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Original Article

A rare but fatal infection with Chromobacterium violaceum isolated from a non-healing localized wound.

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ABSTRACT

Chromobacterium violaceum, is a common free living saprophytic bacterium which is confined to tropical and subtropical regions of the world. Despite ubiquitous distribution, human infections with this organism are rare but when do occur, result in high mortality. Since its first detection in Malaysia in 1927, more than150 cases have been reported in the world literature, out of which few cases have been reported from different parts of India. We report a fatal case occurring in a fifty years old male patient who presented with a history of fever and pain abdomen along with an infected 17 days old wound over right foot due to a bamboo prick. *Chromobacterium violaceum* was isolated from the wound swab. The patient expired on third day of admission due to sepsis, as could not be treated with the sensitive drugs. Probably our isolation was the first from the North Eastern Region of India.

Introduction

Chromobacterium violaceum, is one of the millions of species of free-living microorganisms that populate in the soil and water areas of tropical and sub-tropical biodiversity around the world.[1] The pathogenic potentiality of this organism was first described by P.G Woolley in 1905, by isolating this organism from a buffalo which was fatally infected.[2] The organism was described first as a human pathogen by J.E Lessler in 1927 from Malaysia.[3] It grows on ordinary culture media, producing violet color pigmented colonies. The pigment violacein produced by most of the strains, gives the distinctive metallic, dark-purple sheen. Non pigmented strains are also pathogenic to humans but difficult to identify as they are confused with Pseudomonads, Aeromonas or Vibrionaceae. Both pigmented and Non - pigmented strains exists in the environment. This pigment is soluble in ethanol and insoluble in water and chloroform.[4,5]

Chromobacterium violaceum are pathogenic to human and occasionally cause serious pyogenic or septicemic infections. Strains of virulent Chromobacterium produce an endotoxin and are able to survive attack from phagocytic cells by elevated levels of superoxide dismutase and catalase. More than 150 cases have been reported from several continents, particularly Australia, South America, and Southeast Asia, where the typical disease presentation includes cutaneous inflammation, sepsis, and multiple liver abscesses with high fatality.[1,4,5] Ocular infections are documented in the more recent literature. In Human, portal of entry of infection appear through broken skin exposed to the contaminated water and soil.[6]

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CASE REPORT

A 50 years old male patient was admitted in the Department of Orthopedics at Dr. B.R. Ambedkar Memorial Teaching Hospital, a referral hospital of Tripura, with fever, dull pain in abdomen and an infected wound over right foot, following a 17 days old bamboo prick.[Fig–1] On examination, the patient was febrile and pale with tachycardia, tachypnoea, hepatomegaly and crepitations bilaterally over the chest. Significant Laboratory parameters were recorded as Hb% of 9.2, Total Leukocyte count 14,850/cmm with 80% polymorphs and positive C-reactive protein. X-Ray chest showed high bronchopulmonary prominence and X-Ray of right foot showed a foreign body at lateral aspect of 4th metatarsal. A wound swab from the non-healing wound was sent for culture and sensitivity on 2nd day of his admission.

The pus was inoculated on Sheep Blood agar, MacConkey agar (Hi-Media Laboratories, Mumbai) and incubated overnight at 37° C. Next day, smooth low convex, about 1.5mm size dark purple colored colonies were observed on media with small narrow zone of haemolysis on blood agar.[Fig–2] Gram stain performed from the colony revealed Gram negative coccobacilli and the organism was found to be motile on hanging drop. Oxidase and catalase tests were positive and the organism reduced nitrate to nitrite. Growth was further sub cultured in Nutrient agar (Hi-Media Laboratories, Mumbai) to confirm violet pigment production. [Fig–3] Biochemical tests for identification of the isolated organism were performed as described by Chen et al.[4] It was a non-lactose fermenter, non-aerogenic and fermented glucose with acid production. Urea was not hydrolysed, Citrate was not utilized and Phenyl Pyruvic acid test was negative. A confirmed opinion on identification of the strain was also obtained from The Department of Microbiology, AIIMS, New Delhi. It was further identified biochemically and confirmed by VITEK. It produced acid from

trehalose, N-acetyl glucosamine and gluconate but not from L-arabinose, D-galactose or D-maltose. It utilized Lactate, hydrolyzed Casein and decarboxylated Arginine.

