018; **391** (10130):1589-1598.
9. Bishop D, Dyer RA, Maswime S, Radseth RN, van Dyk D, Kluyts HL, *et al.* Maternal and neonatal outcomes after cesarean delivery in the African Surgical Outcomes Study: a 7-day prospective observational cohort study. *The Lancet Global health* 2019;**7** (4): e513-e522.

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