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SEVERE COMMUNITY-ASSOCIATED MRSA NASAL BRIDGE ABSCESES WITH PERIORBITAL AND FORE-HEAD EXTENSION IN A PAEDIATRIC CHILD.

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ABSTRACT

Community-associated *Methicillin-Resistant Staphylococcus Aureus* skin and soft tissue infections is not uncommon these days in immunocompetent individuals, especially in population of lower socioeconomic status. Herein, we report a case of severe external nasal abscesses with periorbital and forehead extension in a 2-year-old secondary child, due to an insect bite. An accurate clinical judgement and timely imaging evaluation helped in the diagnosis and treatment. Early surgical drainage led to complete recovery and avoidance of possibly severe and fatal complications.

Keywords: Abscess, Community-associated infection, External nasal, Forehead, Methicillin-Resistant *Staphylococcus Aureus*, Periorbital.

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Community-associated *Methicillin-Resistant Staphylococcus Aureus* skin and soft tissue infections is not uncommon these days in immunocompetent individuals, especially in population of lower socioeconomic status. Herein, we report a case of severe external nasal abscesses with periorbital and forehead extension in a 2-year-old secondary child, due to an insect bite. An accurate clinical judgement and timely imaging evaluation helped in the diagnosis and treatment. Early surgical drainage led to complete recovery and avoidance of possibly severe and fatal complications.

Keywords: Abscess, Community-associated infection, External nasal, Forehead, Methicillin-Resistant *Staphylococcus Aureus*, Peri-orbital.

INTRODUCTION

Methicillin-resistant Staphylococcus aureus (MRSA) is generally considered a hospital-acquired infection and is complicated due to its resistance to common first-line antibiotics. It has been well recognized since 1960s to cause skin and soft tissue infections (SSTIs) in immunosuppressed population.¹ In recent years, community-associated MRSA (CA-MRSA) has been reported in immunocompetent individuals and the associated risk factors include lower socioeconomic status, poor hygiene, crowded living, prisoners and

intravenous drug abuse.¹ A review of the literature recognizes a shift of microbiology, over time and CA-MRSA infection is not uncommon in the population of a lower socioeconomic status.²

Nasal abscess is often linked with serious complications such as preseptal or orbital cellulitis, preseptal or orbital abscess, intracranial abscess and cavernous sinus thrombosis (CST).³ In most studies, paranasal sinuses have been implicated as the commonest cause of orbital cellulitis or abscess up to 71%.⁴ Although orbital abscess is an uncommon complication, it can potentially lead to a catastrophic outcome. We report a case of a severe external nasal bridge abscesses with peri-

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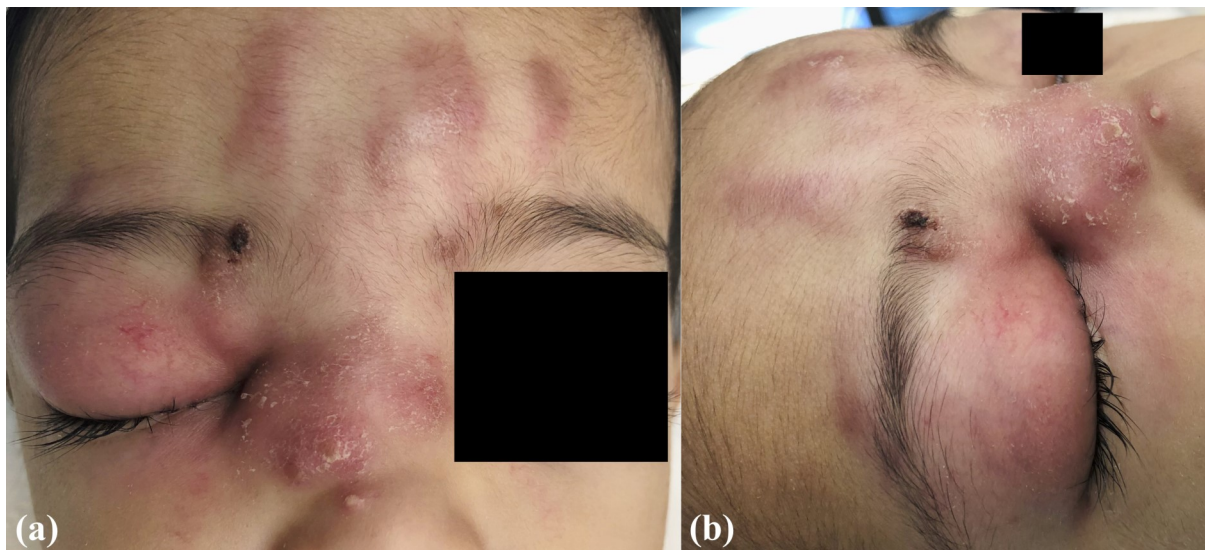


Figure 1: (a) anterior view, 1(b) 45 degree angled view. There is a presence of soft tissue swelling over the nasal bridge, extending to the forehead, right upper and lower lid. There is crust seen over the medial aspect of the right eyebrow and pustule lesion inferior to the nasal bridge swelling. The skin overlying the swelling is erythematous. Left eye is normal.

orbital and forehead extension in a 2-year-old child, secondary to an insect bite and stressed the importance of early diagnosis and management of this condition that can be potentially fatal if secondary complications sets in.

