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CASE REPORT

Perineal Post-related Vulvar Necrosis: A Rare Case Series and Review of Literature

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Abstract
Vulvar necrosis is a rare complication after lower limb fractures and hip surgeries either due to direct damage to internal pudendal artery or post-surgery ischemic necrosis due to use of a perineal post. We present a series of 3 cases post-orthopedic surgeries with vulvar necrosis. All three patients presented to us after history of orthopedic surgeries which used a perineal post intraoperatively. They developed vulvar edema and blackish discoloration 6–8 h after the orthopedic procedure and referred for further management. Traction post-related vulvar necrosis can have major psychological and functional consequences; hence, formulating measures for prevention and promptly diagnosing the condition and ensuring early management to maintain the functionality of vulva is of utmost importance.

Abbreviations

NSAIDs	Non-steroidal anti-inflammatory drugs
EUSOL	Edinburgh University solution of lime

Introduction

Perineal post is an important tool which is used in management of surgeries around the hip for traction purpose. Improper application of this traction could lead to rare complications of vulvar oedema and necrosis. This clinical presentation is often confusing and can present as a diagnostic dilemma to the treating gynaecologist. The current description of cases provides an overview of different clinical presentations and the treatment modalities that can be utilized during the management of this rare complication.

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Case Description

Case 1

A 16-year-old unmarried girl presented to the orthopedic emergency department with motor vehicular accident and was diagnosed to have a left closed femur shaft fracture. She was operated for the same by closed reduction, internal fixation with nail osteosynthesis on a traction table with perineal post under regional anesthesia, and the intraoperative course was uneventful. A gynecology reference was sent 8 h post-procedure for blackish discoloration and swelling of the vulva. Concomitant history of perineal trauma was ruled out. There were no medical comorbidities and no gynecological complaints prior to the surgery. On examination, there was bilateral swelling involving labia majora, labia minora and clitoris with blackish discoloration of skin. A 3 × 4 cm area of black discoloration was also present over the medial aspect of the left thigh (Fig. 1). There was minimal tenderness and induration over the vulva and no accompanying local rise of temperature or evidence of a vulvar hematoma. Urethral meatus was intact. There was no evidence of any itching at the local site or purulent discharge per vaginum. Owing to sexual inactivity, per speculum and per vaginal examination were deferred for further evaluation. Pelvic fractures were ruled out by plain radiography and computed topographic scan of the pelvis post-orthopedic surgery. Conservative management was planned as there was no indication of a surgical intervention at the time of presentation. Local dressings using glycerine and magnesium

Fig. 1 Clinical photograph of case 1 at the time of presentation showing vulvar edema and discoloration

Fig. 2 Clinical photograph of case 1 one week after presentation showing separation of necrotic patch

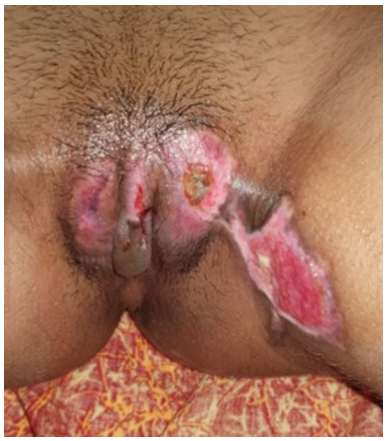

Fig. 3 Clinical photograph of case 1 three weeks after presentation showing healthy granulation tissue at the base of the wound

Fig. 4 Clinical photograph of case 1 showing complete healing by secondary intention

sulfate were started to reduce tissue edema. Limb elevation was advised; systemic broad spectrum antibiotics were started. Non-steroidal anti-inflammatory drugs [NSAIDs] were started for the local pain, and oral proteolytic enzyme preparation containing trypsin and chymotrypsin [6:1] was added to enhance reduction of soft tissue edema. By postoperative day 4, the local tissues showed significant reduction of edema, but the superficial epidermal necrotic patches became more evident. Serial dressings were carried out with povidone iodine solutions and desloughing agents like Edinburgh University solution of lime (EUSOL). Local ointments containing papain-urea and metronidazole were applied after daily dressings. The necrotic patches started to show signs of separation from the base after day 7 (Fig. 2). A urinary catheter was kept for urinary drainage and to prevent perineal soiling for 2 weeks. The wound showed signs of secondary healing with successive dressings, and healthy granulation tissue could be appreciated by day 21 post-presentation (Fig. 3). The patient was followed up 3 months post-fracture fixation, and the vulvar wound showed complete healing by secondary intention with minimal scarring over the medial aspect of thigh (Fig. 4).

Case 2

A 66-year-old postmenopausal female presented to the orthopedic emergency with a fragility fracture of the left hip after a trivial injury at home. The patient had poorly controlled Type II diabetes mellitus since 15 years and was on oral hypoglycemic agents. Two days post-trauma she was managed with closed reduction and sliding hip screw fixation for a left intertrochanteric fracture. She was referred to gynecology with blackish discoloration of vulva bilaterally with edema 6 h post-procedure. Any pelvic fractures and vulval hematoma were ruled out, and similar conservative management was started with glycerine magnesium sulfate dressings and broad spectrum antibiotics. The patient developed fever and systemic signs of infection on day 4 post-procedure. A 4 × 5 cm localized, fluctuant, tender swelling was noticed over the left labia majora along with necrotic patches over bilateral labia majora, minora and medial aspect

of left thigh. The patient had developed a vulvar abscess and was taken up for incision and drainage of the abscess and surgical debridement of the necrotic areas over the vulva under anesthesia. The purulent material after the drainage was sent for microbial culture and antibiotic sensitivity. The culture detected methicillin-resistant Staphylococcus aureus [MRSA] as the primary organism sensitive to linezolid and vancomycin. The antibiotic regime was altered accordingly. For a better predictable glycemic control, the patient was started on subcutaneous human insulin with periodic monitoring. The wound healed by secondary intention with the help of daily dressings and systemic antibiotics.

