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Original Research Article

# Brucellosis in Pediatric Age Group – A Tricky Diagnosis: A Case Report

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**Abstract**

Brucellosis is a zoonotic disease transmitted to humans by infected animals, mostly through direct animal contact or consumption of animal products. Brucella melitensis is the most common cause of brucellosis in humans. We are reporting a pediatric case of Brucella melitensis in a 1.5 year old girl child. Earlier, it was managed as a case of pyrexia of unknown origin considering it to be Salmonella spp. Brucella spp are slow growing, which needs several days for identification with the routine conventional microbiological identification methods. We processed blood culture by automated blood culture, system BacT/ALERT, which provides early growth of pathogens, as compared to the conventional blood culture system. After the growth of pathogen on Blood agar & Macconkey agar the growth was subjected to Grams stain. Due to high suspicion, the growth was also subjected to Biomerieux MALDI-TOF system which identified *Brucella melitensis* which led to early identification & thus helped in guiding treatment which in usual is difficult through conventional methods. Thus that being the aim of our study to contribute to literature of Pediatric brucellosis in terms of clinical features, laboratory findings, usage of MALDITOF MS and treatment.

**Keywords:** Brucella melitensis, MALDI TOF SP, PUO.



## Introduction

Among the many zoonotic illnesses affecting humans globally, Brucellosis account for a wide majority of them with about 5,00,000 new cases being reported annually.[1] It is a Gram-negative coccobacilli belonging to family Brucellaceae. There are around four species of Brucella which are known to cause human disease: Brucella melitensis, Brucella abortus, Brucella suis and Brucella canis. [2] Among these species Brucella melitensis is the most common cause of brucellosis in humans. The main animal hosts of Brucella melitensis are goats, sheep and camels. [3] The most common clinical presentations of brucellosis include recurrent fever, profuse sweating, vomiting, malaise, enlargement of the reticuloendothelial organs and osteoarticular involvement.[4]Here we present a case of brucellosis with acute bacterial sepsis & pancytopenia.

## Case presentation

A 1.5-year old girl child (weight 8.6 kg) presented to Sir Padampat Institute of Neonatology and Department of Pediatrics at SMS Hospital, Jaipur, Rajasthan with a chief complaint of fever and sweating mainly at night, along with vomiting since past 3 weeks. Patient had no history of rash, ear discharge, cough, cold and contact with any tuberculosis patient. The girl was on breastfeed and bottle feed. There was no history of prior hospitalization.

## Investigations

On day of admission (Day-1) CBC, LFT, RFT, CRP, Blood & Urine culture were sent. Reports showed hemoglobin of 8.4 gm/dl, platelet count of 30,000 platelets per microliter and total WBC count of 5000 WBC per microliter with Absolute lymphocyte count of 3350 per microliter. Renal function tests, Albumin/Globulin ratio were normal, liver function test show raised SGPT levels. The pro inflammatory marker CRP was positive. Urine culture was reported sterile after 24 hours. Primary blood culture report after 72 hours was also sterile. On the basis of above investigations results and history, patient was started empirically on Amoxicillin/clavulanate, Folic acid, Methylcobalamin, and Multivitamins.

## Follow up of the patient

Despite above treatment fever continued in the range of 101.3 degree F to 102 degree F. Also there was no improvement in vomiting with frequency of almost 1 episode per day, which was non projectile and non-bilious. So repeat blood culture, urine culture along with Malaria card test, Widal tube test, Dengue NS1 antigen and antibodies were sent on Day 4. Malaria card test, Widal and Dengue results were negative. As no conclusive finding was found by routine investigations, patient was considered as a suspected case of enteric fever with pancytopenia and shifted onto Ceftriaxone and Amikacin (Day-4) empirically. Repeat urine culture was again reported as sterile and primary blood culture by conventional method was reported as skin commensals.

