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Traumatic Laceration Wound Management and Suspected Penicillin-Induced Hypersensitivity in an Argentine Polo Mare

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Abstract

This case report is aimed at providing information on the special needs in management of equine wounds and the suspected penicillin-induced hypersensitivity. A six (6) years old Argentine polo mare with body weight of about 450 kg in a stable in Kaduna, Nigeria, ran into barbed wire fence of a neighboring orchard at midnight. The mare sustained two elliptically-shaped wounds of about 2.5cm and 11cm long on the right buttock and several small cuts involving only the epidermis on other parts of the body. The mare was restrained with muzzle twitch and hobbles. Lidocaine hydrochloride (2%) was used as local anaesthesia. The wounds were cleaned with diluted chlorhexidine gluconate (purit®). Size 1 each of chromic catgut and braided silk were used to apply simple interrupted sutures deeper tissue and horizontal mattress sutures on skin respectively. These were for their good knotting security. Procaine penicillin/ streptomycin inj. combination was applied on wounds surface prior to stitching to control contamination and intramuscularly postsurgical. Suspected penicillin-induced hypersensitivity reaction occurred about 30minutes later and oxytetracycline 5% inj. was used as substitute. The wound healed 17 days post surgical. It was concluded that hypersensitivity reaction to penicillin occur in horses and oxytetracycline 5% inj. can be used as substitute for parenteral antibiosis if wound contamination is not severe.

Key Words: Traumatic, laceration wound, management, penicillin, hypersensitivity, mare.

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Introduction

The aim of reporting this case is to provide equine practitioners and horse owners with information on the special needs in equine wound management and the suspected penicillin-induced anaphylactic reaction that accompanied this case.

Horses kept in stables for days or weeks without exercise, frightened or when on heat often run out of stables. They may get into barbed wire fences and sustain injuries of varying severity. In horses, it may involve full skin thickness deficits, with epithelial and dermal tissue loss, or damage to deeper structures, including the synovial architecture, ligaments, tendons or bone. Equine wounds, especially those in areas of frequent movement, do not heal properly and can result in poor functional outcomes, significant scarring and poor cosmetic appearance. The rate and type of healing is affected by interspecies variation, location of the wound on the body, contamination, the presence of foreign material or non-viable tissues, temperament, size and some unique physiological characteristics of the horse, thereby making treatment of wounds in horses challenging (Greg, 2010). Wounds contamination could result in fatal bacterial infection(s) such tetanus and botulism (Stewart, 2012).

Systemic antibiotics are often administered until potential infections are under control. Culture of the wound may dictate which specific antibiotic to use (David, 2008).

Case history

A six years old Argentine polo mare of about 450 kg bd wt in a polo stable in Kaduna, Nigeria, forced its way out of loose box at midnight. The mare ran into barbed wire fence of a neighboring orchard, sustained 2 cut injuries on its buttock and several small cuts involving only the epidermis on other parts of the body. The mare bled seriously from the cut as reported by the groom on a mobile phone call.

Clinical Examination

Following visit to the farm at day break (five hours later), the mare was inspected while an assistant held it by its halter. Two wounds with elliptical shapes were observed on the right buttock. The first was small cut of about 2.5cm long. The second wound was about 11cm long and extended obliquely and mediolaterally. Under-laying muscle bundle was slashed to a depth of about 2cm. The wound skin edges retracted and gave the wounds elliptical shapes. There were many other small bruises involving only epidermis all over on trunk and lower ends of limbs. Bleeding had stopped, stream of blood and clots stained the posterior aspect of the right hind limb down to the hooves and the tail. Dry pieces of grass and sand mildly contaminated the wound surface.

Diagnosis

Traumatic Laceration wounds

Pre-surgical Wound Preparation

In order to allow for wound manipulation and cleaning, the mare was restrained with the aid of hobbles applied to its right fore and hind limbs (affected side) and twitch was also applied to the upper lip. The surgeon washed and gloved his hands. Twenty milliliters of 2% lidocaine hydrochloride was infiltrated around the wound. Each time needle was being driven into the body the assistant was alerted to steadily increase twist on the twitch to divert attention thus prevented violent reaction from the mare. The wounds were cleaned with cotton wool soaked in chlorhexidine gluconate (purit® 0.3% w/v, Saro lifecare ltd, Nigeria) 1 in 6 aqueous solution as recommended by the manufacturer. Sand, grass, hair and clotted blood were removed by wiping, picking and flushing with cotton wool, forceps and chlorhexidine solution respectively as much as were seen on the wounds. Cotton wool soaked in chlorhexidine solution was squeezed to reduce moisture content and was used to cover the wound surface for shaving and mop up loose hair. Skin around the wound was shaved 2cm from wound edge. The wound was once more cleaned and the cotton wool was gently removed and discarded (Kearney et al., 2009).
**Surgical Procedure**

The wounds were topically sprinkled with a combination of procaine penicillin (4ml) and streptomycin (2ml) solutions for injection to directly control contaminants.

Plate 1: Wound on buttock, post-Surgical.

Plate 2: Wounds on buttock 12 days post-surgical (stitches removed).

Plate 3: The wounds on buttock significantly healed, 17 days post-surgical.

Plate 4: Alopecic flank and ventral abdomen from penicillin-induced hypersensitivity reaction.

Plate 5: Alopecic fore-arm due to penicillin-induced hypersensitivity.

