

## An outbreak of *Pantoea agglomerans* infection in the neonatal intensive care unit at Teaching Hospital, Kandy, Sri Lanka

\*N P Senanayake<sup>1</sup>, V Thevanesam<sup>2</sup>, L Karunanayake<sup>3</sup>

*Sri Lanka Journal of Child Health*, 2016; 45(1): 32-33

### Abstract

**Introduction:** *Pantoea agglomerans* is an opportunistic pathogen which causes blood stream infection (BSI) due to contaminated intravenous fluids.

**Objective:** To investigate an outbreak of BSI in a neonatal intensive care unit (NICU) at Teaching Hospital Kandy (THK).

**Method:** Blood culture samples were collected from the neonates on admission to the NICU and 2 to 3 days later on clinical suspicion of BSI. The blood culture samples were processed according to standard methods and antibiotic susceptibility tests were carried out as per Clinical Laboratory Standards Institute guidelines. The environmental screening samples were cultured and identified using standard microbiological methods.

**Results:** Of the 55 blood cultures, 14 were positive for *P. agglomerans*. Nine of the 14 neonates responded to treatment with susceptible antibiotics. None of the environmental samples were positive for *P. agglomerans* species.

<sup>1</sup>Lecturer in Microbiology, Department of Para Clinical Sciences, Faculty of Medicine, General Sir John Kotelawala Defence University, Sri Lanka, <sup>2</sup>Senior Professor of Microbiology, Department of Microbiology, Faculty of Medicine, University of Peradeniya, Sri Lanka, <sup>3</sup>Consultant Microbiologist, Department of Microbiology, Medical Research Institute, Sri Lanka

\*Correspondence: nilanthisenanayake@yahoo.com

(Received on 06 April 2015; Accepted after revision on 22 May 2015)

The authors declare that there are no conflicts of interest

Personal funding was used for this project.

Open Access Article published under the Creative

Commons Attribution CC-BY  License.

**Conclusion:** *P. agglomerans* was responsible for the outbreak of BSI in the NICU at THK.

DOI: <http://dx.doi.org/10.4038/sljch.v45i1.8082>

(Key words: *Pantoea* species, blood stream infection, neonatal intensive care unit)

### Introduction

*Pantoea agglomerans* (formerly *Enterobacter agglomerans*) is a Gram negative aerobic bacillus in the family *Enterobacteriaceae*. All species of the genus *Pantoea* can be isolated from faeculent material, plants and soil<sup>1</sup>, where they can be either pathogens or commensals<sup>2</sup>. *Pantoea* species are clearly opportunistic pathogens and rarely cause disease in otherwise healthy individuals. Infections with *Pantoea* species are usually associated with an identifiable exogenous source<sup>3</sup>. Within the genus, *Pantoea agglomerans* (*P. agglomerans*) is the most commonly isolated species in humans resulting in soft tissue or bone/joint infections following penetrating trauma by vegetation<sup>4</sup>. *Pantoea* species have also been involved in epidemics of septicaemia due to contaminated intravenous fluid, total parenteral nutrition, blood products and the anaesthetic agent propofol<sup>4</sup>.

### Objective

To investigate an outbreak of blood stream infection (BSI) in the neonatal intensive care unit (NICU) at the Teaching Hospital Kandy (THK) in March 2010.

### Method

This study was carried out at the NICU, THK, which experienced an outbreak of blood stream infection during the period 5<sup>th</sup> to 30<sup>th</sup> March 2010. Blood culture samples were taken from all neonates who were admitted to the NICU during this period. The blood cultures were taken on admission to the NICU and 2 to 3 days later on clinical suspicion of BSI. The clinical diagnosis or suspicion of neonatal septicaemia was made by the paediatric unit responsible for the care of the patient. The clinical

isolates were identified by Gram staining, colony characteristics and the findings were confirmed by using the API 20E system. The antibiotic susceptibility tests were carried out as per Clinical Laboratory Standards Institute (CLSI) guidelines.

The environmental samples included samples from intravenous fluids, intravenous drugs, cleansing solutions, oxygen humidifiers, sterile water, incubators, cots, mattresses, ventilation masks, water taps, sinks, door handles and other instruments to identify the source of the outbreak. Environmental screening swabs were plated directly and solutions were enriched in BHI broth before plating. Cultures were identified using standard microbiological methods.

### Results

During the study period 55 neonates were admitted to the NICU at THK. A total of 55 blood cultures were collected from these neonates. All the initial blood culture samples collected from the neonates on admission to the NICU were negative. Fourteen of the 55 blood culture samples that were collected 2 to 3 days after admission to the NICU became positive for *P. agglomerans*. Of the 14 blood culture positive neonates 12 were preterm and 2 were term babies. All the isolates shared the in vitro susceptibility to cefotaxime, ceftazidime, ceftriaxone, ciprofloxacin, gentamicin, amikacin, netilmicin, imipenem and meropenem. None of the environmental samples were positive for *P. agglomerans* species. Nine of the 14 neonates responded to treatment with antibiotics to which the organism was susceptible. However, 5 neonates died due to sepsis in spite of appropriate antibiotic therapy.

### Discussion

The NICU at the THK experienced an outbreak of 14 cases of *Pantoea agglomerans* BSI during a period of 26 days. *Pantoea* species infections are not prevalent in humans. There are few reports of systemic infections with this organism in preterm neonates<sup>5</sup>. Surveillance between January 2005 and December 2006 in NICUs at two Teaching Hospitals in Kuwait reported five sporadic episodes of nosocomial blood stream infections due to *P. agglomerans* species<sup>5</sup>. In previous reports, *Pantoea* infections among preterm neonates, primarily sepsis, were basically related to hospital outbreaks caused by this organism and traced to contamination by parenteral nutrition fluids<sup>6</sup>. This was the 'world's largest outbreak of blood stream infection in a NICU by *Pantoea* species.

### Conclusion

*P. agglomerans* was responsible for the neonatal BSI outbreak in the NICU at the THK, although the source of these *Pantoea* infections remains unclear.

### References

1. Anderson AMN, Weiss F, Salkinoja-Salonen MS. Dust-borne bacteria in animal sheds, schools and children's day care centres. *Journal of Applied Microbiology* 1999; **86**:622-34.  
<http://dx.doi.org/10.1046/j.13652672.1999.00706.x>
2. Monier JM, Lindow SE. Aggregates of resident bacteria facilitate survival of immigrant bacteria in leaf surfaces. *Microbial Ecology* 2005; **49**:343-52.  
<http://dx.doi.org/10.1007/s00248-004-0007-9>  
PMid: 16003469
3. Liberto MC, Matera G, Puccio R, Colosimo E. Six cases of sepsis caused by *Pantoea agglomerans* in a Teaching Hospital. *New Microbiologica* 2008; **32**:119-23.
4. Andrea T, Andreena C, Allen CH. *Pantoea agglomerans*, a plant pathogen causing human disease. *Journal of Clinical Microbiology* 2007; **45**:1989-92.  
<http://dx.doi.org/10.1128/JCM.00632-07>  
PMid: 17442803 PMCID: PMC1933083
5. Aly NY, Salmeen HN, Lila RA, Nagaraja PA. *Pantoea agglomerans* blood stream infections in preterm neonates. *Medical Principles and Practice* 2008; **17**:500-3.  
<http://dx.doi.org/10.1159/000151575>  
PMid: 18836282
6. Van Rostenberghe H, Noraida R, Habash H, Zeehaida M. The clinical picture of neonatal infection with *Pantoea* species. *Japanese Journal of Infectious Diseases* 2006; **59**:120-1.  
PMid: 16632913