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An unusual case of infective endocarditis, sea urchin spinous injury as portal of entry

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Abstract

Background: Sea urchins belong to the class *Echinoidea*. They can result in various immediate and late complications to humans from spinous injury. Secondary bacterial infection can occur from these spinous injuries which could result in various complications.

Case Presentation: A 33 year old previously healthy male presented with high grade fever for 3 days with generalized malaise. On examination, he was febrile, was clubbed and had an early diastolic murmur in the left lower sternal edge. His left big toe was mildly swollen, tender and had few, small blackish areas where he sustained sea urchin spinous injury 10 days back. He was diagnosed as having infective endocarditis (IE) with positive blood cultures for *Staphylococcus aureus* together with the presence of linear vegetations in the aortic valve. He was treated with intravenous (IV) flucloxacillin 2g every 4 hours for one month and decided on the need of early valve replacement surgery.

Discussion: It is important to identify and treat portal of entry of organisms when treating infective endocarditis. Cutaneous route is among the main portals of entry of the organisms. *Staphylococcus aureus* is the main organism responsible for community acquired IE. Our patient did not have evidence to suggest oral/dental, genitourinary, gastrointestinal, ear, nose throat infections or defects to suspect as being the portal of entry for the organism. Thus the cutaneous lesion over his left big toe (due to injury by sea urchin spikes) could be considered as the potential portal of entry of *Staphylococuus aureus*. We report this case from Sri Lanka, where infective endocarditis resulted as a complication due to Meticillin sensitive *Staphylococcus aureus* (MSSA) septicaemia, from cutaneous access through sea urchin spinous injury.

Keywords

Sea urchin; infective endocarditis; *Staphylococcus aureus*; portal of entry; aortic regurgitation

Abbreviations

MSSA: methicillin sensitive *Staphylococcus aureus*; IE: infective endocarditis; IV: intra venous; ESR: erythrocyte sedimentation rate; CRP: C Reactive proteins

Background

Sea urchins belong to the class *Echinoidea* [2,3]. They can result in various immediate and late complications to humans from spinous injury. Secondary bacterial infection can occur from these spinous injuries which could result in various complications. Our patient presented with community acquired IE, due to MSSA (Meticillin sensitive *Staphylococcus aureus*), with possible portal of entry being the sea urchin spinous injury.

Case Presentation

A 33 year old male presented with fever for 3 days with generalized malaise. For the past 3 days, he had been suffering from high grade fever with chills and rigors. He did not have a cough, coryzal symptoms or sore throat to suggest a respiratory tract infection. He did not have diarrhea, vomiting or abdominal pain to suggest gastroenteritis: neither did he have urinary symptoms suggestive of a urinary tract infection. His past medical history was not significant, in that he did not have history of rheumatic fever, valvular heart disease or dental caries. He did not have high risk sexual behavior or intravenous drug use.

On examination, he was febrile. His GCS was 15/15 and did not have neck stiffness, rashes, dental caries, ear, nose, throat infections or lymphadenopathy. Optic fundi were normal. He had clubbing, but did not have other peripheral stigmata of infective endocarditis. His pulse rate was 82/min, regular, good volume and the blood pressure was 120/70 mmHg. He had a grade 2 early diastolic murmur, best heard at left 3rd intercostal space. He did not have any lung crepitations, hepatosplenomegaly or any neurological deficit.

His left big toe was mildly swollen, tender and had few, small areas of blackish discolouration. On further questioning, he revealed that he sustained sea urchin spinous injury 10 days back to his left big toe, when he stepped on one, while bathing in the sea. He himself had removed the sea urchin from the foot. Initially he had a severe burning type pain, redness, swelling and blackish discoloured spots over the stung site (Figure 1). He has not seeked medical attention since the pain and swelling was gradually improving. He has removed few spines that were emerging out of the skin too.

Febrile illness together with the new onset murmur lead us to suspect infective endocarditis. Thus we took blood samples for cultures, basic preliminary investigations and started treatment with IV flucloxacillin 2g, every 4 hourly. Next day we were able to trace the results of the investigations: two peripheral blood cultures became positive for Meticillin Sensitive *Staphylococcus aureus*, which showed sensitivity to Flucloxacillin.

