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Case Report

Unusual Bacteraemia with *Serratia marcescens* in Immunocompetent Child

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Received: September 30, 2019; **Published:** October 22, 2019

Abstract

Serratia marcescens is an opportunistic pathogen which emerged as a serious cause of nosocomial infections and has rarely been reported as an agent of invasive disease in immunocompetent childen.

We report a case of *Serratia marcescens* bacteremia in a 2-year old child, who was previously healthy, presented with limping and inability to bear weight without identifiable risk factors. He has He has recovered well after being managed with intravenous with intravenous meropenem for two weeks. To our knowledge it is an extremely uncommon finding in immunocompetent children and few cases have been previously reported in the literature.

Keywords: *Serratia marcescens; Bacteraemia; Sepsis; Community-Acquired; Immunocompetent; Children*

Introduction

Serratia marcescens is a gram negative *Enterobacteriaceae* bacilli which acts as a nosocomial pathogen in most cases. It causes bacteremia mainly in hospitalized patients and immunocompromised hosts. It rarely causes invasive infections like bacteremia in immunocompetent persons. There are few reported cases of *Serratia marcescens* infections in immunocompetent patients and most of them are due to known risk factors like trauma, surgical interventions or animal bite [1].

Case Report

A 2 years old child, previously well, presented to the emergency department of a tertiary hospital in Riyadh at Saudi Arabia with one day history of inability to bear weight and bilateral hip pain which is more in the left than right.

The pain was sudden in onset and progressive, which made him unable to stand up and bear weight. No history of fever, trauma or weight loss and no recent sick contacts. Parents had occasional consumption of raw milk but the child did not and was not exposed to animals. Three weeks prior to his presentation, he was prescribed amoxicillin for acute tonsillitis. There was no history of recurrent chest infections, thriving well and fully vaccinated till his age.

The physical examination on admission revealed irritable child with pain on touch. His vital sign showed a temperature of 36.9°C (axillary), HR of 130/min, BP of 105/60 mmHg and maintaining saturation 98% on room air. His weight was 13 kg (at 75th centile). There was no skin rash or lymphadenopathy. His local examination of the lower limbs showed no redness or swelling at both hips.

On palpation both hips were of normal temperature on touch and tender on palpation. There was significant limitation of movement of both limbs because of pain and unable to stand or move. Examinations of other joints were normal. Other systemic examinations were unremarkable.

At this stage, our differential diagnoses was transient toxic synovitis, reactive arthritis, septic arthritis and to rule out brucellosis. He was admitted for further evaluation and work up.

His investigations revealed normal white cell count of 10. Inflammatory markers showed CRP of 12 and ESR of 34. Next day of admission his blood culture revealed growth of gram-negative bacilli, hence, he was started on Iv ceftriaxone then gentamicin was added to cover for possibility of brucellosis.

His ultrasound of the hips was done at this stage and revealed normal study with no joint effusion.

The child was still having pain at hips and unable to stand or move. He remained afebrile.

Blood culture using one pediatric bottle (BACT/ALERT PF Plus (bioMérieux, Marcy-l'Étoile, France)) flagged positive after around 20 hours of incubation on the BactT/ALERT Virtue (bioMérieux, Marcy-l'Étoile, France). Processing included gram stain which revealed gram negative bacilli and culturing on blood, chocolate and MacConkey agars (Saudi Prepared Media Laboratory Company Ltd, Riyadh, Saudi Arabia) incubated aerobically. Growth of non-lactose fermenting, oxidase negative gram-negative rods was observed on the culture media. Identification and automated susceptibility were done using the Microscan walkaway plus automated instrument NEG COMBO 50 panel (Beckman Coulter, Brea, California, United States) using Laboratory Standards Institute (CLSI) breakpoints [2]. Additionally, imipenem and meropenem susceptibility was performed using the E-test gradient diffusion method (biomérieux, Marcy-l'Étoile, France) (Table 1). Organism was also identified using the VITEK MS MALDI-TOF (bioMerieux, Marcy-l'Etoile, France). With both methods organism was identified as *Serratia marcescens* with 99% confidence.

