

Neonatal Diphtheria*

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Neonatal diphtheria is a rarely seen condition. *Corynebacterium xerosis*¹ has not been reported to cause disease in humans to the best of our knowledge. Therefore we would like to report a case of diphtheria which was caused by a non-toxicogenic *C. xerosis*.

Case Report

A-27-day-old baby boy was admitted to Hacettepe Children's medical Center on November 23, 1976 because of difficult and noisy breathing which was complicated by breast feeding and intercostal retractions.

Physical examination revealed: Temperature 36.5 C, pulse 146/min, respiration 60/min, height 50 cm, and weight, 3,6 kg. There was bloodless mucopurulent nasal discharge, tachypnea and suprasternal intercostal retractions. On auscultation transmission rales were heard. Liver was 3 cm and spleen 2 cm palpable below their respective costal margins.

Laboratory examination: Hb was 14.25 g/dl, WBC 7200/mm³. Peripheral smear showed 1 % immature, 20 % segmented neutrophils, 2 % eosinophils, 2 % basophils, and 70 % lymphocytes. Red blood cells were normochromic and normocytic. Platelets were abundant. BUN 17 mg/dl, blood sugar 60 mg/dl, CO₂ 38.45 mEq/l. Blood electrolytes: Na 125 mEq/l, K 5.3 mEq/l, Cl 96.2 mEq/l. VDRL: patient, mother. Throat culture revealed normal flora. Nasal discharge culture on Loeffler's and tellurite agar media grew *Corynebacterium xerosis*, which on further investigation proved to be virulent on guinea pig and mouse inoculation with a control. Toxigenicity assay (Elek test) was negative. Cranial and chest X-rays were normal. Cervical X-ray revealed no tracheal obstruction. ECG was within normal limits.

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Epidemiology: All family members were swabbed and virulent *C. xerosis* was isolated from the father of the patient, who proved to be a symptomless faucial carrier.

The patient was placed on nasogastric feeding because of difficulty in breathing during oral feeding. 1200 units of diphtheria antitoxin were administered. He was also given 100.000 U/kg. Crystalline penicillin. I. M. On his tenth day in the hospital he was given 0.03 mg/kg. Digoxin due to cardiac failure. The patient recovered and was discharged from the hospital on December 20, 1976 in good condition.

Discussion

Neonatal diphtheria is rare and usually localized to the nares. Faucial diphtheria in neonates is seldom seen due to the acidity of the mouth and the poor development of tonsils in early infancy.² Diphtheria usually affects tonsils and larynx, but it also has been reported to affect skin, umbilicus, and conjunctiva.

There are three reasons for the rareness of the neonatal diphtheria: 1) Local tissue immunity, however, the role of it is not well known, 2) The relative isolation of the neonates, and 3) the most important there is transfer of the antitoxin from the mother to the infant. At birth infant's passive blood antitoxin titer can be 0.005 U/ml. or even more, in breast fed infants the passive immunity is maintained longer.³ The degree of protection which passive antitoxin provides, is not known. Therefore, active immunization can and should be started early in the life. However, if passive antitoxin concentration exceeds 0.1 U/ml, it may interfere with the active immunization.⁴

Diphtheria is usually caused by toxigenic, virulent *C. diphtheriae*. Previously toxigenic was taken to mean virulent thus it was thought that non-toxigenic *Corynebacteria* cannot cause disease in man. However, non-toxigenic *C. diphtheriae* have been reported to cause clinical diphtheria in humans and experimentally in animals.^{1, 2, 4, 5-9} Similarly in our case the disease was caused by nontoxigenic virulent *C. xerosis*.

Out-breaks of neonatal diphtheria usually occur in the hospital nurseries. One of the most serious occurred long ago, in Tipperary Ireland in the form of three separate epidemics between 1937 and 1941 during which a total of 36 infants were affected of which 26 of them expired.¹⁰ The high mortality rate in all neonatal diphtheria epidemics rare as they may be should prepare doctors in hospital nurseries for early diagnosis of diphtheria so that the treatment with antitoxin and antibiotics can be started as early as possible thus reducing the number of fatal outcomes and preventing the spreading of the epidemic.

Summary

C. xerosis has not been reported as a cause disease in man, therefore a case of neonatal diphtheria caused by nontoxigenic, virulent *C. xerosis* in a 27-day-old baby boy was reported.

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