CASE REPORT

A fungating spica

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Accepted 30 December 2014

SUMMARY

Developmental dysplasia of the hip (DDH) is a common paediatric orthopaedic problem. There are various options for treatment dependent on the age and presentation. In closed and open reduction of DDH, we use a hip spica cast for immobilisation after the procedure. We present an unusual case of fungal growth on a hip spica. A 7-month-old girl presented to our institution with clusters of yellowish-white outgrowths resembling mushrooms from her spica. To the best of our knowledge, this is the first reported case of fungal growth on a hip spica following DDH treatment. It is of utmost importance to be aware of any growth on a hip spica, as this requires a prompt change of spica to avoid further complications. We recommend that the integrity of the spica and the skin be checked at regular intervals in patients with a hip spica.

BACKGROUND

Developmental dysplasia of the hip (DDH) is a common problem in paediatric orthopaedics and there are various options for treatment that depend on the age and presentation of the patient. Closed and open reduction of DDH involves the use of a postoperative hip spica cast for immobilisation. Cast problems are often due to damage to the cast necessitating changing the cast.¹ Caring for a child with a hip spica can be technically challenging and the moist condition of the cast can cause problems.² We present a case of an unusual complication of hip spica immobilisation in a 7-month-old girl who presented with clusters of yellowish-white outgrowths resembling mushrooms from her hip spica. To the best of our knowledge, this is the first reported case of fungal growth on a hip spica. Fungal growth on a spica can have significant implications in spica care as direct inoculation onto disrupted skin can cause a fungal infection that can spread and cause a disseminated infection.³

CASE PRESENTATION

We present a case of a 7-month-old girl who was admitted to accident and emergency (A&E) with visible mushroom-like growths on her spica. She had undergone an examination under anaesthesia (EUA), followed by an arthrogram and medial open reduction with hip spica cast immobilisation of her left hip 5 weeks earlier. She is the second child in her family. Her mother had a normal pregnancy. She was delivered by emergency caesarean section at 41 weeks due to being in a breech position. She weighed 6 lb 8 oz at birth. She is fit and well and there is no significant family history of DDH.

After the infant was diagnosed with DDH, she was initially treated with a pavlik harness. However, she was unable to tolerate this so it was

discontinued. Further treatment was attempted using double nappies. In her subsequent follow-up, her clinical examination and her ultrasound scans both revealed that her left hip was still dislocated. A decision to proceed with surgical intervention was taken (figure 1).

She had a EUA, which showed a dislocated left hip with abduction of 50°. There was an incomplete reduction with the Ortolani manoeuvre with a small safe zone. An arthrogram and attempted closed reduction was performed. However, this revealed medial dye pooling, blunted rose thorn sign and the equator of head did not go under the tip of labrum. This meant the closed reduction was unsatisfactory. We then proceeded to a medial open reduction of the left hip. We achieved a stable reduction with a wide safe zone. We applied a spica cast to the patient. First, we wrapped the area in a layer of wool, followed by plaster of paris, finally reinforcing it with fibreglass as the final layer. The edges of the cast were padded to prevent rubbing of the fibreglass on the infant's skin. She was placed in a hip spica in 100° flexion and 70° abduction. Our usual practice is to use an absorbable suture for the wound and to leave the spica on for a total of 3 months. The postoperative period was uneventful. CT scan postoperatively showed a congruent left hip. The infant was discharged home 2 days later. She was seen in clinic 6 days later with a slightly loose plaster cast and a broomstick was applied to reinforce the spica cast.

The baby presented to A&E 5 weeks postoperatively with macroscopic mushroom-like growths on her hip spica (figures 2 and 3). The fungal growth arose from inside the spica near the abdominal area of the spica, mostly along the edge where the padding met the fibreglass. The growth was away from the site of the incision. No fungal growths were in direct contact with the incision. The patient was systemically well. There were no other major issues with the spica. The parents had no problems with spica care as they had followed standard advice on it. There were no issues with housing conditions. There was no history of recent travel.

OUTCOME AND FOLLOW-UP

The fungi were debrided from the spica in A&E. The samples were sent for microscopy, culture and histology. The spica was changed under anaesthesia and the baby's skin was examined carefully. The skin looked healthy and showed no signs of cutaneous infection. We took skin scrapings and these were sent for analysis. Postoperatively, the baby was well and her imaging showed a congruent left hip (figure 4). She was discharged home safely the next day.

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To cite: Chan Y, Selvaratnam V, Garg N. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-206901

Figure 1 Ultrasound of left hip showing an α angle of 38.2° and β angle of 77.8° confirming the diagnosis of a dislocated left hip.

INVESTIGATIONS

Histopathology analysed the three samples we sent from theatres. Macroscopically, they found an irregular piece of soft yellowish brown tissue wrapped in a delicate translucent mesh-like material that was embedded within the spica material. The second sample was a dark brown friable material, again embedded within the spica. The third sample was a fruiting body of the growth with multiple pieces of beige/brown chord-like growth with some paler white budding areas.

Microscopically, the first sample consisted of numerous small fragments of hair with abundant eosinophilic material with appearances of anucleate keratin, with large numbers of admixed bacterial organisms. A small amount of tissue with

Figure 2 A 'mushroom' debrided off the hip spica on initial presentation.

