

## Bacillus Pumilus Septicemia: A Neonatal Case

F. BENNAOUI<sup>1,2\*</sup>, N. EL IDRISSE SLITINE<sup>1,2</sup>, KOUTA RABII<sup>1,2</sup>, N.S ORAA<sup>3</sup>, FMR. MAOULAININE<sup>1,2</sup>

<sup>1</sup>Neonatal Intensive Care Unit, Mohammed VI University Hospital Center, Marrakech Morocco

<sup>2</sup>Research laboratory: Heath, children and development, Faculty of Medicine and Pharmacy of Marrakech, Cadi Ayyad University Marrakech Morocco

<sup>3</sup>Department of Microbiology, Mohammed VI University Hospital Center, Marrakech Morocco

\*Corresponding author: Fatiha Bennaoui, Neonatal Intensive Care Unit, Mohammed VI University Hospital Center, Marrakech Morocco. Email: [fatihabennaoui@yahoo.fr](mailto:fatihabennaoui@yahoo.fr)

**Citation:** Bennaoui F, Slitine NEI, Rabii K, Oraa NS, Maoulainine F (2021) Bacillus Pumilus Septicemia: A Neonatal Case. Annal Cas Rep Rev: ACRR-211.

**Received Date:** 21 March 2021; **Accepted Date:** 25 March 2021; **Published Date:** 31 March 2021

### Abstract

*Bacillus Pumilus (B. pumilus) is an environmental contaminant rarely associated with clinical infections. Here, we report a case of severe septicemia caused by B. pumilus identified in a term newborn; a newborn male without any factor predisposing to infection; he is hospitalized for jaundice complicated by nosocomial infection. In this case, the microorganism was detected from repeated blood cultures. The newborn was treated with imipenem, amikacin and vancomycin with a fatal outcome. This report reveals the potential role of B. pumilus as a pathogen in the bloodstream during infancy.*

**Keywords:** *Bacillus pumilus, septicemia, blood culture.*

### Introduction

*Bacillus pumilus* is a Gram-positive, aerobic, spore-forming microorganism usually found in the soil as a commensal and more commonly isolated in cultures as contaminant. The clinical significance of the isolation of these microorganisms which produce a careful assessment, the initial report of a blood culture growing a species of *Bacillus*, often creates a therapeutic dilemma. Other than *Bacillus anthracis*, species of the genus *Bacillus* are rarely associated with infection, despite their widespread distribution in the environment, and are more frequently isolated as contaminants of culture [1]. Bacteremia caused by *Bacillus* species is mainly attributed to *Bacillus cereus* and has been reported mainly in immunocompromised patients with hematologic malignancies [2] [3] [4].

Here, we report a rare case in the literature of severe sepsis caused by *Bacillus pumilus* in a newborn no having a predisposing factor.

### Case Report

A newborn male, born from a twin pregnancy, presenting a harmonious intrauterine growth retardation with a weight of 1300g. His mother had 21-year-old, primiparous whitout

any chronique disease or infection at term (gestation of 39 weeks).

On the 9th postnatal day, the newborn presented with neonatal jaundice, associated with hypertonic seizures without other clinical signs of infection. The initial biological assessment objectified leukopenia at 3540 /  $\mu$ l, thrombocytopenia at 123,000 /  $\mu$ l with a CRP at 2.92 mg / l and a negative respiratory PCR. However, the infant complicated by septicemia 2 days after admission and presented with respiratory distress for which he had to be intubated ventilated and sedated.

Laboratory analysis showed a white blood cell count of 23,600 / mm<sup>3</sup> and a high level of C-reactive protein (110 mg / l). The cultures of urine and cerebrospinal fluid (CSF) were sterile. Blood culture has shown growth of Gram-positive rods in chains. Subsequently, the microorganism was identified as *Bacillus Pumilus*.

The newborn was treated by Imipenem, Amikacin and Vancomycin. The evolution was marked by worsening respiratory distress and the occurrence of the death of the newborn after 10 days.

## Discussion

Bacillus species, apart from *B. anthracis* and *B. cereus*, have little or no pathogenic potential and are rarely associated with clinical infections (Drobniewski, 1993) [4]. A computerized search in the National Library of Medicine database provided a total of 18 cases of clinically significant infections caused by *B. pumilus*. These infections fall into three broad groups: (i) 10 cases of bloodstream infections (nine cases in adults and one case in an 8-year-old child) [2] [5] [3] [6] [7] [8] [9]; (ii) three cases of cutaneous infections [10]; and (iii) five cases of food poisoning, characterized by toxin-induced emetic and diarrheagenic syndromes [11].

The present study describes, one of the rarest cases of septicemia caused by *B. pumilus* in neonates. Documented cases of clinically significant bloodstream infections in neonates or older infants due to non-anthraxis Bacillus species are very limited and include only cases caused by *B. cereus* [2] [12]. Maria Kimoul and al. report two cases of severe sepsis caused by *Bacillus pumilus* in neonatal infants successfully treated with vancomycin [13]. This is despite the fact that the neonatal population is particularly susceptible to disseminated disease caused by environmental organisms due to molecular, cellular and functional deficiency of both cellular and humoral immunity. The low number of cases could be partially attributed to the fact that clinical laboratories may not attempt to identify Bacillus organisms at the species level, arbitrarily designating them as contaminants, without adequate consultation with clinicians. Previous studies have shown that Bacillus species should be recognized as true pathogens, especially in neonates and other immunosuppressed hosts and when isolated from blood cultures collected at the same time or from at least two samples collected at different time [5]. In our case, *B. pumilus* was identified in a blood culture, which in combination with an obvious clinical picture, meets the appropriate criteria to distinguish a real infection of the blood from a simple stain in the sample.

Risk factors for *B. pumilus* bacteremia in adults have included use of a central venous catheter [8] cancer [3] [9], particularly hematological malignancies [5] [7], and spinal anesthesia [2]. The predisposing factors identified in our newborn are: mechanical ventilation, umbilical venous catheterization and the use of long-term intravascular catheters.

*B. pumilus* isolated from our new patient was susceptible to penicillin, vancomycin and the vast majority of other antibiotics tested. Both neonates promptly responded to vancomycin treatment, which is considered the drug of choice for Bacillus infections.

In conclusion, our study highlights the fact that *B. pumilus* is a potential bloodstream pathogen in neonates, and should be recognized as such, especially if this micro-organism is isolated from subsequent blood cultures.

## Author contribution

All the authors contributed to the realization of this work, read and approved the final version of this manuscript.

## Conflict of interest

The authors declare no conflict of interest related to this work.

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