

CASE REPORT

Hair tourniquet removal by needle Hook technique. A case report

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ABSTRACT

Background: Hair tourniquet syndrome is a potentially serious condition in which a strand of hair or thread tightly encircles a body part, leading to progressive swelling and possible ischemia if not promptly recognized and treated. Management depends on the depth and severity of the constriction, ranging from chemical dissolution or simple mechanical removal to more invasive techniques when the fiber is deeply embedded.

Case presentation: A 24-day-old female infant presented with a 4-hour history of persistent irritability and inconsolable crying. Examination revealed a swollen toe with a deeply embedded hair tourniquet and no signs of ischemia. Initial manual removal was unsuccessful. But a novel needle-assisted technique was used to hook and cut the embedded hair without incision, achieving complete release.

Conclusion: Deeply embedded hair tourniquets can be difficult to detect and manage, often requiring invasive procedures to relieve the constriction and prevent tissue damage. This case highlights a minimally invasive technique as a potentially simpler and faster alternative for effective removal while minimizing trauma.

Keywords: Case report, hair tourniquet, needle, hook, needle hook technique, infant.

Introduction

Hair tourniquet injury occurs when a strand of hair or thread tightly encircles a finger, toe, or genitalia, leading to progressive edema and potential ischemia if not promptly treated. The source of the tourniquets varies by the site of constriction: hair tourniquet, thread tourniquet, and elastic band tourniquet. The location of the injury appears to be associated with the patient's age and the type of tourniquet: toes, fingers, and external genitalia [1].

One of the potential etiological agents is human hair, which has remarkably high tensile strength, documented to exceed approximately a range of 530 to 2750 kilograms per square centimeter. To add on, it tends to swell when exposed to moisture and subsequently contract upon drying, thereby causing a constrictive effect that can compromise local blood flow by exerting pressure on the surrounding vascular structures, ultimately placing the affected appendage at significant risk of ischemia and possible tissue loss if not promptly addressed [2]. The patient with a hair or thread tourniquet usually presents with irritability. Parents or primary caregivers may also report swelling and discoloration at the site of strangulation [1]. Hair tourniquet can be managed by several techniques depending on the extent of tissue damage and the depth of the fiber or hair. Superficial tourniquets can be dissolved by chemical depilatory agents. If the previously mentioned methods fail or are

not available, mechanical removal can be attempted by using a scissor or scalpel to cut the tourniquet. When the thread is deeply embedded, it may need more invasive methods to be removed due to the inability to simply cut it. This case report presents a minimally invasive technique in which a needle is utilized and shaped as a hook and cutting tool to release the tourniquet, offering a simple and effective alternative approach for appropriately selected cases.

Case Presentation

Clinical information

A 24-day-old female infant, previously healthy and with no significant perinatal complications, was brought to the emergency department (ED) by her mother with an acute onset of swelling involving the middle toe of the infant's

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right foot, accompanied by persistent irritability and inconsolable crying. The symptoms began approximately four hours before they arrived at the ED.

Clinical findings

Upon arrival, she was continuously crying, with mild tachycardia, but her remaining vitals were within the normal limits for her age. Physical examination revealed a right middle toe swelling compared to the other toes. Closer inspection identified a deeply embedded hair tourniquet encircling the toe, consistent with hair-tourniquet syndrome. There were no clinical signs of ischemia, and the other toes appeared normal.

Diagnostic assessment

Hair tourniquet was suspected clinically based on the presence of circumferential constriction around the right middle toe associated with localized swelling and the irritability state of the patient. Upon further examination,

there were no signs suggestive of ischemia or secondary infection; the laboratory investigations and imaging were not warranted.

Therapeutic intervention

A trial of manual hair removal was unsuccessful, as it was deeply embedded. Informed consent was obtained from the mother to use the proposed new technique to remove the tourniquet. This technique aimed to release the constricting hair without the conventional need for incising the edges of the toe, thereby reducing potential trauma and risk of infection. Figure 1 shows the affected toe before the intervention, highlighting the degree of swelling and the barely visible embedded hair. Figure 2 illustrates the method that we used by curving the needle's tip to enable its simultaneous function as a hook to grab the hair and a cutting instrument to release it. Using this method, the knotted hair was dissected and removed as separated threads, ensuring complete release of the constriction.