Antibiotic susceptibility test of the isolated organism was performed by Kirby-Bauer Disc Diffusion method. [Fig–4] The isolate was sensitive to Ciprofloxacin (5µg), Amikacin (30µg), Chloramphenicol (30µg), Levofloxacin (5µg), Tobramycin (30µg), Piperacillin-Tazobactum (100/10µg), Cefoperazone & Sulbactum (75/30µg), Imipenem (10µg) and resistant to Penicillin-G (2units), Ampicillin (10µg), Amoxycillin-clavulanic acid (20/10µg), Ceftriaxone (30µg), Cefotaxime (30µg), Ceftazidime (30µg). Empirical treatment was started on admission with intravenous Amoxicillin and Clavulunate injection due to suspected Staphylococcal infection. The patient did not respond to the treatment and rapidly developed septicemic shock next day. The patient succumbed to death due to multiorgan dysfunction. A blood culture was done and the same strain of Chromobacterium violaceum was isolated, thereby confirming the diagnosis.

DISCUSSION

Chromobacterium violaceum is a free living soil saprophyte confined to tropical and sub-tropical regions. Human infection with Chromobacterium violaceum is uncommon until and unless there is exposure. In India, Chromobacterium violaceum was first isolated in 1979 at Vishakapatnam, from a child with septicemia and meningitis, followed by death.[7] Subsequently three cases from Manipal and one each from Mangalore, West Bengal, Chandigarh, Orissa were isolated.[5,8-11]

It is very difficult to identify the non pigmented strain and differentiate from Pseudomonaceae and Vibrionaceae as they have got similar biochemical properties.[6] Pigmentation of Chromobacterium violaceum is not related to its pathogenicity.[12] In review of articles, Chromobacterium violaceum was also observed to have been isolated from ear discharge and vaginal discharge with high incidence of puerperal sepsis.[13,14,15] Blood Dissemination of the organism can lead to a case fatality rate of 80%.[4] The isolate was sensitive to Ciprofloxacin, Amikacin, Chloramphenicol, Levofloxacin, Tobramycin, Piperacillin-Tazobactum, Cefoperazone & Sulbactum, Imipenem and resistant to Penicillin, Ampicillin and Cephalosporins. The present observation can be correlated with previous reports, that the strains were sensitive to Aminoglycosides, Ciprofloxacin, Chloramphenicol and Resistant to Penicillin, Ampicillin and Cephalosporins.[4,5,16]

CONCLUSION

Human infection with Chromobacterium violaceum though considered rare, the increasing incidence suggest it to be an emerging pathogen. Moreover, it is conferred that the isolation and identification of the major pigmented strain of Chromobacterium violaceum, is not difficult in a routine bacteriological laboratory if done meticulously. High index of suspicion, early detection and appropriate antimicrobial therapy may reduce the propensity of the organism for blood dissemination from a non healing localized wound. Owing to high fatality of the infection, emphasis should be laid to isolate Chromobacterium violaceum and minimize under reporting.

Figure – 1 : Cellulites with avulsed blisters of the right foot due to infection.

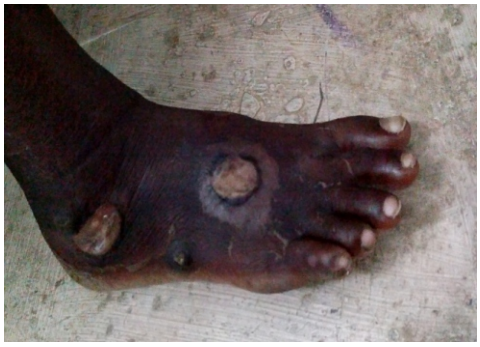


Figure – 2 : Colonies on Blood agar medium.

Figure – 3 : Dark Violet pigment produced in Nutrient agar.

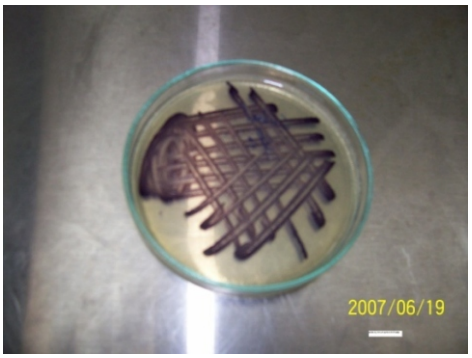
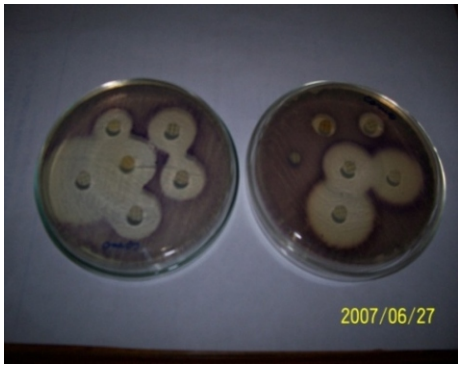


Figure – 4 : Antibiotic susceptibility testing done by disc diffusion



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