CASE REPORT

A 2-year-old child from a poor socioeconomic background presented with progressive nasal bridge swelling and redness extending to the right periorbital and forehead region. He had a history of insect bite 10 days prior, where the bite mark initially started as a pustule at the nasal bridge region. A course of oral beta-lactamase antibiotic was prescribed by the primary healthcare practitioner; however, the swelling progressively increased. There was intermittent fever, lethargy and poor oral intake. The mother denied intracranial symptoms. Soft tissue examination revealed swelling over the nasal bridge, extending to the forehead and involving the right upper and lower lid. There was crust over the medial aspect of the right eyebrow and pustule inferior to the nasal bridge swelling along with erythematous skin changes (Figure 1). On

palpation, the swelling was warm, tender and fluctuant at the region of the nasal bridge and right lower lid. The periorbital swelling was confined to the upper and lower lid without the involvement of the anterior segment of the eye, and there was an absence of conjunctival ecchymosis. Fundoscopy was normal.

Correlating the clinical features, a provisional diagnosis of nasal bridge abscess with right preseptal abscess was made. Rigid nasal endoscopy and other ENT examinations were unremarkable. Contrasted enhanced computed tomography (CT) scan of brain, paranasal sinuses and orbit revealed multiple rim enhancing hypodense lesions at nasal and frontal region, involving the preseptal, extraconal and intraconal space of the right orbit (Figure 2). There was no evidence of intracranial extension. The diagnosis of external nasal bridge abscess with preseptal, orbital and frontal abscesses was made. Summary of blood investigations through admission is shown in Table I. Blood products were transfused for optimization.

Intravenous Ceftriaxone and Metroni-

Table I: Summary of blood investigations through admission.

Blood Investigations	Day 1	Day 2	Day 3
Full Blood Count			
- Total white blood cells count	40.4 x 10 ³ /UL	22.7 x 10 ³ /UL	13.2 x 10 ³ /UL
- Haemoglobin	5.0 g/L	6.5 g/L	9.5 g/L
- Platelets	1032 x 10 ³ /UL	702 x 10 ³ /UL	565 x 10 ³ /UL
- Reticulocyte count	2.4 %		
Full blood picture	Microcytic hypochromic anemia, suggestive of an iron deficiency anemia and possible leukoerythroblastic features secondary to sepsis		
Renal profile			
- Sodium	133 mmol/L		
- Potassium	4.26 mmol/L		
- Urea	2.2 mmol/L		
- Creatinine	36.3 mmol/L		

dazole were commenced and surgical drainage under general anaesthesia was performed. A vertical linear incision was made at the nasal bridge and multiple locules were found at the forehead, nasal bridge and right lower lid, where approximately 7 milliliters (mls) of pus was drained (Figure 3). Post-operative daily dressing was applied to promote healing by secondary intention. The pus culture and sensitivity showed MRSA, which was sensitive to Trimethoprine-sulfamethoxazole, Gentamicin, Erythromycin, Vancomycin and resistant to Oxacillin and Penicillin G. The antibiotics remained unchanged considering patient's significant clinical improvement. The child's condition completely resolved 7 days post drainage and was discharged well. The child was well at subsequent outpatient follow-up.

DISCUSSION

External nasal bridge abscess is a collection of pus beyond the skin involving surrounding soft tissues due to bacterial infection. *Staphylococcus* species are commonly found on the skin and *S. aureus* is prevalent in most community settings.¹ This strain is often found in the nasal passages and is highly contagious.⁵ The treatment of this strain is particularly challenging in the presence of antibiotic-resistant strains where immunocompromised individuals are more susceptible to be infected.¹ Resistant strain including MRSA can be acquired through healthcare settings (Hospital-acquired MRSA) or in the community (CA-MRSA).¹ Several authors have highlighted an increase in CA-MRSA SSTIs over the last 15 years. In early 1981, Ambrus et al., reported nasal abscesses over a 10-year period and there was no specific mention of