Figure 1. Involved toe before removal.

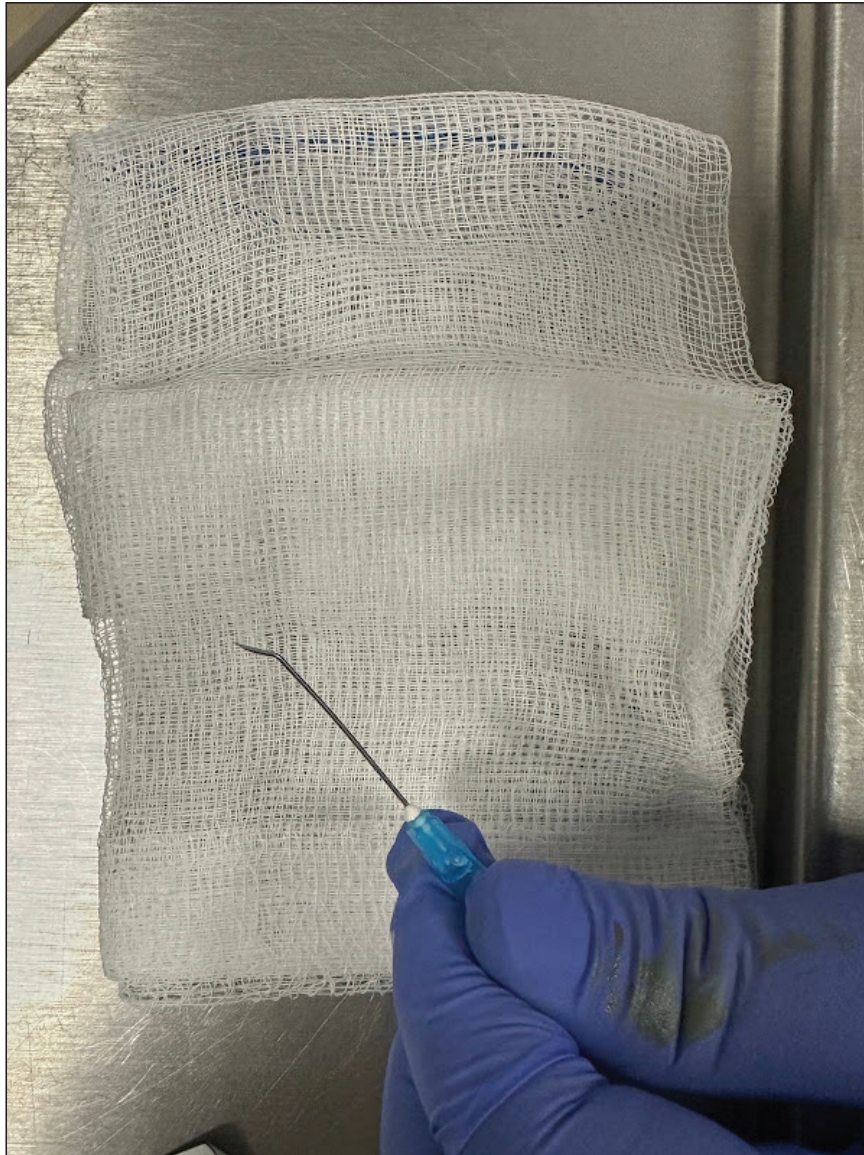


Figure 2. Curving the needle as a hook.

Follow-up and outcomes

Reassessment performed 30 minutes after the intervention and confirmed the absence of residual hair, with mild reduction in the swelling. The infant's irritability improved shortly after the intervention, which suggests the effectiveness and safety of this technique. No immediate complications, ischemic changes, or signs of infection were noted after the intervention. Figure 3 demonstrated the post-intervention appearance of the toe after releasing the hair tourniquet.

