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Emergency Department tricks: osmotic reduction of paraphimosis

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Abstract

Paraphimosis is a common urological emergency, in which the foreskin is trapped behind the coronal sulcus of the penis, forming a constricting band that causes strangulation of the glans, painful vascular involvement, distal venous congestion, edema, and even necrosis. Therefore, timely treatment in the emergency department is essential.

The primary treatment for paraphimosis is manual reduction with compression of the glans and gradual retraction of the foreskin, which can be extremely painful and require sedation in the operating room, or more invasive maneuvers such as micro-puncture and dorsal slit of the foreskin.

This article presents an alternative, effective, and less painful method for reducing paraphimosis using a common osmotic agent: 50% dextrose or 20% mannitol.

TRUCOS DE LA GUARDIA: REDUCCIÓN OSMÓTICA DE LA PARAFIMOSIS

Resumen

La parafimosis presenta una emergencia urológica común, en la que el prepucio queda atrapado detrás del surco coronario del pene, formando una banda de tejido constrictivo que ocasiona estrangulamiento del glande, compromiso vascular doloroso, congestión venosa distal, edema e incluso necrosis, por lo que el tratamiento en los servicios de Urgencias debe ser oportuno.

El tratamiento más conocido de la parafimosis es la reducción manual con compresión del glande y retracción gradual del prepucio, que en algunas ocasiones puede llegar a ser extremadamente dolorosa y requerir sedación en sala de operaciones, o maniobras más invasivas como micropunciones del prepucio y hendidura dorsal del mismo.

El presente artículo presenta una manera alternativa de reducción de la parafimosis, efectiva y menos dolorosa, mediante el uso de un agente osmótico común: dextrosa al 50% o manitol al 20%.

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INTRODUCTION

Paraphimosis is a urologic emergency that occurs in about 1% of uncircumcised boys, adolescents, and adult men, where the foreskin becomes trapped behind the coronal sulcus of the glans penis. The primary treatment of paraphimosis is manual reduction with compression of the glans and gradual retraction of the foreskin[1,2]. Without adequate and early treatment, the condition can lead to entrapment and strangulation of the glans, causing vascular congestion, edema, and necrosis[3]. It is important to distinguish paraphimosis from phimosis, a non-urgent condition where the foreskin cannot be retracted backward.

Delayed treatment of paraphimosis can lead to severe complications such as tissue necrosis, gangrene, and partial amputation of the glans; therefore, it is crucial for emergency department teams to diagnose and treat this condition in a timely manner[4].

ETIOLOGY

Paraphimosis commonly occurs iatrogenically, when the foreskin is retracted for cleaning, placement of a urinary catheter, procedures such as cystoscopy, or for a genital examination[5]. Other less common causes include piercings in the preputial ring and trauma during sexual activity[6].

CLINICAL MANIFESTATIONS

Paraphimosis usually presents as acute penile pain, with a congested glans and a collar of swollen foreskin around the coronal sulcus. A band of constricted tissue is typically identified immediately behind the head of the penis. Occasionally, the constriction of the glans can cause ulceration due to ischemia and urinary obstruction[7].

A pink color of the glans indicates a fairly good blood supply, while a dark, pale, bluish, or black color suggests ischemia or even necrosis[5].

DIAGNOSIS IN THE EMERGENCY DEPARTMENT

The diagnosis is made clinically by identifying the previously described findings. Laboratory or imaging studies are not required[1].

In addition to the physical examination, taking a history to determine the time of symptom onset and the presence of additional symptoms helps confirm the diagnosis and exclude the main differential diagnoses[8]:

- Acute angioedema.
- Allergic contact dermatitis.
- Hair torniquet.
- Balanitis.
- Penile carcinoma.
- Penile hematoma.
- Penile fracture.

TREATMENT: OSMOTIC REDUCTION

Rapid pain relief will reduce the child's suffering and anxiety and facilitate the reduction maneuvers required to resolve the paraphimosis. The pain associated with reduction maneuvers is often so severe that procedural sedation or general anesthesia is often required[9].

Recent studies have proposed non-invasive strategies, such as ketamine nebulization and the use of topical anesthesia with LET gel (lidocaine 4%, epinephrine 0.1%, tetracaine 0.5%), as the initial mainstay of treatment in the emergency department. These strategies provide adequate analgesia and offer the advantage of avoiding transfer to the operating room and the administration of intravenous drugs[10,11].

Once the initial analgesia has been administered, the traditional method involves the intermittent application of ice and the exertion of circumferential and constant pressure from the shaft of the penis towards the glans. As the edema of the foreskin decreases, the thumbs are positioned on the glans to push it backward and reduce it into the previously retracted foreskin[1].

The osmotic method for paraphimosis reduction has been described since the 1970s but fell into disuse until the 1990s, when studies were again published reporting successful reduction of rectal and stomal prolapse using granulated sugar[12-14].

The physiological principle is simple: the application of an osmotically active substance creates a concentration gradient that forces water to diffuse from the site of lower concentration (edematous paraphimotic ring) to the site of higher concentration (area where the osmotic agent is applied), thereby reducing edema and tissue tension[15].

Recent studies have reported successful reduction of paraphimosis using 20% mannitol, achieving rapid reduction (less than 45 minutes), painlessly, and at a much lower cost compared to other reduction strategies[16].

How to do this in a practical way:

1. Apply lidocaine gel to the glans and shaft of the penis.
2. Soak gauze in the available osmotic agent (either mannitol 20% or dextrose 50%).
3. Cover the glans and the paraphimotic ring with the gauze soaked in the osmotic agent and leave it in place for 30-45 minutes.
4. Reapply mannitol 20% or dextrose 50% to prevent the gauze from drying out.
5. Reduce paraphimosis gently and without pain using circumferential pressure maneuvers.

CONCLUSIONS

Paraphimosis is a true urologic emergency, and pediatric emergency physicians should be competent in its identification and timely treatment.

In addition to rapid non-invasive methods for administering analgesia, osmotic methods can be considered for the treatment of paraphimosis, achieving successful reduction without the need for invasive and painful procedures. This

approach also helps avoid the potential adverse effects and costs associated with sedation and management in the operating room.

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