



Pediatrics

A rare case of necrotizing soft tissue infection following circumcision of buried penis

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ABSTRACT

Circumcision is generally a safe procedure with rare serious adverse events. We report the case of a 7-month-old male who developed necrotizing soft tissue infection following circumcision of his buried penis. A high index of suspicion must be present to diagnose necrotizing fasciitis, and treatment involves early, aggressive debridement, and broad spectrum antibiotics.

1. Introduction

Circumcision is one of the most common surgical procedures performed, with almost 60 % of newborn males in the United States being circumcised annually.¹ In newborns, circumcision is typically performed with a Gomco clamp, Plastibell device, or Mogen clamp under local anesthesia. In older infants and children, general anesthesia is necessary, and Sleeve resection technique is often used. Circumcision can provide health benefits, such as a reduced risk of urinary tract infections.² Like any procedure, there are potential risks and complications. Complications are uncommon; one systematic review estimated adverse events associated with circumcision to be less than 0.5 % in newborns.³ These can include bleeding, injury to the penis, and infection. Rarely, severe infections such as Staphylococcus Scalded Skin Syndrome and necrotizing soft tissue infection (NSTI) can occur.

NSTI is a rapidly progressing and potentially life-threatening condition that can affect children. NSTI is caused by a combination of bacteria, usually polymicrobial, and commonly involves the deeper layers of skin and subcutaneous tissue. The incidence of NSTI in children has been reported to range from 0.022 to 0.843 cases per 100,000 population. Large, retrospective cohort studies have found that infections following circumcision in infants occur at an incidence of 0.04–0.06 %. There are no rates of NSTI following circumcision in infants reported in the literature, but there are several case reports. We report the case of a 7-month old male who was developed NSTI following circumcision of buried penis.

2. Case presentation

Our patient is a 7-month-old male who presented to our institution three days after undergoing an outpatient circumcision with sleeve technique at an outside facility. Due to the presence of buried penis secondary to large suprapubic fat pad, this required degloving of the penis and fixation of the penopubic junction to the periosteum of the pubic bone at the 12 o'clock position. On the day of surgery, he developed fevers up to 101F and projectile vomiting followed by facial, abdominal, back and leg rash on postoperative day (POD) 1. On POD 2, he had increasing fussiness and poor oral intake. By POD 3, a new left groin and left upper quadrant bruise was noted which visibly progressed throughout the day. Additionally, there was increasing genital redness spreading to his bottom, and the family noted decreased lower extremity movements and stiffness.

He initially presented to an outside facility ER, where he was afebrile but had leukocytosis to $26.7 \times 10^9/L$ with left shift. His exam was notable for an edematous penis as well as groin swelling that was taut but with no crepitus. He also had an area of purple skin discoloration over his left groin (Fig. 1). He would not actively move his bilateral lower extremities, and passive movements elicited pain out of proportion to what was expected on exam. CT scan showed diffuse subcutaneous edema within inguinal regions and extending along the abdominal wall. Broad spectrum antibiotics were started. Due to concerns for possible penile gangrene and NSTI, he was transferred to our facility, where he had an elevated white blood cell count of $31.2 \times 10^9/L$, C-reactive protein elevation to 91.1 mg/L and hyponatremia (132 meq/L).

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Fig. 1. NSTI of groin, left flank.

Due to the constellation of findings and concerns for NSTI, he was taken promptly to the operating room for debridement. Necrotizing infection involved the subcutaneous fat extending from the prior circumcision site into both groins and up the left flank. There was skin necrosis over the left groin and left flank. The left spermatic cord, penile shaft, and glans penis were intact and viable (Fig. 2). A wound vacuum-assisted closure device was placed. Cultures from the wound grew methicillin sensitive staph aureus. He underwent subsequent multiple debridements, washouts, and exchanges of the wound vac under anesthesia.

Approximately 10 weeks after initial placement of the wound vac, the wound size was approximately 1.0 cm × 1.5 cm and the wound was managed by packing. Approximately 4 months after initial presentation, the wound was closed. He did however develop scar contracture and subsequently underwent excision of left lower abdominal wall scar and advancement flap with layered closure approximately 6 months after presentation.

3. Discussion

We report the rare case of NSTI following infantile sleeve circumcision. Complications following circumcision are rare; they are estimated to be approximately 0.4 % in infants and while the incidence increases as the patient ages, it is still considered to be a safe procedure.³ While there are no documented rates of NSTI in the literature, there have been similar case reports, mostly following Plastibell circumcision.

NSTI are rapidly progressive infections that can have significant morbidity and mortality if not treated quickly. NSTI are usually initiated when skin integrity is compromised and may be due to underlying infection, trauma, or surgical intervention. There must be a high index of suspicion to diagnose NSTI as there are no pathognomonic features and there is no validated algorithm for diagnosing NSTI in the pediatric population. However, severe pain, rapid progression of necrosis, and high fever are often present. Treatment of NSTI includes early surgical debridement, use of broad-spectrum antibiotics, and supportive care. Early diagnosis and aggressive management are essential for optimal outcomes and to reduce mortality in children.

Antibiotics are not routinely given peri-operatively in regard to circumcision in pediatric patients. In a survey sent to pediatric urologists



Fig. 2. Following second OR debridement.

in 2011, approximately 85 % of urologists do not give pre-operative antibiotics, and over 90 % of urologists do not give post-operative antibiotics.⁴ In a technique describing penoplasty for buried penis, antibiotics were given prophylactically.⁵ In this particular case, the need to deglove the penis and utilize anchoring stitches at the penopubic junction may have increased his risk for NSTI. This technique of tacking the base of the penis to the periosteum has been described by Maizels et al for the correction of buried penis.⁶ Given the infection risk, one may consider the use of preprocedural antibiotics for such cases.

4. Conclusion

Necrotizing soft tissue infections are very rare following circumcisions. They are characterized by pain out of proportion to exam, erythema, and lab abnormalities. Often, infections are polymicrobial and a high index of suspicion leading to early diagnosis is critical to minimize morbidity and mortality.

Declaration of competing interest

The authors of this manuscript have no conflicts of interest to disclose.

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