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Injuries caused by a free fall in an elevator shaft from the 5th floor: About a case

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Abstract

Elevator-related accidents are rare but can cause serious injury. In the United States, elevator and escalator accidents seriously injure nearly 17, 100 people and kill around 30 per year. No African study would have reported such an aetiology. This observation concerns a 38-year-old patient who allegedly free-falled into the shaft of an elevator from the 5th Floor with a reception on the roof of the cabin, which was blocked on the ground floor. Accident in the course of which she presented with polytrauma associated with a fracture of the right anterior arch of the seventh rib, two wounds in the gluteal region, a floating knee on the right and a fracture of the left tibial pilon. She was admitted to the operating room for trimming and osteosynthesis. The postoperative course was uncomplicated. The objective of this work was to present a type of accident little known in our context but of which it is necessary to have an idea of the changes in our construction style.

Keywords: Polytrauma, free fall, cage, elevator, 5th floor

Introduction

An elevator is a lifting device equipped with a passenger-carrying unit that moves vertically on guides that serve two or more building or structure floors. There are hydraulic elevators for floors with four levels and traction for buildings with more than four levels. They represent commonly used elevator types. Alongside, several other systems exist, including various combinations of hydraulic and traction mechanisms and those that use chains ^[1].

Elevator-related accidents are rare but can cause serious injury. In the United States, elevator and escalator accidents seriously injure nearly 17, 100 people and kill around 30 per year ^[2]. The city of Conakry, like other African capitals, is undergoing rapid urbanization. Low-rise buildings give way to high-rise "Western Style" constructions that require elevators when built on multiple levels. Although this device is handy, the accidents it causes can be severe or even fatal. We report an observation due to a technical failure and a lack of vigilance of a 38-year-old patient who would have made a free fall in the shaft of an elevator with a reception on the roof of the cabin. An accident during which she presented polytrauma. She was admitted to the theatre, where osteosynthesis was performed. Nowadays, she benefits from rehabilitation sessions on an outpatient basis. The objective of this work was to present a type of accident little known in our context but a necessary idea with the change in our construction style.

Clinical case

KB, 38 years old, is a shopkeeper with no reported pathological history who reportedly free-fall from an estimated distance of <<15m>>. She would be on the 5th Floor when she pressed the button to open the elevator. Suddenly, the door would have immediately opened, and without paying attention, she would have entered the cabin while it was blocked on the ground floor. So she would have made a fall into the void with a reception on the roof of the elevator.

On examination, she was polytraumatized and complained of pain in the right hemithorax and pelvis associated with functional impotence in the lower limbs. Clinically, we noted the following:

- Pain on palpation of the right hemithorax with a decrease in breath sounds and vocal vibrations were barely audible;
- Two cutaneous continuity solutions to the right gluteal region [Figure 1];

- Clinical fractures of both ankles with deformity in angulation [Figure 2];
- Absence of vascular-nervous disorders. X-rays performed showed:
 - A fracture of the anterior arch of the right seventh rib;
 - A comminuted fracture of the distal 1/3 of the femur [Figure 3];
 - A comminuted fracture of the right tibial pilon [Figure 4] and [Figure 5].

Admitted to the operating room, we performed osteosynthesis using a plated blade of the distal femur, tibial-calcaneal exostification in triangulation with pinning of the fibula at the ankles [Figure 6] and trimming of the gluteal wounds. Control radiographs revealed satisfactory osteosynthesis [Figure 7], [Figure 8], [Figure 9]. The postoperative course was simple, with first-line healing of the wounds. Rehabilitation sessions have begun.

Discussion

The idea of an elevator, a mechanical device used to transport people vertically between different levels of a structure, is said to have been first dreamed up by the Greek mathematician Archimedes in 236 BC. Before the development of modern and safe elevators, the use of elevators was restricted to particular circumstances. They were used in ancient Rome in the Colosseum. Another variation of the elevator, known as the "flying chair", existed in the palace of Louis XV at Versailles in the 1700s. From the early to mid-1800 s, steam or water-powered elevators existed, but the lifting cables were so unreliable that they made their daily use untenable. Then, in 1852, Elisha Graves Otis invented an elevator safety brake that revolutionized the elevator industry. It took until 1857 to see the advent of the first commercial passenger elevator, which was installed by Otis in a five-story department store in New York. Since then, elevators have become an essential part of the modern world. Without them, efficient transport of people in high-rise buildings would be almost impossible or at least impractical [3].

However, in addition to its usefulness, this device can lead to accidents responsible for severe injuries, which can sometimes be fatal. These accidents usually occur during the installation, maintenance or use of lifts. They may be linked to insufficient maintenance, malfunction of the devices or a drop in vigilance or negligence on the part of users.

In contrast, injuries and fatalities caused by elevators are rare, but cases have been reported in the medical literature and in various media [4, 5].

Between 1982 and 2010, 45 elevator-related deaths were reported, including 25 falls in elevator shafts; eight deaths involving people struck by an elevator car or by a counterweight or people caught in an elevator mechanism; four deaths due to collapsing elevators with a worker in or on the elevator; three electrocutions; and two "other" causes, including an explosion and one related to the fall of material [6]. There have been many reports of elevator injury cases over the past few decades.

However, most involve people who have been crushed by an elevator or fallen into an elevator shaft [4, 7].

Even so, they remain one of the safest means of mechanical transportation today, resulting in 0.015 injuries per elevator unit, compared to escalators which produce 0.221 injuries per escalator unit [8, 9].



Fig 1: Clinical aspect of the two correct buttock wounds.



Fig 2: Ankle angulation type deformity.



Fig 3: Comminuted supracondylar fracture of the distal femur 32C2 from AO



Fig 4: Highly displaced articular fracture and significant communication of the tibial pilon realizing type III of Ruedi and Allgower.



Fig 5: Highly displaced articular fracture and significant communication of the tibial pilon realizing type III of Ruedi and Allgower.



Fig 6: Exofixation in closed tibial-calcaneal triangulation.



Fig 7: The radiological aspect of control of F/P of the distal femur with a satisfactory reduction.



Fig 8: F/P control radiological aspect of the tibial pilon fracture and fibula pinning.



Fig 9: The radiological aspect of F/P control of the pilon fracture and pinning of the fibula.

Conclusion

Injuries involving elevators are rare and severe. The caution of users and the maintenance of the devices would constitute safe alternatives to minimize injuries related to their use.

Conflict of Interest

Not available

Financial Support

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