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Penile Replantation After Five Hours of Warm Ischemia

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ABSTRACT

Although a rare occurrence, this event may occur as a result of self-mutilation among individuals with psychiatric disturbances or due to work-related accidents, iatrogenic injuries or the actions of individuals motivated by jealousy, rage and feelings of betrayal. In western societies, most penile amputations are the result of self-aggression during a psychotic episode, the treatment of victims involves resuscitation, stabilization and immediate psychiatric support. The amputated tissue must be preserved under hypothermic conditions. Micro-surgery is currently the most widely employed method for penile replantation. This paper describes a successful case of penile replantation following 5 hours of warm ischemia.

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Introduction

Trauma to the penis, such as fracture, amputation and penetrating injuries, is considered an emergency situation. The aims of treatment are to preserve the size of the penis, erectile function and the capacity to urinate in a supine position.1

Penile amputation is an uncommon genital injury. The largest series reported was 18 cases in Thailand in the 1970s as a form of punishment imposed by the wives of unfaithful husbands.2 Iatrogenic injury is more common among children due to circumcision and is normally distal.3 Among adults, self-mutilation by individuals experiencing a psychotic disturbance, domestic violence resulting from infidelity of the male gender, burns and industrial accidents are reported.4

The amputated penis should be immediately replanted in order to avoid ischemia of the remaining stump. The amputated segment should be cleaned of debris and maintained dry in a recipient with ice, which can be maintained in conditions of hypothermia for up to 16 hours.1,3

We present a case of penile replantation after 5 hours of warm ischemia that recovered erectile function. Also, the patient referred satisfaction with his body image.

Case presentation

A 30-year-old patient suffered complete penile amputation as a consequence of aggression during a family conflict. The penis had been severed with a kitchen knife 1 cm from the mons pubis. The patient was admitted to the trauma surgery service 2 hours following the aggression. Resuscitation was performed based on the Advanced Trauma Life Support protocol. The patient was hemodynamically stable and the secondary examination revealed the presence of a Penrose drain in the penile stump and no profuse bleeding (Fig. 1a).

The patient was sent to the surgical ward for the exploration of the wound. A search for the amputated segment was solicited and the specimen arrived 4 hours after the patient had been admitted in a clean plastic recipient containing saline solution and ice (Fig. 1b). Warm ischemia had lasted 5 hours and cold ischemia had lasted 1 hour, totaling 6 hours since the amputation. Penile replantation using microsurgery was performed by the urology team, together with the plastic surgery team.

The assessment of the wound was performed, involving cleaning with heparin, the removal of areas of tissue necrosis and clamping of the dissected blood vessels. The spongy body was sutured with polyglactin 910 4-0 using an 18 French catheter with a urethra mold (Fig. 1c). The arteries and dorsal vein of the penis were anastomosed through end-to-end microsurgical repair, followed by suturing of Buck’s fascia and skin.

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Intravenous antibiotic therapy was initiated, following the protocol of the Commission for the Control of Hospital Infection, along with a tetanus vaccine and daily bandages. The gland immediately exhibited adequate perfusion. On the first postoperative day, the graft was vascularized and pink, with a small area of ischemia on the skin in the scrotal region.

On the second postoperative day, superficial epidermolysis formed on the body of the penis, associated with a small hematoma and edema of the graft. Doppler ultrasound revealed distal cavernous flow, with perviousness of the anastomosis and cavernous arteries as well as the presence of peripheral venous flow. The patient progressed well, with the formation of local granulation tissue after slight necrosis of the skin, and was discharged on the seventh postoperative day, with the cavernous body and neo-urethra lined and no signs of local inflammation. Two years later, the patient reported effective erectile function, a good urinary pattern, intact penile body and adequate esthetic acceptance (Fig. 1d).

Discussion

In cases of penis amputation, discerning surgical principles should be adopted, such as the debridement of necrotic tissue, anastomosis of the severed urethra, the repair of the tunica albuginea and microsurgery of the dorsal neurovascular plexus, as done in the present case, in which replantation was performed after 5 hours of warm ischemia.

Ehrich et al (1929) reported the first macroscopic replantation of an amputated penis, in which arterial anastomosis was not performed. The technique consisted of the approximation of the structures of the penis with no neurovascular repair. Although the functional and final cosmetic results were satisfactory, necrosis of the skin was generally reported. This led to the development of microsurgical techniques, which were independently described by Cohen et al (1977) and Tamai et al (1977), including microsurgical re-anastomosis and microsurgery of the blood vessels and nerves, which reduced the risk of necrosis of the skin. These techniques achieved excellent results. However, the skill and equipment for such procedures may not be available in places with few resources or, at times, in emergency situations.

More than one vein for anastomosis is useful for achieving a reduction in venous congestion. The deep dorsal vein is very important, but the surface vein is also useful in ensuring the viability of the skin. Sinusoidal blood flow and its venous outflow are critical to the success of penile replantation. The repair of the cavernous artery remains controversial. Some authors have attempted such a repair, especially when the injury is more proximal, where the arteries are larger and more easily sutured. Other authors state that the arteries do not provide a significant amount of vascular flow and lead to a more prolonged operating time, which could result in damage to the erectile tissue.

The possible complications of penile replantation are curvature of the penis, erectile dysfunction, hematoma, abscess, urethral fistula and urethral stenosis. Necrosis of the skin occurs in approximately half of all cases, but is often superficial. In the present case, hematoma and necrosis of the skin occurred and were treated with plastic surgery. Erectile function is preserved in more than 86% of patients submitted to microvascular re-anastomosis of the dorsal arteries. Penile sensation is maintained in 82% of patients, although it may be reduced in comparison to the primary state. Urethral stenosis develops in up to 20% of patients.

Microsurgical restoration of penile revascularization offers the rapid establishment of blood flow, with a greater possibility of graft success and a smaller number of complications. One may therefore conclude that penile replantation should be performed with a meticulous surgical technique in order to diminish the possibility of skin loss and increase the chances of maintaining erectile function. In the case, the patient was satisfied with his body image (Fig. 1d). Three-years after the accident, his partner became pregnant.
Conflicts of interest
The authors declare that they have no relevant conflicts of interest.

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