Figure 3 Fruiting bodies on hip spica on presentation.

appearances similar to vegetable matter was possibly of fungal origin. In the 2nd sample, Grocott stain for fungi revealed the sample to be strongly positive. Large numbers of broad fungal hyphae were seen within this sample, which is consistent with the clinical impression of 'mushroom'. The appearances were consistent with Zygomycetes such as Mucorales. Gram stain revealed a mixture of Gram positive and negative organisms. A third sample showed multiple irregular areas consisting of large numbers of hyphae and spores, mixed with bacteria and proteinous exudate. Special stains were performed on the sample. PAS (Periodic acid-Schiff), GRO (Grocott's Methenamine Silver stain) and GRT (Gridley's fungus stain) stains confirmed architecture of hyphae strongly suggestive of mucormycosis.

The mycology laboratory was given the microscopic images for analyses, the results of which showed that the structures

Figure 4 Post hip spica change X-ray showed the joint was congruent.

represented fungal growth of one or more kinds. The wispy white mesh seen macroscopically may represent the general hyphal growth. There were no visible clamp connections on the hyphae, which are characteristic of the basidiomycotina group of fungi that produce polypore type fungal growth, usually on dead wood.

Direct microscopy not did find any fungal elements on the skin scrape sent after removal of the spica.

DISCUSSION

Mucorales is an order of the class of Zygomycetes from the kingdom Fungi. Infections caused by mucorales are called mucormycoses. Mucormycosis is an angioinvasive infection. It is generally an opportunistic infection and is usually associated with patients with diabetes mellitus or those who are immunocompromised. Mucormycosis can be classified into six broad categories—rhinocerebral, pulmonary, cutaneous, gastrointestinal, disseminated and uncommon presentations. Mucormycosis is associated with a high mortality rate. Infection arises when the fungal sporangiospores are inhaled or there is direct inoculation into disrupted skin.³

Cases of mucormycosis have been reported all over the world.^{4 5} In developed countries, it is mainly seen in patients with diabetes mellitus or in immunocompromised patients. In developing countries, it is seen in patients with uncontrolled diabetes or trauma. Apart from patient factors, some cases of mucormycosis have been attributed to exposure to heavy air fungal loads such as in areas of construction work, contaminated air filters or from contaminated hospital devices or products.^{3 6} Mucormycosis can occur in immunocompetent patients and is usually associated with trauma or burns where there is a disruption of the skin.^{3 4} The typical manifestation is primary cutaneous mucormycosis.

Cutaneous mucormycosis results from direct inoculation of fungal spores into the skin, which can lead to disseminated disease. In our patient, although no harm came to the patient, there was the potential risk of spores entering the surgical wound and causing infection. The onset of cutaneous mucormycosis can be gradual and the progression is often slow. However, it can have a quick onset leading to gangrene and haematogenous dissemination. The appearance is a necrotic eschar with surrounding erythema and induration.^{3 5} The treatment of mucormycosis includes aggressive debridement of tissue and antifungal therapy. The drug of choice is amphotericin B.⁷

A case of cutaneous mucormycosis on the upper extremity was described by Lineberry *et al*⁴ in an immunocompetent patient after an arterial puncture. Another case of cutaneous mucormycosis was described in a 39-year-old immunocompetent patient who sustained minor trauma to his left hand. He had a soft tissue swelling on his hand with multiple ulcers oozing serous discharge. He was not diabetic. He was successfully treated with amphotericin B injection followed by oral posaconazole.⁸ One further case by Shivananda *et al*⁹ also describes cutaneous mucormycosis in a fit and well patient following minor bruises to the patient's knee after a road traffic accident. He went on to develop necrotising fasciitis due to the mucormycosis.

In a study looking at reasons for unplanned cast changes, the most commonly reported are cast damage due to the cast

getting wet, wear or breakage of the cast and skin irritation from the cast.¹ In another study looking at skin complications in hip spicas, 28% of the patients had skin complications.² Neither of these studies mentioned skin complications due to fungi or cast change due to fungal growth. Caring for a child in a hip spica can be very difficult. It can be technically challenging to keep the spica clean and dry. Skin integrity can be impaired due to the moisture created from the closed spica and its proximity to urine and stools.²

To the best of our knowledge, this is the first reported case of fungal growth on a hip spica. It is an important complication to be aware of because the cast ensures a moist thriving condition for fungal growth, and if a growth on the spica is not promptly noticed and dealt with, it can lead to further complications such as the development of a cutaneous infection from an ordinary environmental organism. Parents should be advised to seek medical advice if they notice any growth from their child's spica. We recommend that the integrity of the spica and the skin be checked at regular intervals.

Learning points

- ▶ A hip spica can provide optimum conditions for fungal growth.
- ▶ Any growth on a hip spica necessitates changing the spica to prevent the development of infection on the skin.
- ▶ Integrity of the spica and the skin should be checked at regular intervals.

Contributors YC wrote the manuscript. VS reviewed and edited the manuscript. NG is the responsible consultant and edited the final manuscript.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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