CASE REPORT

Microbiology

RHIZOBIUM RADIOBACTER BACTEREMIA IN A NEONATE - A CASE REPORT

KEY WORDS: Bacteremia, *Rhizobium radiobacter*, Neonate

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ABSTRACT

Rhizobium radiobacter is a gram-negative plant pathogen that is occasionally reported to cause opportunistic infections in humans. R. radiobacter infection occurs mostly in patients with underlying chronic disease or immunosuppression. Herewith we report a rare case of Rhizobium radiobacter bacteremia in a preterm neonate at our institute.

CASE REPORT

A two-day-old male baby with respiratory distress was admitted to neonatal intensive care unit (NICU). He had fever, lethargy, refusal to feed and tachypnoea. Baby's mother was a 30-year-old gravida 2 and para 2. There was history of premature rupture of membrane >24 hours before delivery with foul smelling discharge from vagina. Baby was delivered via spontaneous vaginal delivery. Amniotic fluid was clear. The baby was preterm with birth weight of 1.2kg. He presented with fever, lethargy, weak cry, no sucking and chest indrawing with decreased oxygen saturation (up to 68%). The patient was admitted and was managed with bubble continuous positive airway pressure (CPAP). Intravenous fluids, corticosteroids and empiric antibiotic therapy with injection vancomycin and piperacillin+tazobactam were started. His hemoglobin was 10 g/dL, total leukocyte count was 3700/uL, lymphocytes were 56.9%, mid cells were 14.7% and granulocytes were 28.4%. Platelet count was 63 $x10^3$/ul and RBC count was 3.3 $x10^6$uL. Serum electrolytes were sodium 133 meq/l, potassium 6.3 meq/l, and calcium 9.2 meq/l. Blood sample was sent for culture.

After overnight incubation blood culture yielded 1-2 mm non-lactose fermenting translucent colony on Mac-Conkey agar and non haemolytic moist translucent colony on blood agar. Gram stain revealed Gram-negative bacilli. The microorganism was positive for motility test, oxidase test, urease test and negative for indole test and glucose fermentation. Isolate was identified as *Rhizobium radiobacter* with 95% probability by VITEK-2 (fully automated identification system) (Biomerieux, France). It was found sensitive to gentamicin, imipenem, ciprofloxacin, levofloxacin, tigecycline, minocycline and cotrimoxazole and resistant to Piperacillin+tazobactam, Ticarcillin+clavulinic acid, cefotaxime, cefoperazone+sulbactam, amikacin and colistin. Antibiotic therapy was changed according to antibiotic susceptibility report with gentamicin 4mg/kg/dose daily and imipenem 25mg/kg/dose 8 hourly for 10 days. Patient responded well and was discharged after 20 days of treatment.

DISCUSSION

Rhizobium radiobacter was formerly called as *Agrobacterium radiobacter* until recently, when *Agrobacterium* spp. was reclassified on the basis of comparative 16S rRNA gene analyses.[1] It is an aerobic, motile, oxidase-positive, nonspore-forming Gram-negative phytopathogenic bacillus. [1,2] Genus *Rhizobium* contains five species (i.e. *R. radiobacter, R. rhizogenes, R. rubi, R. undicola* and *R. vitis*) out of which *R.radiobacter* is the only one known to cause human disease.[3] *R. radiobacter* has been recognized as an opportunistic human pathogen, typically of low virulence, and has been reported to cause urinary tract infections, bacteremia, endocarditis, endophthalmitis, and peritonitis in catheterized immunocompromised patients.[4] In the literature, *R. radiobacter* infections are mostly associated with indwelling intravascular devices. Majority of the patients have some debilitating underlying illness and immunosupression.[5] Before 1977, *Rhizobium* species was considered as laboratory contaminant or even colonization but not a true infection.[6] The first case of human infection due to *R.radiobacter* was recorded in 1980 concerning an episode of endocarditis in patient with prosthetic aortic valve.[7] Since then an increasing number of *R. radiobacter* infections are being reported, especially among immunocompromised or carriers of long-standing indwelling foreign devices or plastic materials, for which the organism shows remarkable adhesion capacity. [8] In most cases the infection has been associated with the presence of external plastic material, like central venous catheter, nephrostomy tube, peritoneal dialysis catheter or prosthetic valve.[9] Lai et al have emphasized that *R. radiobacter* be included in the list of pathogens that cause bacteremia even in immunocompentent patients, especially in the presence of an intravenous catheter. Corticosteroid therapy and diabetes have also been identified as predisposing factors for *R. radiobacter* infection.[6,10]

Tiwari et al have reported the first case of *R. radiobacter* infection in a neonate from India.[10] In our case the neonate was preterm with abnormal differential leukocyte count and was given corticosteroids. Prematurity with defective immunity and cortisteroids could be the predisposing factor for *R. radiobacter* infection in this case.