Patient was continued on the above antibiotics for next 48 hours and on further assessment the patient reported no improvement & thus patient was shifted onto Piperacillin tazobactam and Meropenem. Patient showed a slight improvement in fever. On Day 7 the patient requested for discharge. Again Repeat blood culture and urine culture were sent before discharging the patient. Blood culture this time was processed by automated BacT/Alert system. On day 3rd of incubation, machine gave a positive beep.

When gram staining was done from positive blood culture bottle, Gram negative small rods were observed. Bottles were sub cultured on Blood agar (BA) and MacConkey agar (MCA) as a routine microbiology laboratory protocol. Plates were incubated for 18-24 hour. Next day, on BA there were very fine, round, translucent with pearly appearance, non-haemolytic and non-pigmented colonies were observed.

There was no growth on MCA. Routine biochemical tests were performed. Colonies were catalase positive, oxidase positive and on Gram staining, small Gram negative rods were seen. As we have MALDI- TOF facility in our department, we put the growth on MALDI and it was identified as Brucella melitensis. For further confirmation routine biochemical tests and Antibiotic susceptibility was performed. On the same day the results were communicated to the pediatric department. After 2 days of discharge the patient again had fever spikes at home & was again admitted to the hospital. This time history regarding animal contact or ingestion of any animal products was taken. The parents reported history of the raw goat milk ingestion in bottle feed. Serological test for Brucella was performed. Both anti-Brucella IgM and IgG came out to be positive. Thus, confirming the results of MALDITOF MS.

**Treatment**

In this patient when finally Brucella was identified on nonspecific culture media (Blood Agar) with the help of colony characteristics & biochemical reactions & MALDI TOF the patient was started on Cotrimoxazole and Rifampicin antibiotics for 6 weeks as standard treatment regimen.

**Follow up**

Patient improved gradually with treatment and recovered completely.

**Discussion**

Many cases of Brucellosis have been reported in children but it is mainly a mild & self-limited disease and less likely to be chronic as compared to adult population.[5] Brucella is primarily prevalent in developing as well as tropical countries. But even till date it is still underreported and is being misdiagnosed. This delay in the onset of treatment may lead to certain severe symptoms like cardiac, intestinal, nervous, and pulmonary complications. Usually a lower mortality has been reported from Human Brucellosis however it is the chronic form that may lead to a higher mortality.

Brucella species are basically encapsulated Gram negative coccobacilli which are said to affect wild plus domestic animals, causing abortion and infertility. Brucella melitensis mainly infects sheep and goats and is said to be a major pathogen to cause human disease. Transmission occurs mainly by ingestion of unpasteurized dairy products along with contact with animals who are infected.[6] Hematologic alterations have been commonly reported in brucellosis.

Nearly 5-20% of pediatric cases have reported pancytopenia. [7]The gold standard for diagnosing brucellosis is blood cultures. But the major problem being the nonspecific clinical manifestations making diagnosis tough only on the basis of clinical signs & symptoms. And that is where the role of automated systems like MALDI TOF comes in which helps in early identification thus helps to quickly guide the treatment decisions.

Since Brucella spp are intracellular pathogens therefore focus of antimicrobials is on the ones which can penetrate the cell but full eradication will definitely need prolonged treatment. According to protocols the treatment involves usage of at least 2 agents, with combinations of (1) trimethoprim-sulfamethoxazole and rifampin and (2) doxycycline and rifampin.

The total duration of treatment is a minimum of 6 weeks with relapse rate of 4.5% commonly seen in children.[8] Usually a combination therapy is preferred as that result in fewer failures than monotherapy.[9] The World Health Organization recommends Doxycycline and Rifampicin daily for a minimum of 6 weeks. Alternatively, Rifampicin

can be replaced with Streptomycin, administered intramuscularly for only 2 weeks. [8]

## Conclusion

Brucellosis has a broad range of signs and symptoms and is difficult to diagnose based on clinical findings alone. Failure to recognize brucellosis and provide appropriate antibiotic treatment may result in serious complications or death. It is important to include brucellosis in the differential diagnosis of children with prolonged fever, especially in those with a history of exposure to animals.

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