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Ralstonia Mannitolilytica: A Rare Pathogen Found in Pleural Membrane in a Child with Empyema

Dr.S. SasiAnand[$], Dr. Raeshmi[$], Dr. N. Saravanan[#], Mr. Mariappa Mani[*], Dr. Ramalingam[$]

$- Department of Paediatrics, Ramalingam's Hospital, Salem, Tamilnadu
#- Department of Paediatric surgery, Ramalingam's Hospital, Salem
**- Chief Microbiologist, Microbiological laboratory, Salem*

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ABSTRACT :
Ralstoniamannitolilyticais an emerging aerobic Gram-negative bacteria causing infection among immunocompromised patients. It has been described in hospital outbreaks, mainly as bloodstream infection, but also as meningitis, hem peritoneum infection and post renal transplant infection. We report a case of R. mannitolilytica grew in pleural membrane-tissue culture in a child with empyema .

Keywords: Ralstoniamannitolilytica, pleural membrane, empyema.

I. INTRODUCTION :

Ralstonia spp. are aerobic Gram-negative non-fermentative bacteria that can be found in water and soil, now emerging as an opportunistic pathogen causing infection among immunocompromised patients. (1). They could be an aetiological agent in common source nosocomial outbreaks due to contamination of parenteral fluid and medical equipment that is considered to be sterile [2]. R. mannitolilytica are known to cause sepsis, meningitis and central venous catheter-associated bacteraemia [3].

The tendency of R. mannitolilytica to form biofilm enhances the organism's survival in the environment (including the hospital environment), and plays a role in frequent antibiotic resistance.(4)

II. CASE:

A 3 year old boy presented with fever for 20 days, cough and cold for 15 days. No h/ofastbreathing. No other significant history. On examination: febrile, pale, no lymphadenopathy, temperature 101 degree F, heart rate – 110/min Blood pressure- 100/60 mmhg.weight- 12 kgs. Respiratory examination : not tachypnoeic, dull note over right hemithorax on percussion. on auscultation : reduced air entry on right side. Chest x-ray- collapse and consolidation on right side. Ultrasound chest- right side pleural effusion with loculated collection with septations on right side chest. HRCT chest suggestive of empyema. Blood investigations suggestive of anemia, (hb-8.6g/dl). Total wbc counts- 11450cells/cu.mm. platelet count- 6.11 lakhs/cu.mm. child received intravenous antibiotics (meropenem and vancomycin). Fever spikes persisted, henceChild underwent video assisted thorocoscopic decortication .thickpyomembrane of pleura excised and sent for culture and biopsy. Biopsy specimen suggestive of necrotic pleural membrane. No granuloma or malignant changes seen. Child discharged with syrup linezolid. Culture of pleural pyomembrane grew Ralstoniamannitolilytica which was sensitive only to trimethoprim and sulfamethoxazole. Bacteria was identified by proteomic studies method (MALDI TOF/MS-Biotyper).Blood culture- sterile. Child presented with fever on post discharge, hence he was treated with syrup septran for 2 weeks. During follow up child remained afebrile. Since child had no previous history of abscess or granulomas and child was thriving well, we didn't workup for immunodeficiency.

III. DISCUSSION :

Infection due to Ralstonia spp. is becoming more prevalent mainly due to three bacterial species: Ralstoniapickettii, Ralstoniainsidiosa and Ralstoniamannitolilytica.(1) Usually isolated in water and soil samples, these bacteria are widespread in many different types of water supplies, including hospital water supplies (1). Ralstonia spp. persists in sterile solutions due to its ability to grow and survive over a wide range of temperatures (15–42 °C) and pass through both 0.2 and 0.45 µm filters, which are used to filter-sterilize medical solutions. (5). They have been reported to survive mild hospital disinfectants like chlorohexidine 5% and ethacridine lactate solutions (6)(7).Ralstoniacan create biofilms on the surfaces of medical supplies and produce toxins(8).These factors contribute to the dissemination of the bacteria and

contamination of medical equipment (air conditioners) and products (normal saline and other solutions flushed through indwelling devices), resulting in the aforementioned hospital outbreaks (9)

The biochemical identification of the Ralstonia genus poses special challenges for the microbiologist. The distinction between the species of the genus is not straightforward. Key knowledge for the biochemical distinction between the species of the genus is that R. mannitolilytica metabolizes only mannitol but not nitrate or arabinose, R. insidiosa metabolizes nitrate but not mannitol or arabinose, R. pickettii metabolizes nitrate and arabinose but not mannitol (10).

The Ralstonia genus seems to have developed resistance against many antibiotic agents. The treatment protocol needs careful planning as the genus produces various enzymes that can hydrolyze antibiotics and resistance to aminoglycosides and beta-lactams is frequently reported.(11). Special attention has been drawn to the rising resistance against many modern antibiotics such as ceftazidime, aztreonam and carbapenems (11)(12). In a recent study, Suzuki et al. identified a species-specific extended spectrum oxacillinase (OXA60) with carbapenem-hydrolyzing properties that contribute to the genus resistance against imipenem and carbapenem (13). Co-trimoxazole and ciprofloxacin are generally considered effective against the genus, while tigecycline also has been shown to have good in vitro activity against Ralstonia spp.(14). In most cases the microorganisms were susceptible to many antibiotics. On the contrary, in our case the R. mannitolilytica presented with a multidrug resistance profile, susceptible only to co-trimoxazole. Child presented with fever post discharge. After the culture report, Co-trimoxazole was given orally for 2 weeks and child was doing fine on followup.

IV. CONCLUSION :

Even though R. mannitolilytica is not recognized as a major pathogen, clinicians and microbiologists should pay attention to the potential of this opportunistic bacteria, which is able to cause bloodstream infections. it has certain characteristics, such as multidrug resistance, the ability to survive in water supplies and resistance to disinfection practices. Prompt diagnosis and subsequent administration of antibiotics in line with antimicrobial susceptibility testing results are needed to clear infections. R. mannitolilytica is capable of being resistant to many routinely used antibiotics, including carbapenems. To the best of our knowledge, Ralstoniasp was not isolated in pleural membrane, eventhough it can be present in hospital equipment and hospital supplies, clinically child's fever got settled after starting co-trimoxazole as per the culture report.

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