

# Nosocomial Infection of *Pantoea* Spp in Neonatal Unit About 11 Cases

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**Abstract:** In 2016, an outbreak of *Pantoea* Spp occurred in the intensive care unit of Children Hospital Abderrahim Harrouchi of Casablanca. Rapid microbiological investigations lead to identify eleven cases of *Pantoea* sepsis. Strict hygiene measures were lead to early interruption of the outbreak, without recurrences to this date still.

**Keywords:** Newborn, Neonatology, *Pantoea*

## 1. Introduction

The common pathogens causing early onset neonatal sepsis are *Klebsiella pneumoniae*, *Serratia marcescens*, group B streptococcus, *Escherichia coli*, coagulase-negative staphylococci and *Pseudomonas* spp. *Pantoea* spp is a very rare pathogen causing early onset neonatal sepsis [1].

The *Pantoeas* are Gram negative germs, not encapsulated, forming no spores, belonging to the Enterobacteriaceae family. They are isolated from several geographic and environmental such as soil, fruit, vegetables, human feces, and the environment. These organisms grow well at 4°C and most commonly cause septic arthritis or synovitis following a penetrating injury by vegetation. Organic materials like plant thorn may penetrate the skin and remain embedded in the tissues and set up a chronic inflammatory process [2]. It is an opportunistic pathogen and very rarely causes disease in healthy individuals. However, it is an unusual pathogen in the etiology of neonatal sepsis. The incidence is not known but some isolated cases have been reported in India and Malaysia [3].

*Pantoea* Spp is often associated with outbreaks due to contaminated intravenous solutions and stored blood products. *Pantoea* Spp when involved in a systemic infection

has a predilection for the lungs.

We have reported 11 cases of newborns with *Pantoea*, hospitalized in the neonatology unit of Abderrahim Harouchi Hospital. The objective of this study is to analyze the epidemiological, clinical, bacteriological, biological and evolutionary profile of these cases.

## 2. Materials and Methods

It is a retrospective descriptive study over a period of one year, from January 1 to December 31, 2016, at the children hospital Abderrahim Harouchi of Casablanca. All newborns are hospitalized more than 48 hours with documented nosocomial infection of *Pantoea* spp. were excluded newborns infected with other types of Enterobacteriaceae, as well as those hospitalized for less than 48 hours. All medical informations were taken from the files of the newborns.

## 3. Results and Discussion

### 3.1. Results

We have reported 11 cases of newborns infected with the germ *Pantoea*, either a prevalence of 3% of nosocomial

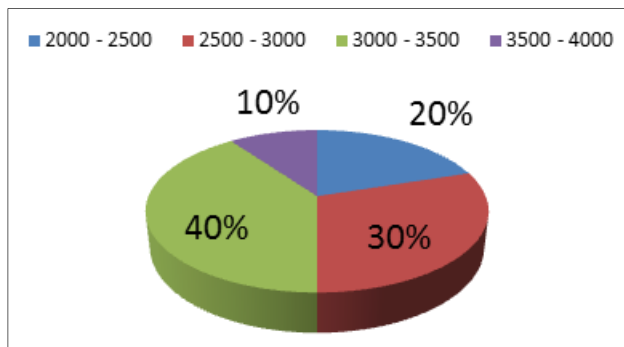
infections. The sex ratio was 1.7. The reason for hospitalization was an early respiratory distress in 60% of cases. Prematurity was found in 45% of cases, so 55% were term babies. 5 cases have been intubated ventilated with umbilical venous catheters and 6 cases have been transfused.

The following table shows the clinical characteristics and culture results of the eleven infants infected with *Pantoea* Spp, and the graphic shows the distribution of these infants according to the birth weight:

**Table 1.** Characteristics of the study population.

Case	Sex	Gestational age (weeks)	Birth weight (g)	Invasive procedures	Culture results (blood)	Culture results (Catheter)	Evaluation
1	M	37	3100	None	<i>Pantoea</i> Spp	-	Survived
2	F	33	2600	IV UVC TS	<i>Pantoea</i> Spp	-	Survived
3	M	34	2800	IV UVC TS	-	<i>Pantoea</i> Spp	Survived
4	F	38	3350	None	<i>Pantoea</i> Spp	-	Survived
5	M	34	2300	IV UVC TS	<i>Pantoea</i> Spp	-	Died
6	F	37	2950	TS	<i>Pantoea</i> Spp	-	Survived
7	M	35	2400	TS	<i>Pantoea</i> Spp	-	Died
8	F	37	3800	IV UVC	<i>Pantoea</i> Spp	-	Survived
9	M	37	3200	None	<i>Pantoea</i> Spp	-	Survived
10	M	34	2200	IV UVCTS	<i>Pantoea</i> Spp	-	Died
11	M	38	3000	None	<i>Pantoea</i> Spp	-	Died

UVC: umbilical venous catheter IV: intubated – ventilated TS: transfused.



**Figure 1.** Distribution of newborns according to birth weight.

Clinically, the revealing symptoms of infection were dominated by hemodynamic instability in 6 cases as it shows this following board:

**Table 2.** Clinical presentation of *Pantoea* Spp sepsis.

Clinical presentation	Number of cases	Percentage
Hemodynamic instability	4	37%
Respiratory distress worsening	2	18%
hyperthermia	1	9%
Apnea	1	9%
Infectious jaundice	1	9%
Sclerema	1	9%
Failure of extubation	1	9%

The blood culture was positive in 10 cases. The CRP was always positive, with values more than 20 mg/l. The hemogram showed thrombocytopenia in 9 patients. The lumbar puncture was done in 8 cases, objectifying a meningeal location at 3 cases.