His CRP was 130mg/L, ESR was 20mm/ 1st hour, white cell count was 11600/L, platelet count was 90 × 109/L, haemoglobin was 16g/dL. Blood picture showed toxic changes in white cells with a slightly reduced platelet count, suggestive of bacterial infection. Dengue antigen test, leptospirosis PCR were negative. Thransthoracic echocardiogram (ECHO) done on day 2 showed a linear vegetation (12.5mm) attached to the aortic valve with very mild regurgitation. But transoesophageal ECHO done a week later showed severe aortic regurgitation and the disappearance of vegetations. By this time, the intensity of the diastolic murmur had increased to grade 4.

The diagnosis of infective endocarditis was confirmed. We continued IV flucloxacillin 2 g every 4 hours via a temporary vascular catheter inserted into right internal jugular vein. His fever subsided within 3 days of initiation of treatment. Blood counts returned to normal and blood cultures became negative within a week. We continued IV flucloxacillin for one month and discharged him planning for an early date for aortic valve replacement surgery. He did not need wound toileting or wound exploration of the right big toe, since the inflammation gradually subsided. The X rays of left foot did not reveal opacities to suggest the presence of spikes inside tissues. They usually get absorbed into soft tissues within few days.

Figure 1: Showing the skin disclouration, mildswelling of left big toe

Discussion

It is important to identify and treat portal of entry of organisms when treating infective endocarditis [1]. Cutaneous route is among the main routes of entry in many studies: other routes are oral/dental, gastrointestinal, genitourinary and ear, nose, throat [1]. Community acquired infective endocarditis is when the diagnosis is made on admission to hospital or within 48 hours of admission. *Staphylococcus aureus* is the main organism responsible for community acquired IE [1]. Our patient did not have evidence to suggest oral/ dental, genitourinary, gastrointestinal, ear, nose throat infections or skin defects to suspect as portal of entry of the organism. Thus the cutaneous lesion over his left big toe (due to spinous injury by sea urchin) could be considered as the potential portal of entry for *Staphylococcus aureus*. To the best of our

knowledge, such cases have not been reported.

Sea urchins belong to the class *Echinoidea* [2,3]. They are slow moving non-aggressive marine bottom-dwellers and are found in deep waters, rocky inclines and tropical and temperate coral reefs [3]. Sea urchins have an egg shaped, globular or flattened body and a surrounding shell with spines [4]. The spines are made of calcium carbonate and some types can contain poisons including histamine, serotonin, glycosides, steroids, cholinergic substances, and bradykinin-like substances [2,3,5]. Injuries from sea urchins may result from various causes: poisoning from ingestion of toxic ova, stings from venomous sea urchin pedicellariae, stings from venomous sea urchin spines and mechanical trauma due to puncture wounds from nonpoisonous sea urchin spines [6].

The primary injury caused by sea urchins is due to spine penetration. The most commonly compromised areas are the feet and ankles (when one steps on a sea urchin) and the hands (from manipulation or as a defense mechanism) [3,5]. Spine penetration can immediately cause localized intense pain, bleeding, erythema, skin discoloration, edema and local myalgia [3]. Discolouration can be due either to the presence of spikes or temporary tatooing by dyes released from spikes [3,4,7]. Synovitis can occur if joints are penetrated [3,5]. About 40% of patients who do not completely remove the spines present with fever, local pain, painful nodules and other complications [3]. Systemic symptoms are especially common when toxin injection from fifteen or more spines occur like paresthesia, radiating pain, hypotension, muscular weakness, dyspnea, aphonia, deafness, and even death due to envenomation [3,7]. The fragmentation of spines is very common and occasionally radiological examination of soft tissues or surgical exploration is needed to identify the fragments, especially in cases of injuries involving joints [3]. Secondary bacterial and fungal infections are possible after the spinous injury as in our patient who suffered MSSA septicaemia [6,8]. Retention of fragments can cause infections and foreign body reactions and as delayed complications, we can observe formation of granulomas, tenosynovitis, chronic arthropathy, persistent neuropathy, local bone destruction and delayed hypersensitivity [2,3].

We report this case from Sri Lanka where infective endocarditis resulted as the ultimate complication due to MSSA septicaemia, gaining cutaneous access from sea urchin spinous injury. Thus it is vital to apply first aid measures following sea urchin spinous injuries and to seek early medical advice when necessary.

Conclusion

In our patient, the spinous injury site due to sea urchin spikes is the most probable site of entry of the MSSA which resulted in infective endocarditis, complicated with aortic regurgitation.

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