Discussion

A hair tourniquet injury is a condition seen almost exclusively in infants and young children, occurring when a strand of hair or fine thread becomes tightly wrapped around a finger, toe, or genitalia. In an extensive literature review and meta-analysis comprising 210 cases of hair tourniquet, the affected appendages in decreasing order of frequency were penis (44.2%), toes (40.2%), fingers (8.6%), and other miscellaneous sites (6.8%) [3].

This often happens unintentionally, during bathing, diaper changes, or when a loose hair inside a sock or mitten becomes caught as the child moves. The constricting material forms a tourniquet that first blocks initially impedes venous and lymphatic drainage, subsequently leading to progressive edema and pain. If the condition is not promptly recognized, the obstruction may advance to arterial compromise, culminating in tissue ischemia or, in severe cases, necrosis. Early cases may reveal the hair lying just proximal to the swollen area, but delayed presentation can make the strand difficult to detect because it may cut through the skin or become embedded within swollen tissue. Clinically, hair tourniquet injuries can be divided into superficial and deep forms. Superficial tourniquets allow the constricting material to be seen easily with magnification, and although swelling may be notable, significant discoloration or ischemic damage is usually absent. Deep tourniquets, however, are often hidden by edema and tissue overgrowth. The embedded strand may not be visible without careful and sometimes painful manipulation or sedation [1].



Figure 3. Toe after removal of hair tourniquet.

These cases may already show color changes ranging from purple to black, signaling advanced ischemia. Rarely, long-standing constriction leads to frank tissue necrosis. Cases that fall between the superficial and deep categories are particularly challenging to diagnose and manage, as the constricting strand may be partially visible yet still deeply embedded enough to cause significant physiologic compromise. Identifying and removing the tourniquet promptly is crucial to prevent permanent injury.

In many cases, as in a superficial tourniquet, the strand can simply be loosened or trimmed away. And visibly identifiable constricting bands made of hair rather than thread, using a thioglycolate-based depilatory agent, offer a highly effective and painless treatment option. A small quantity of the cream or foam is applied, and after waiting three to 10 minutes for the hair to break down and dissolve, the area is gently cleaned. Relative contraindications include allergies to the components of depilatory creams, application over mucosal surfaces,

and areas of non-intact skin [4]. In a single-center retrospective review, 94% of patients were successfully treated by this method [5]. In another review of case reports and articles, they found 64% of patients had resolution of hair tourniquet after one or two cycles of depilatory agent treatment [6].

In unfortunate situations, where a tourniquet is a strong thread, a nonsurgical trial has failed, is deeply embedded, or there is uncertainty about whether any constriction remains, a more thorough evaluation is warranted. In those situations, local anesthesia by nerve block can be performed, and a perpendicular incision can be made over the hair if visible. To avoid damage to the underlying neurovascular structures, such an incision should be made on the lateral or ulnar aspect of a finger or toe at 3 or 9 o'clock [7]. This technique was reported in a retrospective analysis of pediatric ED records of patients treated for "toe tourniquet syndrome" during 1990 to 2001 [8].

Also, it was done under general anesthesia in two cases reported in [9]. In one case report [10], the hair tourniquet was not visualized, and upon the second visit, the decision was made to put the patient under general anesthesia for thorough examination and removal if needed. In another case, hair was visualized only by loupes (3x magnification), and the removal was done in the operating room [11].

The surgical option is stressful to the patient and parents. Therefore, in this case report, a new method is used and demonstrated to release a hair tourniquet with a successful outcome by using a needle as a hook and a cutting object at the same time.

Conclusion

Superficial and loosely constricting hair tourniquets are often easily identified, whereas deeply embedded strands can be difficult to detect and can cause significant tissue damage and swelling, which makes the removal process more difficult. While simple removal is sufficient in many cases, deeply embedded tourniquets often require anesthesia and a lateral incision to relieve the pressure and protect the neurovascular structures. In this case report, we proposed a minimally invasive procedure in a try to offer an easier and faster option for hair tourniquet removal.

Conflict of interests

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

None.

Consent to participate

Verbal informed consent was obtained from the patient's parents.

Consent for publication

A general consent form was signed by the patient's parents upon entering the ED of King Fahad Medical City, which includes agreeing and allowing the medical team to use data for research purposes.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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Supplementary content (If any) is available online.

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