Antibiotics	Minimum inhibitory Concentration Result (mg/L)	Antimicrobial Susceptibility Report
Ampicillin-Sulbactam	>16/8	R
Cefuroxime	>16	R
Ceftazidime	≤1	S
Cefepime	≤8	S
Piperacillin- tazobactam	<=16	S
Aztreonam	≤4	S
Ciprofloxacin	≤1	S
Levofloxacin	≤2	S
Gentamicin	<=4	S
Amikacin	≤16	S
Ertapenem	≤0.5	S
Meropenem (E-test)	0.125	S
Imipenem (E-test)	1	S

Table 1: *The antibiotics tested and their sensitivity results.*

So, Iv ceftriaxone was discontinued and meropenem was added. IV gentamicin was given for 5 days then discontinued.

Blood culture was repeated after 48 hours from starting meropenem and revealed no growth.

MRI of the hips was normal with no signs of septic arthritis (Figure 1).

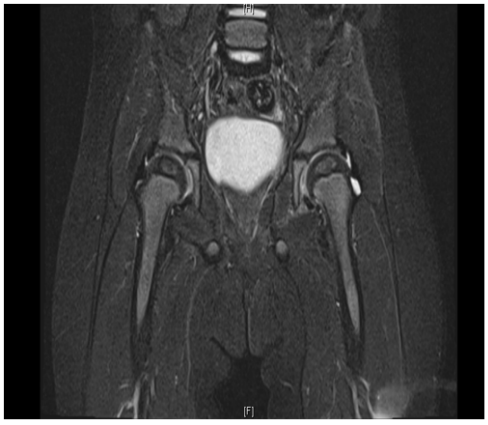

Figure 1: *MRI of both hips.*

At day 5 of admission, the child started to improve and was able to stand and move with mild limping of left lower limb which improved after few days.

As the child grew an unusual organism and he is immunocompetent, he was referred to immunology team for evaluation. Immunology workup revealed normal immunoglobulins, lymphocyte subsets and oxidative burst test.

Meropenem was continued for total of 14 days and child showed clinical improvement and discharged in normal condition and moving normally with good activity.

Discussion and Literature Review

Serratia marcescens is a gram-negative bacillus of an opportunistic pathogen which belongs to family Enterobacteriaceae, emerged as a serious cause of nosocomial infections [1]. *Serratia marcescens* species are able to survive in various environments including water and soil, but most commonly in healthcare settings [3]. Hospitalization is the main risk factor for the development of bacteremia due to *Serratia* species in children. Followed by immaturity of immune system, and exposure to invasive procedures [4]. Bone and joint infections secondary to *Serratia* species without risk factor are very rare, mainly in an immunocompetent patient [5]. Essentially all of the have been reported in either trauma patients, exposure to invasive maneuvers, immunocompromised, critically ill, or perioperative patients [6]. Our patient did not have any of these risk factors and as we mentioned earlier the occurrence of this infection without any of the previously reported risk factors is extremely rare.

Using MEDLINE, we searched the English literature from 1960 to July 2019 for similar presentations. The terms searched included '*Serratia*' combined with 'community' and 'immunocompetent'. All articles had their references reviewed for inclusion. *Serratia marcescens* has not previously been reported to cause bacteremia in an immunocompetent child without a risk factor.

Risk factors for the acquisition of *Serratia marcescens* infection include immune suppression, diabetes, renal failure, steroid use and exposure to invasive maneuvers, such as the placement of venous, urinary or intraperitoneal catheters and of mechanical ventilation devices [4]. In each case of community acquired invasive disease recognized in the literature, an inciting event or risk factor could be recognized [3,4]. The present case is unique, with unusual bacteremia, given the notable absence of risk factors with a relatively rare clinical presentation in an immunocompetent child.

Conclusion

Serratia marcescens has a wide spectrum of clinical manifestations and occurs mostly in hospitalized and immunocompromised patients. Although, it might occur as a community acquired infection in immunocompetent patients without known risk factors as we described in our case. We should be alert to the possibility of nosocomial pathogens being transmitted in the community as it carries a treatment challenge and increasing burden.

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Volume 8 Issue 11 November 2019