Case Report

Pantoea infection - A rare case report from South India

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ABSTRACT

Pantoea agglomerans is an opportunistic plant pathogen and a rare human pathogen causing infection in the immunocompromised patients, especially in the absence of characteristic risk factors. It is an opportunistic human pathogen, reported to cause neonatal sepsis, septic arthritis, synovitis, osteitis, cholelithiasis, urinary tract infection, respiratory infections, skin allergy, and blood stream infections, particularly in association with the contamination of intravenous fluids. Here, we report a case of *Pantoea* sepsis occurring in a child admitted with febrile illness in Sree Balaji Medical College and Hospital.

KEY WORDS: *Pantoea agglomerans*, Sepsis, Thrombocytopenia

INTRODUCTION

Pantoea agglomerans is a free-living bacterium commonly isolated from soil and plants. *P. agglomerans* is Gram-negative bacterium that belongs to the family Enterobacteriaceae. It is an opportunistic pathogen in the immunocompromised, causing wound infections, bacteremia, urinary tract infections,[1] septic arthritis, synovitis, osteitis, cholelithiasis, occupational, respiratory infections, skin allergy, and bloodstream infections, particularly in association with the contamination of intravenous fluids and their contaminated closures, parenteral nutrition (PN), anesthetic agent propofol, blood products, and transference tubes used for intravenous hydration, both sporadically or in outbreaks.[2,3]

P. agglomerans, formerly named *Enterobacter agglomerans* is less often implicated in infection than *Enterobacter aerogenes* and *Enterobacter cloacae* and usually complicates debilitating illnesses. *P. agglomerans* strains are among the most promising biocontrol agents for a variety of bacterial and fungal plant diseases, particularly fire blight of apple and pear. This species is currently listed as a biosafety level 2 organism due to clinical reports as an opportunistic human pathogen.[4-6]

CASE REPORT

A 10-year-old, female child was brought to the outpatient department with chief complaints of fever for 10 days, which was high grade, intermittent in nature associated with chills and also had complaints of cold for 5 days. For the above-mentioned complaints, the child had visited several doctors but symptoms not relieved. No other positive history.

On admission, the child was febrile, vitals were stable, and the systemic examination was normal. Routine investigations were done, which showed leukocytosis with neutrophil predominance, and thrombocytopenia. Widal test was negative, urine analysis found to be normal, blood culture was sent reports were awaited. She was started on prophylactic antibiotic therapy with ampicillin and other symptomatic treatment. The blood culture was done using VITEC method. The culture report showed positive results, which revealed an unusual organism *P. agglomerans*. Antibiotic susceptibility was performed by both disc diffusion method on Mueller Hinton agar, and Vitek-2 system and interpretation was done according to the Clinical Laboratory Standards Institute guidelines (M100-S25) version 2015. The organism was sensitive for amikacin, amoxiclav, ampicillin, cefazoline, cefotaxime, ciprofloxacin, co-trimoxazole, gentamycin, imipenem, piperacillintazobactam and was resistant to cefepime and cefuroxime. The child was started ampicillin and other supportive measures with which the child improved symptomatically and was discharged.

DISCUSSION

Pantoea infection is rare in humans. The genus *Pantoea* belongs to the family Enterobacteriaceae, contains different species such as *P. agglomerans*,

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P. ananatis, *P. citrea*, *P. dispersa*, *P. punctata*, *P. stewartii,* and *P. terrea*. *P. agglomerans* was formerly known as *E. agglomerans* or still earlier as Erwiniaherbicola. *P. agglomerans* is Gram-negative bacterium. *P. agglomerans*, is less often implicated in infection than *E. aerogenes* and *E. cloacae* and usually complicates debilitating illnesses. It is recognized as an agent of endogenous nosocomial infections and able to cause epidemics among hospitalized patients when associated with the use of contaminated intravenous products due to its ability to grow in commercial infusion fluids. This feature suggests that direct inoculation into the bloodstream is required to produce disease. This pattern is further supported by findings in a study by Cruz3, wherein 21 of 53 patients with *P. agglomerans* infection had catheter-related bloodstream infections. Vitec 2C Systems (bioMerieux, France) definitely helps to do species identification.

A nationwide epidemic of *P. agglomerans* septicemia due to contaminated intravenous products has been reported by Mackel *et al*. in 1975.,[7] Milanowski *et al*. in 2003, and De baere *et al*. in 2004 have reported occupational respiratory infections and skin allergy due to *P. agglomerans*.[8] Liberto *et al*. in 2009 reported six cases of sepsis by *P. agglomerans* from Italy teaching hospital.[9] Bennet *et al*. (1995), Wagner *et al*. (1994), and Matsaniotis *et al*. (1984) have reported outbreaks due to contaminated intravenous solutions and stored blood products as well as "cotton fever" in intravenous drug abusers.[4] Rodrigues *et al*.[4] reported a case of *P. agglomerans* producing liver abscess following appendectomy, again raising the possibility of contamination of the surgery by *P. agglomerans*.

P. agglomerans infection were encountered predominantly in the neonatal[10,11] and pediatric population,[4] patients with chronic kidney disease,[12] adults on chemotherapy[11] with depressed immunity or individuals with lymphoreticular malignancies.[13,14] These infections were clinically characterized by acute febrile episodes with minimal organ involvement.

- Gram stain of growth in liquid broth revealed sausage shaped aggregations or symplasmata, the Gram staining of colony of organism showed plenty monomorphic Gram-negative bacilli, which were motile, catalase-positive, and oxidase negative with fermenting sugars and phenotypically identified as *P. agglomerans*. The final identification of the bacteria by the Vitec 2 Systems (bioMerieux, France) was *P. agglomerans*
- Blood Agar showed pale yellow-colored convex colonies of 2–3-mm diameter in size, nonhemolytic
- On MacConkey agar lactose fermenting, punctuate, umbilicated, convex, smooth glistening colonies were grown [Figure 1].

Figure 1: Lactose fermenting colonies on MacConkey agar

Antibiotic susceptibility was done using the Kirby–Bauer disk diffusion methods, and it showed susceptibility to amikacin, gentamicin, cotrimoxazole, ciprofloxacin, tobramycin, cefotaxime, ampicillin, and ceftazidime. Antibiotic therapy was administered based on the strain susceptibility and started on oral ciprofloxacin. The patient improved gradually with favorable outcome.

In 2005, Habshah *et al*. and Van Rostenberghe *et al*. reported the same outbreak of neonatal sepsis among eight neonates by *Pantoea* spp. transmitted through contaminated PN solutions from a tertiary care hospital of Malaysia. The organism was susceptible to most antibiotics, but *in vitro* therapeutic response was very poor with an excessive case fatality rate of 87.5%. Most of the patients (75%) developed thrombocytopenia within the 2nd day of presentation, which progressed to pneumonia, acute respiratory distress syndrome and disseminated intravascular coagulation.

Thus, the patient can be summarized to be a case of febrile illness, presenting with fever and thrombocytopenia caused by *P. agglomerans* and treated with ampicillin.

CONCLUSION

In the last decade, sporadic cases due to *P. agglomerans* were reported from the USA, Brazil, Spain, and Belgium. This report presents probably the fifth case from India where *P. agglomerans* was the sole pathogen isolated from blood culture. As *P. agglomerans* is frequently found in water and soil, our report highlight the fact that, this could be a source of infection in our patient. There is a need for microbiologists to identify and report such emerging new members as sole source of causative agent from family Enterobacteriaceae. Hence, prompt identification along with antibiotic susceptibility testing is essential for the proper management of the cases.

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