

# A case of respiratory diphtheria in a child

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## Abstract

Diphtheria is a highly communicable bacterial disease. It is a severe and sometimes fatal disease caused by toxin producing strain of *Corynebacterium diphtheria* also known as Klebs-Loeffler bacilli. The disease mainly involve tonsillar, pharyngeal, laryngeal, nasal, otitic and conjunctival mucosa. Respiratory diphtheria is characterised by infection involving the tonsil(s), pharynx and/or larynx, low-grade fever with or without an asymmetrical greyish-white adherent membrane of the tonsil(s), pharynx and/or nose. Route of entry is respiratory tract. After mass vaccination program against diphtheria have been established, the disease became very rare, now a days. A 6year old male child presented with low-grade fever for 6 days, painful swallowing for 6 days and swelling of neck glands in department of ENT, Silchar Medical College and Hospital. On examination, dirty white membrane on both of tonsils and posterior pharyngeal membrane seen. Throat swab from the membrane shows presence of Klebs-Loeffler like bacilli in direct staining. The specimen is further plated in blood agar and tellurite blood agar medium and *Corynebacterium diphtheria* bacilli are isolated. Patient was started on intravenous antibiotic therapy and referred to Calcutta Medical College and hospital, West Bengal, for administration of antidiphtheritic serum (ADS). Following ADS and antibiotic administration, the patient recovered fully.

**Keywords:** *Corynebacterium diphtheria*, Respiratory diphtheria, Dirty-white membrane, Antidiphtheritic serum.

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## INTRODUCTION

Diphtheria is a highly communicable bacterial disease. It is a severe and sometimes fatal disease caused by toxin producing strain of *Corynebacterium diphtheria*. These are Gram-positive, non-acid fast, non-motile, non-sporeing, pleomorphic rods with irregularly stained segments and sometimes metachromatic granules. They show club shaped swellings and hence called corynebacterium (coryne means club). These are also known as Klebs-Loeffler bacilli. The disease mainly involve tonsillar, pharyngeal, laryngeal, nasal, otitic and conjunctival mucosa. Respiratory diphtheria is

characterised by infection involving the tonsil (s), pharynx and/or larynx, low-grade fever with or without an asymmetrical greyish-white adherent membrane of the tonsil (s), pharynx and/or nose. Portal of entry is respiratory route.

The disease is very rare, now a days, following mass vaccination program against diphtheria. Demonstration and isolation of Klebs-Loeffler bacilli from the membrane in the throat from clinically suspected cases is diagnostic of diphtheria.

## CASE STUDY

A 6years old fully immunized male child hailing from Tripura presented with chief complaints of fever for 6 days, painful swallowing for 6 days and swelling of neck glands to ENT Department, Silchar Medical College and Hospital. On examination, the patient is of average built, well nourished but looked toxic. General examination reveals multiple, enlarged, matted, sub-mandibular glands in the left side of neck. On local examination, a dirty white membrane on both tonsils and posterior pharynx was seen which bleeds on touch and difficult to remove. His chest x-ray reveals normal study.



Figure 1



Figure 2

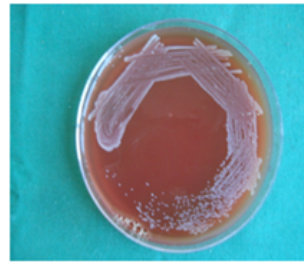


Figure 3

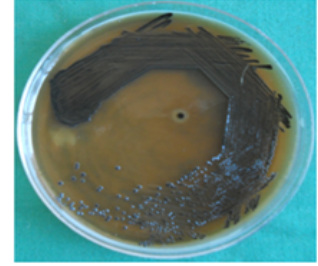


Figure 4

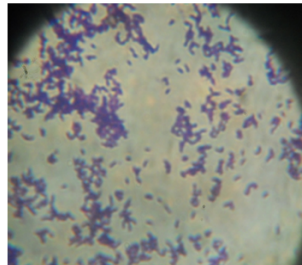


Figure 5

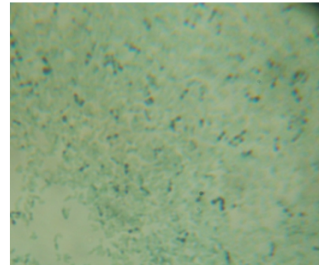


Figure 6

#### Legend

**Figure 1:** Neck swelling due to enlarged sub-mandibular lymph nodes; **Figure 2:** Dirty white membrane over both the tonsils; **Figure 3:** colony on blood agar; **Figure 4:** Colony on tellurite blood agar; **Figure 5:** Gram stain showing Gram positive bacilli arranged in Chinese letter pattern; **Figure 6:** Albert's stain showing bacilli with metachromatic granules

**Microbiological study:** Throat swabs were taken from both the tonsils and the posterior pharyngeal wall and processed according to standard microbiological procedure. *Gram staining:* Abundant gram positive bacilli seen. Few gram positive cocci in pairs and Gram negative cocci were also seen suggestive of normal flora of throat. *Albert staining:* Few Kleb-Loefflers bacilli like organisms seen. *Ziehl Neelsen staining:* No acid fast bacilli seen on Ziehl Neelsen staining *Culture in blood agar media:* small, circular, greyish white opaque colonies appear after overnight incubation *Culture in Tellurite blood agar media:* small, circular, black colonies appear after overnight incubation.

**Gram staining:** from culture in blood and tellurite blood agar plate shows gram positive bacilli. *Albert staining:* from culture in blood and tellurite blood agar plate shows greenish bacilli with bluish black meta-chromatic granules at both ends which is typical of *Corynebacterium diphtheria*.

The patient was started on intravenous antibiotic therapy and was taken to Calcutta Medical College, West Bengal, for administration of antidiphtheritic serum (ADS) as it is not available here. After administration of antibiotic and ADS, the patient recovered fully.

#### DISCUSSION

After the mass immunization program with DPT and DT, the incidence of diphtheria is becoming rare. Respiratory diphtheria in a fully immunized child is of rarest occasion and may indicate vaccine failure. It necessitates review of the vaccine potency, storage and administration process.

In this case, we failed to further evaluate the case, as it was taken to Kolkata for administration of ADS. Diagnosis of diphtheria also needs determination of its toxigenicity by different in vivo and in vitro tests. Polymerase chain reaction probing of suspect organisms for DNA sequences coding for the toxin's A subunit has proved to be sensitive new method of diagnosis.

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