Plate 6: Alopecic shoulder and girth due to penicillin-induced hypersensitivity.
The skin of the small wound was closed with 2 horizontal mattress stitches. The large wound was closed in 2 layers. A major venous bleeder detected during wound cleaning was ligated. The underlying muscle and skin edges were separately apposed with chromic catgut size 1 and braided silk size 1 using simple interrupted suture pattern and horizontal mattress suture pattern respectively (plate 1) (Amresh, 2003).

Post-surgical Care
The surgical site and bruises were cleaned daily with cotton wool soaked in chlorhexidine (1 in 6) aqueous solution and dressed with oxytetracycline aerosol spray (oxytetracycline hydrochloride 4.2g, Gentian violet 420mg, Excipient q.s. 210 ml, Vetaque intl., Animal Health Division, Tehran-Iran) twice daily until healed. Procaine penicillin powder for injection equivalent to 4,500,000 I.U. (Paulio®, Reyoung pharmaceutical co., Shandong, China) was diluted with 8ml sterile injection water and administered at the dose rate of 17,000 I.U. (10mg)/kg bd wt together with streptomycin injection solution (CSPC Zhongnuo pharmaceutical co. ltd, Shijiazhuang city, China) equivalent to 3.75g at the dose rate of 10mg/kg bd wt intramuscularly on day one. Approximately 30 minutes after this treatment, the mare became restless, stamped its feet continually, itching and skin swellings appeared (urticaria) on the brisket, shoulder, ventral abdomen, radio-ulnar region, cannon, injection site in neck region and face. The mare was warm all over her body when touched. Tap water was poured on its body to enhance cooling. About 3 hours later the mare was calm and by 24th hour, affected body parts became alopecic with erythemic spots. Other signs observed the previous day had disappeared. The mare was strongly suspected to have had acute anaphylactic reaction to the penicillin. The penicillin-streptomycin combination therapy was replaced with oxytetracycline hydrochloride inj. (Tetranor® 5.5% w/v, Shijuazhuang Guanghua pharmaceutical co. ltd, China) at the dose rate of 7.5mg/kg bd wt intramuscularly from day 2 for 5 days. Tetanus toxoid (Dano Vaccines and Biologicals PVT Ltd, India) 15 Lf, equivalent to 1.5ml was administered by deep intramuscular injection (Aliu, 2007).

The mare was allowed free movement in loose box for the first 72 hours and subsequently tamed by its halters during the day intermittently when not feeding and throughout the night to avoid rubbing surgical site on objects due to itching which characterizes early wound healing process. By day 12 post-surgical, suture line had apposed, external stitches were removed (plate 2) and the skin reaction to penicillin-induced-hypersensitivity had resolved. By day 21 post-surgical, mare was gradually returned to exercise.

Discussion
In the management of wounds on this mare, chlorhexidine solution was used as antiseptic to clean the wounds; procaine penicillin/streptomycin combination and oxytetracycline were used topically and parenterally because the wounds were contaminated. The foreign bodies observed on the wounds constitute a source of opportunistic bacteria which could cause tissue damage, decreases rates of wound healing thereby increasing morbidity and cost of management. The clinical rationale for topical and systemic antimicrobial therapy in this case was to suppress microbial organisms contaminating the wound by ensuring that there is microcirculation for oxygenation, nutrition, moisture, increased temperature, neutral to slightly acidic pH and a bacterial population load less than 105 organisms per gram of tissue (Peacock Jr. 1984, Knottenbelt 1997). These will allow acceptable wound healing process.

The location of the sutured wounds on buttock is an area of high mobility and tension on skin. This was our consideration for the use of horizontal mattress suture pattern and the size 1 silk and chromic catgut. The material size and pattern have very good tensile strength to prevent loosening of stitches. These allowed good knotting security before wound edges are apposed/healed. Howard et al. (1993) reported that wounds can be considered to have healed when visible epithelium covered the wound (plate 3).
Although, broad spectrum antibiotics, such as penicillin and gentamicin, trimethoprim-sulfa, or ceftiofur, are recommended for an initial antibiosis before bacterial culture and sensitivity results are out (David, 2008), we substitute procaine penicillin/streptomycin combination therapy for oxytetracycline inj. simply because of the hypersensitivity that ensued and oxytetracycline was the available antibiotic.

Since wound contamination with soil is a means to contracting tetanus, tetanus toxoid was administered to the horse to prevent possible Clostridium tetani infection (Stewart, 2012). The short time interval (about 30 minutes) after procaine penicillin and streptomycin combination therapy, the restlessness, feet stamping, itching, skin swellings (urticaria) on the brisket, shoulder, ventral abdomen, radio-ulnar region, cannon and at injection site in neck region, face and the warm body when touched were signs of penicillin-induced anaphylactic reaction (plates 4, 5, and 6). Although, anaphylaxis is reported to be rare in horses, our findings are in line with those of Panwar (2002) who reported that acute anaphylaxis is associated with shaking, fever, vomiting, collapse, hypersalivation, eosinophilia, neutropenia, agranulocytosis, thrombocytopenia, leucopenia, anemia and lymphadenopathy are signs of the condition. This is the first encounter of the corresponding author in 18 years of equine practice and 8 years of exposure to Argentine horses’ cases. Following initial stabilization and care of the wound, the mare was restricted to stall rest and gradually returned to exercise as was dictated by the wound. This was in compliance with the report that exercises during recovery result in a greater tendency to loosen stitches and develop exuberant granulation tissue due to movement at the wound site (David, 2008).

References