Because of low virulence and incidence, the optimal therapy for *R. radiobacter* infection has not yet been defined. Therefore, treatment of *R. radiobacter* infections should be individualised according to the antibiotic susceptibility test.

[8,11] In our case the isolate was found sensitive to imipenem, gentamicin, cotrimoxazole and fluoroquinolones and resistant to piperacillin + tazobactam, cefoperazone + sulbactam and amikacin. Ciprofloxacin is generally considered the first-line drug.[3] But ciprofloxacin being unsafe in children, gentamicin and imipenem were chosen for treatment. Double antibiotics were used to prevent development of resistance. As in this case, most *R.radiobacter* infections are reported to have favourable outcome.

CONCLUSION

R. radiobacter is being increasingly reported to be associated with infections in neonates. Therefore, clinicians should be aware of this agent. Complete cure can be achieved with appropriate antibiotics.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Young JM, Kuykendall LD, Martı´nez-Romero E, Kerr A, et al. A revision of Rhizobium Frank 1889, with an emended description of the genus, and the inclusion of all species of Agrobacterium Conn 1942 and Allorhizobium undicola de Lajudie et al. 1998 as new combinations: Rhizobium radiobacter, R. rhizogenes, R. rubi, R. undicola and R. vitis. Int J Syst Evol Microbiol. 2001; 51:89–103.
2. J. M. Young, L. D. Kuykendall, E. Martinez-Romero, A. Kerr, H. Sawada. Classification and nomenclature of Agrobacterium and Rhizobium. International Journal of Systematic and Evolutionary Microbiology. 2003;vol. 53, no. 5, pp. 1689–1695.
3. Lai CC, Teng LJ, Hsueh PR, Yuan A, Kuang-Chau Tsai, Jih-Luh Tang, et al. Clinical and microbial characteristics of Rhizobium radiobacter infections. Clin Infect Dis. 2004;38:149-43.
4. Sameer Sawhney, Tammey Naab, Partricia Oneal. Rhizobium Radiobacter Infection in a 27-Year-Old African American Woman With Munchausen Syndrome. Lab Medicine 2016;47:3;e32–e34.
5. Funda Erol Çipe, Figen Do u, Deniz Sucuo l, Derya Aysev, et al. Asymptomatic catheter related Rhizobium radiobacter infection in a haploidentical hemapoetic stem cell recipient. J Infect Dev Ctries 2010; 4(8):530-532.
6. N. I. Paphitou, K. V. Rolston. Catheter-related bacteremia caused by Agrobacterium radiobacter in a cancer patient: case report and literature review. Infection. 2003. vol. 31(6); 421–424.
7. G. R. Plotkin. Agrobacterium radiobacter prosthetic valve endocarditis. Annals of Internal Medicine. 1980; vol. 93, no. 6, pp. 839-840.
8. Aikaterini Stamou, Charalampos Pavlopoulos, Roumeliotis S., Samoladas E., Xatzokos I., Kontopoulou K. Nonunion Humerous Fracture Infection Caused by Rhizobium radiobacter in a 24-Year-Old Healthy Patient:A Rare Case Report. Hindawi Case Reports in Infectious Diseases. Volume 2018, 4 pages.
9. Raquel Marta, Catarina Dâmaso, José Esteves da Silva, Margarida Almeida. Peritonitis due to Rhizobium radiobacter. einstein. 2011;9(3 Pt 1):389-90.
10. Shreekant Tiwari, Siba Shanker Beriha. Primary Bacteremia Caused by Rhizobium radiobacter in Neonate: A Rare Case Report. Journal of Clinical and Diagnostic Research. 2015 Oct, Vol-9(10): DD01-DD02.
11. M. Chanza, S. Vidal, and C. Gimeno. Rhizobium radiobacter in pulmonary abscess associated with postgripal necrotizing pneumonia. Revista espanola de quimioterapia: publicacion oficial de la Sociedad Espanola de Quimioterapia. 2017;vol. 30(1), pp. 50-51.