

A Very Rare and Rapidly Fatal Case of *Chromobacterium Violaceum* Septicemia

Y M Ang, MRCPCH

Paediatric Unit, Hospital Tengku Ampuan Afzan, Jalan Tanah Putih, 25100 Kuantan, Pahang

Summary

Chromobacterium violaceum infection is rare but causes a high mortality rate particularly in immunosuppressed persons. Since its clinical presentation is non-specific and the diagnosis basically relies upon blood culture and sensitivity, this infection should be considered among the organisms targeted empirically for antibiotic therapy when a cellulitis or rapidly progressive illness follows exposure to water or soil. This is a case of fulminant septicemia caused by this rarely encountered organism.

Key Words: Paediatric, Fatal, *Chromobacterium Violaceum*

Introduction

Chromobacterium violaceum (formerly known as *Bacillus violaceus*) is a facultative *anaerobic, motile, gram negative bacillus that is a normal inhabitant of soil and water*^{1,2}. It is also found in food (refrigerated food growing only *C.lividum*)³. Characteristically, the organism produces a purple pigment that can result in blackish colonies on blood agar and violaceous cellulitis clinically. Human infections are rare, but have been reported from various tropical and subtropical countries. There are at least 40 cases of human infection were reported worldwide including Malaysia, Argentina, Australia, China, India and USA¹. Most of these reported cases are associated with a high mortality rate². *Chromobacterium violaceum* can affect various organ systems with differing clinical presentations including overwhelming septicemia², ocular infections (necrotizing conjunctivitis, periorbital cellulitis), meningitis, lymphadenitis, pneumonia, cutaneous lesions (minor abrasions, rashes, cellulitis) and etc.

Most of the affected were children. Although most cases have been in previously healthy individuals,

chronic granulomatous disease is an important predisposing illness for the infection. The case reported here was a 4 year-old boy who presented with lobar pneumonia and fulminant septicemia.

Case Report

This 4 year-old boy was admitted with two days history of high-grade fever and productive cough with yellowish sputum. Recently he had just moved to a new home in a new housing estate with a grassless field. Everyday he and his new friends will play on this field.

On admission he was otherwise well though a little lethargic with a temperature of 38°C. His BP was 100/50 mmHg with a pulse rate of 120/min. Systemic examination revealed no significant abnormalities. A provisional diagnosis of viral upper respiratory infection was made and he was treated accordingly.

Initial investigations taken on admission showed Hb 10.7 g/dl, WBC 19,000/ul (polymorph 60%, lymphocyte 40%) and platelet count of 228,000/ul. The blood urea

This article was accepted: 29 March 2004

Corresponding Author: Y M Ang, Paediatric Unit, Hospital Tengku Ampuan Afzan, Jalan Tanah Putih, 25100 Kuantan, Pahang

CASE REPORT

was 5.6 mmol/L, sodium 134 mmol/L, potassium 3.7 mmol/L and chloride 101 mmol/L.

Within 10 hours of admission, his condition deteriorated with a high spiking temperature. He became tachycardic, tachypneic and had cold peripheries. BP was very labile. Examination also showed dullness and bronchial breathing in the middle zone of right lung and an enlarged liver of about 4cm. He was then sent to ICU for elective ventilation. The chest X-ray confirmed the presence of right-sided lobar pneumonia (middle lobe). High dose antibiotics (cefuroxime 50mg/kg/dose) was started and the child was placed under CVP monitoring. In spite of resuscitation with crystalloids and colloids as well as the triple inotropic support (Dopamine 20mcg/kg/min, Dobutamine 20mcg/kg/min and Adrenaline 2mcg/kg/min), there was no improvement and his condition deteriorated further. Finally, he succumbed about 22 hours after admission.

After 48 hours of death, the blood culture grew a violet pigment producing gram negative bacillus; *Chromobacterium violaceum* which was found to be sensitive to gentamicin and cotrimoxazole but resistant to cefuroxime, ampicillin, tetracycline and ceftazidime.

Discussion

Chromobacterium violaceum infection in human is very rare but frequently associated with high mortality². The case reported here is the 2nd documented paediatric case in this hospital; the 1st case was reported in December 1995 where a 11 year-old Malay girl presented with similar problems i.e. pneumonia and septicaemia due to *Chromobacterium violaceum*.

Although these cases (5) previously reported in other parts of Malaysia had histories of skin lesions and leg injuries, these were not found in the two cases which occurred in this hospital.

Chromobacterium violaceum is found in the soil and water. The portal of entry is believed to be a break in the skin which may be trivial or was not asked/looked at specifically. The ingestion of contaminated food or water may also play a role since the organism have been isolated from faeces when near drowning was the only source of exposure. Typically, the infection begins around a break in the skin followed by local

cellulitis, regional or diffuse lymphadenitis, then hematologic dissemination. The history of playing on the grassless field is most probably the source of infection in this case.

Many reports suggested an association of chronic granulomatous disease with *Chromobacterium violaceum* infection. This patient (as the 1st case reported) was previously well and healthy, nothing to suggest any form of severe or typical immunodeficiency state like chronic granulomatous disease. *Chromobacterium violaceum* infection in patients with other neutrophil defects, such as G6PD deficiency of polymorpho leukocytes (and red cells) and leukemia have been described. Normal hosts who have suffered either overwhelming exposure (near drowning) or minimal exposure (walking barefoot in mud) have been reported.

The virulence properties of *Chromobacterium violaceum* include production of a Biologically active endotoxin, chromosomally mediated beta-lactamase and possibly an extracellular slime layer. It is reported that the virulent strain demonstrate greater superoxide dismutase and catalase production which enable them to survive attack from phagocytic cells.

Chromobacterium violaceum strains usually are susceptible to chloramphenicol, aminoglycosides, tetracyclines and cotrimoxazole but resistant to penicillin, ampicillin and cephalosporins². The mortality rate is 60 to 70%, probably related to the underlying disease (e.g. neutrophil defects), appropriateness of antibiotic therapy and accuracy of diagnosis.

The prognosis of the case might be better if the condition is considered and appropriate antibiotics were started as shown in the culture and sensitivity.

Conclusion

Since the *Chromobacterium violaceum* infection is rare and its presentation is so non-specific, the diagnosis is only able to be made by blood culture and sensitivity. The infection should be considered among the organisms targeted empirically for antibiotic therapy when a cellulitis or rapidly progressive illness follows exposure to water or soil. Only with early treatment there is likely influence to the final outcome.

References

1. Saigin DD, Dolkadir J, Tan PT. Chromobacterium violaceum infection in Malaysia. Asian Medical Journal 1994; 37: 47-51.
2. Ponte R, Jenkins SG. Fatal Chromobacterium violaceum infections associated with exposure to stagnant water. Pediatric Infect Dis J 1992; 11: 583-6.
3. Koburger JA, May SO. Isolation of chromobacterium spp. from foods, soils and water. Appl Environ Microbiol 1982; 44: 1463.