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Genito-urinary Trauma
Case report

A novel technique for removing a metal constriction device causing genital strangulation using a bolt cutter: A case report

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KEYWORDS
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Bolt cutter

Abstract
Introduction: Strangulation of the genitalia by a metallic device is a rare occurrence. However, such cases present a challenge to any healthcare professional because of the difficulty associated with removing the device.
Observation: Herein, we present the case of a patient with genital strangulation that was resolved quickly using a bolt cutter.
Conclusion: Bolt cutters are useful for quickly removing metallic strangulation devices, even those made of thick metal.

Introduction

Genital strangulations are relatively rare in the emergency room; however, they can be a challenging problem for any healthcare professional, especially in strangulations caused by metal devices, as they are difficult to remove. Motorized tools are often used to remove metal devices [1–7]. Herein, we report a case of genital strangulation caused by a thick metal constriction device, which was rapidly resolved using a manual-powered bolt cutter, with no complications.

Case report

A man in his 30 s was admitted to the emergency department at the University of Miyazaki Hospital with penile and scrotum pain. He had no prior history of psychological problems. Approximately 26 h prior to admission, he had placed a metal device around the circumference of his penis and scrotum to strengthen his erection during self-stimulation. On admission, he was struggling, and his

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Figure 1 The appearance of the patient's penis and scrotum.
The patient's penis and scrotum were strangulated by the constriction device, resulting in severe congestion and swelling. Limited space existed between the device and the skin.

Figure 2 The constriction device (after separation).
The constriction device was a 5–10-mm thick metal ring made of steel.

penis and scrotum were severely congested and swollen because of strangulation by the metal constriction device (Fig. 1). The device was teardrop in shape, made of stainless steel, 10 mm in width, and 5–10 mm in thickness (Fig. 2). His urine was clear and there was no evidence of hematuria.

Although we had initially planned to use a string technique, metal ring cutter, or diamond dental drill to remove the metal device, these methods may have taken considerable time because the constriction device was thick. Finally, we decided to use a bolt cutter (BC-0760, MCC Corp®, Mie, Japan) that had been placed in the building safety control center. After procedural intravenous sedation with propofol, we inserted the top of the cutting edge of the bolt cutter between the device and the abdominal side of the skin. Nothing could be inserted to protect the skin due to the severe swelling. By pinching the bolt cutter slowly, we successfully made a crack in the band of the device (Fig. 3). Subsequently, we made a second crack in the other side of the device, resulting in the device separating into two pieces. Once the device was broken, the strangulation of his penis and scrotum quickly resolved. The removal took approximately three minutes.

We confirmed that the skin was intact after the procedure. He did not experience any pains or hematuria during the overnight observation, and he was finally discharged on day 2.

Discussion

In this study, we present the case of a patient with genital strangulation caused by a thick metal device that was rapidly removed with a bolt cutter. Constricting devices are used to prolong and increase penis erectile function for sexual intercourse or self-stimulation. These devices obstruct venous blood flow and lymphatic channels, resulting in penile congestion with enhanced penile erection. Because the rate of high-grade penile injuries (such as urethral fistulae, necrosis, and gangrene) is higher in cases with a time-to-admission exceeding 72 h compared to that in cases with a time-to-admission below 72 h [4], clinicians should remove the constricting device as early as possible.

Genital strangulations by various metal devices have been reported [1–10]. Motorized tools powered by electricity or compressed air (e.g., a circulating saw or grinder [1–5], pedal cutter [6], or dental diamond drill [7]) have been used to remove the metal devices, usually under general anesthesia [3,5,8,9]. In these methods, the underlying skin is protected from the cutting edges using metallic tongues or blades [1,2,4,5,6,11], which may be cooled by ice or water against the heat and sparks of the motorized tool to avoid procedural skin complications [3,10]. However, protective blades cannot be inserted in cases involving limited space between the device and skin due to severe swelling of the penis or scrotum. In such cases, penile aspiration with a hollow-bore needle [2,8] and incision to the penis [9] may be necessary to reduce the penile congestion. In the present case, although the penis and scrotum were severely swollen, we did not perform these procedures because we were able to inset the top of the cutting edge of the bolt cutter between the device and the skin.

Bolt cutters are usually used for cutting metallic bars, such as iron bars, in settings of building demolition, the destruction of padlocks, and so on. To our knowledge, only two cases of penile and scrotum strangulation caused by a metal constriction device were resolved using a manual-powered bolt cutter have been reported [5,10]. One case was caused by a 30-mm wide and 5-mm thick stainless steel bearing [5], the other case was caused by a radiator clamp [10]. In the former case, the metallic device was completely cut in two places; the details of the removal procedure were not provided in the latter case report. The use of large orthopedic pin cutters to remove metal constriction devices has been reported [11]. In this patient's case, the band on the constriction device was completely pinched between the broad edges of the bolt cutters, allowing the entire width of the constriction device to be cut. Our technique, which involved making two cracks in the constriction device by pinching it with the top edge of the bolt cutters, is the first such description of metallic constriction device removal. The bolt cutter is potentially equivalent to the thin cutting-edge type of orthopedic pin cutter for removing metallic devices. Although the bolt cutter was not originally created for use as a medical device, our technique may be useful for cases in which the bands of the constriction device are wide, and thin cutting-edge type orthopedic pin cutters are not readily available.

Figure 3 The bolt cutter and depiction of the procedure.
The top edge of the bolt cutter was inserted into the limited space between the device and the skin. By pinching the band of the device, two cracks were made in the band, resulting in the separation of the device into two pieces.

Skin injuries during a removal procedure using a bolt cutter have been reported [10]. The skin injuries may be caused by the tool or the debris from the destroyed device. Therefore, if the degree of swelling allows, something should be placed between the skin and the device to protect the skin during the removal procedure, even when using a bolt cutter.

Conclusion

The bolt cutter is a useful choice for quickly removing metal foreign bodies, including thick metallic devices. However, caution should be taken to prevent potential skin injuries.

Conflict of interest

Authors declare no conflict of interests.

Authors' contributions

Takahiro Nagai M.D. was responsible for the evaluation and management of the patient, conceptualization, reviewing the literature, and writing the manuscript; TA was responsible for the evaluation and management of the patient and identifying the relevant literature; HO was responsible for editing and supervising the development of the article.

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Consent from the patient

We could not obtain written informed consent from the patient because we were unable to contact him after discharge. We removed all identifiable images and information, and we obtained approval for this protocol from the Institutional Review Board at the University of Miyazaki Hospital (2017-060).

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