The therapeutic management was initially based on a probabilistic antibiotherapy: Amoxicilin + C3G + aminoglycoside in 3 cases (27%) and C3G + aminoglycoside in 8 cases (73%). Antibiotherapy was secondarily according to the results of the antibiogram and the clinical course to Tienam + Ciproxine + Amikacin in 6 cases (55%), while 4

cases (36%) were treated by Tienam + Amikacin.

The resistance to antibiotics is detailed in this following board:

**Table 3.** Sensibility of *Pantoea* to antibiotics.

ANTIBIOTICS	RESULTS
Ampicillin	Resistant
Amoxicillin/Clavulanic-acid	Resistant
3 <sup>rd</sup> generation Cephalosporin	resistant
Ciprofloxacin	sensitive
Imipenem	sensitive
Amikacin	Sensitive
Cotrimoxazol	Sensitive

The evolution under treatment was good in 8 cases (73%), with death of 4 cases by abundant pulmonary hemorrhage, severe respiratory distress, or refractory hypothermia. The fourth died from septic shock after his transfer to intensive care for diaphragmatic hernia.

### 3.2. Discussion

Neonatal sepsis is the leading cause of morbidity and mortality in infants in the world. A wide variety of both aerobic and anaerobic bacteria can cause sepsis. *Pantoea* is a member of the Enterobacteriaceae family which lives plants, soil and water [3]. In 1989, the *Pantoea* was named by Gavini with *Pantoea dispersa*, *Pantoea punctata*, *Pantoea countries* and *Pantoea ground*. It is difficult to differentiate between the other members of the tribe such as *Klebsiellae*, *Enterobacter*, *Serratia* and *Hafnia* spp [4]. *Pantoea agglomerans*, Member of this family, has been reported as a cause of severe neonatal sepsis, however, *Pantoea dispersa* was not reported as being a cause of septic [5].

*Pantoea* Spp is an opportunistic pathogen and rarely causes disease in healthy individuals. Infections caused by *Pantoea* spp. have been reported in samples obtained from cotton swabs, intra-arterial devices as well as plants and plant material [6]. Cotton swabs are continuously used by nurses

and physicians in hospital and can be contaminated in many ways.

Among all the species, *P. agglomerans* is the most common to cause soft tissue or bone/joint infections following penetrating trauma by vegetation. Moreover, *P. agglomerans* bacteremia has been described in association with contaminated IV products, total parenteral nutrition, the anesthetic agent Propofol and blood products [7, 8]. In our series, 6 cases have been transfused.

A nationwide epidemic of septicemia by *P. agglomerans* due to use of contaminated IV products had been reported during 1975. However, spontaneously occurring bacteremia as in the present study has rarely been reported especially for children and neonates and the pathogenic mechanism is also not clear [9].

A study done in India for a series of 5 newborns showed that all infants presented with signs of lethargy, difficulty of suck and bradycardia (55% in our series). All were suspected to be sepsis of late onset as >48 h old. Four were male babies delivered at home and one female by caesarean section. Three were low birth weight (LBW: 1500e2500 g) and preterm (26e30 weeks) male babies. There was evidence of meconium stained foul smelling liquor with premature rupture of membrane. There was no evidence of pneumonia, bleeding tendency or disseminated intravascular coagulation. 1e1.5 ml of blood was drawn from each neonate, of which 0.5 e1 ml was inoculated into BACTEC aerobic blood culture bottles and incubated at 37 C in BACTALERT system which is a rapid automated blood culture system. Hematological parameters were within normal limit except raised C - reactive protein e 14 mg/dl. The antibiogram revealed sensitive to most of the antibiotics used: Piperacillin Tazobactam, Amikacin, Ciprofloxacin, Aztreonam, Meropenem. Empirical therapy was modified as per the sensitivity report and all responded well; the same result was noted in our series. Resistance to Cefotaxime was observed in both cases. A good therapeutic response was found in all cases after the adaptation of treatment to the antibiogram. In our series, the evolution was favorable in 63% of cases [10].

Neonatal sepsis by *Pantoea* species is rarely reported. A recent report, which described the clinical picture of an almost fatal infection caused by *P. agglomerans*, was observed during an outbreak caused by contaminated parenteral nutritional fluids in a Malaysian neonatal intensive care unit in 2005. Seven of the eight infected neonates succumbed to the infection in this outbreak. *P. agglomerans* was isolated from cultures other infected neonates and it spread by infected parenteral nutrition solutions. Two subsequent series afterwards reported eight neonates with late onset sepsis due to *P. agglomerans*, out of which five survived after appropriate antibiotic therapy [11, 12].

## 4. Conclusion

*P. Agglomerans* is an unusual pathogen infection in the newborn. The risk factors are the same as Enterobacteriaceae: antibiotics broad-spectrum, intra vascular devices, prematurity. Bacteriological investigations in collaboration with the Department of bacteriology have objectified the presence of enterobacteria without specificity in this devices, where the interest to insist on measures of prevention and hygiene and asepsis rules prior to any manipulation of a newborn, the systematic disinfection of incubator, and awareness and training continues to medical and paramedical team. Early detection and appropriate antibiotic therapy can improve overall outcome.

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