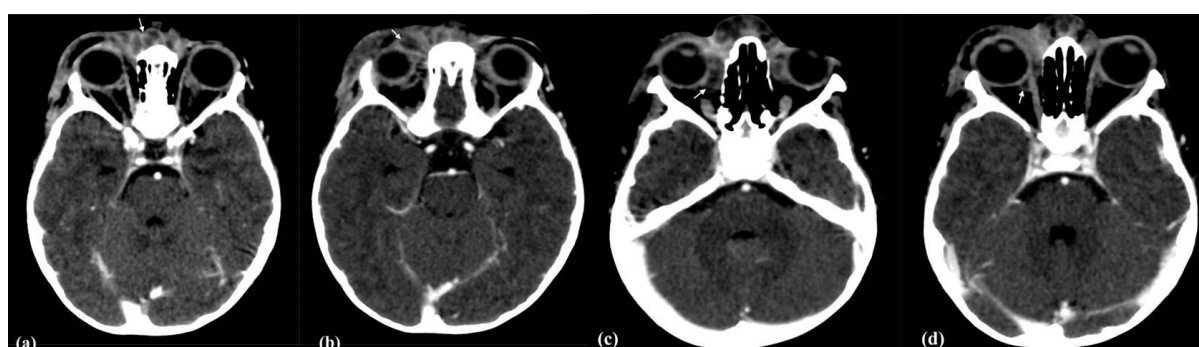


Figure 2: Contrast enhanced computed tomography (CT) scan of brain, paranasal sinuses and orbit revealed rim enhancing hypodense lesions (white arrow): (a) at nasal, (b) right preseptal, (c) extraconal along the medial aspect of the right medial rectus muscle and (d) intraconal space of the right orbit. (Click image to enlarge.)



Figure 3: A vertical linear incision made at the nasal bridge to drain pus from multiple locules over the nasal bridge, forehead and right lower lid.

MRSA but in later years, Bothwell et al., demonstrated an increase from 21% to 64% of CA-MRSA infections.^{3,6}

Several epidemiology studies of CA-MRSA demonstrate a higher risk of CA-MRSA infections in individuals from lower socioeconomic status.⁷⁻⁸ Wang et al., demonstrated nasal abscesses in a low socioeconomic population, where 100% reported *S. aureus*, of which the majority were CA-MRSA.² The associated risk factors of CA-MRSA in cases reported include lower socioeconomic status, poor hygiene and crowded living condition. Unlike most insect bites that usually resolves spontaneously, this unfortunate child suffered sepsis secondary to external nasal bridge abscess with orbital complications at a short duration of 10 days, likely contributed by poor living condition, lack of awareness and access to tertiary medical care. CA-MRSA strains tend to express resistance to beta-lactams; therefore, the prescribed beta-lactam antibiotic was inadequate and continued spread of infection led to invasive orbital complications. Therefore, the possibility of CA-MRSA SSTIs must be considered in this population group, especially if they are not responsive to standard antibiotic therapy.

External nasal abscess is a clinical diagnosis and imaging may not be mandato-

ry. An accurate clinical evaluation is important to differentiate between periorbital cellulitis and orbital cellulitis or abscess because they are often misdiagnosed. Both conditions can present with unilateral periorbital swelling, edema and erythema, whereas the latter may present with proptosis, eye pain, decreased vision and limited extraocular motility. When an orbital complication is suspected in the paediatric population, imaging is an absolute diagnostic tool. Although magnetic resonance (MR) imaging is superior for soft tissue delineation, CT scan is more readily available in most centers and was deemed sufficient to assist diagnostic differentiation and decision of surgical intervention. Typical imaging features were found in this case and aided in determining the extension of abscess into the orbital space and excluded the possibility of intracranial extension. This reinforces the importance of imaging as preseptal and orbital abscess may be missed in children, particularly when clinical assessment is a challenge.

Orbital abscess is a rare complication and it can be secondary to spread of infection from adjacent structures such as the lid, lacrimal gland, lacrimal sac, face, scalp, paranasal sinuses, and intracranium.⁴ This child suffered orbital complication secondary to an external nasal abscess and it is believed that CA-MRSA is related to a more serious infection and the spread of infection into the periorbital region is likely due to its close anatomical relations via the facial valveless venous system. This allows access of infection posterior to the orbital septum into the orbits and beyond.

The management of orbital complication often involves expectant treatment with intravenous antibiotics, with surgical intervention of the primary infection, which in this case was an incision and drainage (I&D) of the external nasal bridge abscess. Typically, a rapid improvement should be expected during

the early post-operative period after I&D of the abscess, but in cases where there was no improvement, additional drainage may be indicated based on serial clinical evaluation and repeat imaging. In this case, an external approach of I&D of the nasal bridge abscess was performed. The small orbital abscess is generally interconnected with the primary abscess and a single incision at the primary nasal bridge site would be sufficient to allow for adequate drainage of the periorbital abscesses, provided loculations are broken down. Pus obtained should be sent for culture and sensitivity, and post-operative antibiotics should be tailored according to antibiotic sensitivity assessment.

CONCLUSION

MRSA infection is no longer confined to hospital-acquired infections or in immunocompromised patients as before but has spilled into the community and infected immune-competent individuals as highlighted by this case. Failure to respond to the usual standard antibiotic therapy in a community setting should alert any medical healthcare provider to possibility of antibiotic-resistant infection and prompt further investigations, imaging and early drainage of the offending abscesses and send pus for culture and sensitivity. Appropriate empiric antibiotics are crucial as delay in treatment can lead to severe consequences, including blindness, intracranial extension and death.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

DECLARATION

Written consent was obtained from the patient's guardian.

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