Case 3

An 18-year-old unmarried girl presented to the orthopedic emergency department with motor vehicular accident and was diagnosed to have a right closed femur shaft fracture. She was operated for the same by closed reduction, internal fixation with nail osteosynthesis, and the intraoperative course was uneventful. A gynecology reference was sent 6 h post-procedure for blackish discoloration and swelling of the vulva. On examination, there was bilateral swelling involving labia majora, labia minora and clitoris with blackish discoloration of skin. A 3×5 cm area of black discoloration was also present over the medial aspect of the right thigh. Conservative management was planned after ruling out pelvic fractures. After an initial favorable course of conservative management, the patient underwent surgical debridement. The wound healed with secondary intention with minimal scarring.

Discussion

Vulvar necrosis arising after orthopedic surgeries is an extremely rare complication and sparingly reported. Its diagnosis and management poses unique challenges to the treating gynecologist. It could be assumed to be related directly to a vascular damage to the blood supply around the vulva, but such a direct trauma can be related only to ischiopubic fractures which could damage the internal pudendal artery [1]. The differential diagnosis at the time of presentation can be of a hematoma secondary to pelvic fractures, friction/cautery burn, preexisting genital infection or lastly sexual abuse. During hip arthroscopy, intertrochanteric fracture or fracture of shaft of femur fixation, adequate traction and counter-traction are essential. A perineal post is used for alignment of fracture fragments to provide counter-traction against the traction applied on the fractured limb [2]. It is made up of carbon fiber and made up of various sizes [2, 3]. Traction table-related perineal region complications are described in both males and females in the literature. It ranges from vulvar hematoma, vaginal tears, vulvar ischemia followed by necrosis and ulceration, clitoral injury leading to sexual impairment. Urethral injuries, scrotal hematoma and pudendal nerve injuries leading to erectile dysfunction are common in males [1, 2, 4]. Crush syndrome of the thigh can be found in both. In one of the first reports published worldwide of a bilateral vulvar necrosis by Chantalat et al. [1], an investigation was conducted in cadavers to refute the hypothesis that the mechanism of injury was due to damage to a selective blood vessel. Existent literature shows that vulva has a dual supply by both internal and external pudendal arteries and there are numerous distal anastomoses which make the vulva as 'sponge-like' and compression of the distal blood supply due to prolonged traction by perineal post can cause ischemic necrosis of the vulva [1, 5, 6]. Certain measures for prevention of such injuries suggested include a correct size, wide perineal post placement against the medial thigh with adequate padding around the vulva for a more even distribution of the compression forces, the duration of the traction to be minimized by reduced operative time, minimum magnitude of traction with adequate muscle relaxants use [2, 7]. Few reports also mention intermittent release of traction, especially in prolonged procedures with use of agar between vulva and perineal post [8–10]. Moreover, the use of a fracture distractor can prove to be beneficial in reduction of the fractures obviating the use of a perineal post. The adduction of limb should also be avoided and the limb should preferably be kept in 20 degrees of abduction while the other limb is in flexion, abduction and external rotation. There have been recent reports on procedures conducted with hip distraction techniques in arthroscopies without the use of a counter traction perineal post and usage of moldable posts around genitalia but should be best left to the discretion of the treating orthopedic surgeon [11]. Conservative management works well in most cases, with postoperative examination to look for vulvar edema and other associated injuries. Once the development of vulvar edema has ensued, measures should be taken to maintain strict perineal hygiene and reduce the edema with local cold compression and hygroscopic dressings. Frequent periodic checks should be ensured to rule out progression to frank necrosis. In case the edema progresses to necrosis, addition of antibiotics should be considered as per institutional protocols and the wound generally requires a formal debridement to clear all the necrotic tissue and provide a healthy bed for wound healing. Aggressive debridement should be avoided especially in young patients as it could have grave psychological consequences. The use of hyperbaric oxygen is reported and followed as per anecdotal reports and has been found to improve wound healing in such patients [1]. Elderly patients with comorbidities like diabetes mellitus require adequate glycemic control to prevent secondary bacterial infections as described in our previous case. In any case, if there is

development of frank abscess, formal drainage and antibiotic therapy becomes imperative. The antibiotic therapy should be parenteral for the initial part of about 7–10 days as per the sensitivity and can later be shifted to oral course as per response. Wider defects post-debridement could warrant a reconstructive flap/graft repair.

Conclusion

Traction table related perineal complications are rare with grave functional and psychological consequences and can present as a diagnostic dilemma for the treating gynecologists. Efforts to ensure knowledge regarding the mechanism of injury are imperative in early diagnosis of the condition. Preventive measures and standard management protocols are of critical importance to maintain maximum functionality of the vulva and offer favorable long-term outcomes.

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Compliance with Ethical Standards

Conflict of interest The authors declare that none of the authors have conflict of interest.

Informed Consent Informed consent has been obtained for publishing.

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