

*EPIDEMIOLOGY OF
DIPHTHERIA*

DEFINITION

- **Diphtheria is an acute infectious disease caused by toxigenic strains of *Corynebacterium diphtheriae*. 3 major clinical types have been described: anterior nasal, faucial & laryngeal; however the skin, conjunctiva, vulva & other parts of the body may be affected**



- **The bacilli multiply locally, usually in the throat & elaborate a powerful exotoxin which is responsible for:**
- **1. The formation of greyish or yellowish membrane commonly over the tonsils, pharynx or larynx, with well-defined edges & the membrane cannot be wiped away.**
- **2. Marked congestion, oedema or local tissue destruction.**
- **3. Enlargement of the regional lymph nodes.**
- **4. Signs and symptoms of toxaemia.**

PROBLEM STATEMENT

- **World:-** Diphtheria is a rare disease in most developed countries owing to routine children vaccination.
- Changes in life-style allows far less opportunity to maintain natural immunity, such as through frequent skin infection with *C. diphtheriae*.
- In developing countries the disease continues to be endemic due to lack of adequate widespread immunization.
- **India:-** Diphtheria is an endemic disease.
- The available retrospective data indicate a declining trend of diphtheria in the country.
- It is due to increasing coverage of child population by immunization.

AGENT FACTOR

- **Agent:-** The causative agent is *C. diphtheriae* which is a gram- positive, non-motile organism. It has no invasive power but produces a powerful exotoxin.
- 4 types of diphtheria bacilli are differentiated- *gravis*, *mitis*, *belfanti* & *intermedius*, all pathogenic to men.
- In general *gravis* infection tends to be more severe than *mitis* infection.
- **Source of infection:-** It may be a case or carrier.
- **Infective material:-** Nasopharyngeal secretions, discharges from skin lesions, contaminated fomites & possibly infected dust
- **Period of infectivity :-** Unless treated, it may vary from 14-28 days from the onset of the disease.

HOST FACTOR

- **Age:-** It particularly affects children aged 1 to 5
- In countries where widespread immunization is practiced, a shift in age incidence has been observed from preschool to school age.
- **Sex:-** Both sexes are equally affected
- **Immunity:-** Infants born of immune mothers are relatively immune during the first few weeks or months of life.
- Before artificial immunization, large proportion of population in developing countries were acquiring active immunity through inapparent infection which resulted in widespread production of antitoxin in the population

ENVIRONMENTAL FACTOR

- **Cases of diphtheria occur in all seasons, although winter months favour its spread.**

MODE OF TRANSMISSION

- **The disease is spread mainly by droplet infection.**
- **It can also be transmitted directly to susceptible person from infected cutaneous lesions.**
- **Transmission by objects contaminated by the nasopharyngeal secretions of the patient is possible, but for only short periods.**

PORTAL OF ENTRY

- **Most common is RESPIRATORY ROUTE.**
- **Non-respiratory route:-** The portal of entry sometimes may be the skin where cuts, wounds & ulcers not properly attended to, may get infected with diphtheria bacilli, & so is the umbilicus in the newborn.
- **Occasionally the site of implantation may be the eye, genitalia or middle ear.**

INCUBATION PERIOD

- **2 to 6 days , usually longer.**

CLINICAL FEATURES

- **Respiratory tract forms of diphtheria consist of pharyngotonsillar, laryngotracheal, nasal & combination thereof.**
- **Non- respiratory mucosal surface i.e., the conjunctiva & genitals may also be the site of infection.**

PHARYNGOTONSILLAR TYPE

- It has usually sore throat, difficulty in swallowing & low grade fever at presentation.
- Examination of throat may show mild erythema, localised exudate or a pseudo-membrane.
- Membrane may be localized or a patch of the posterior pharynx or tonsil, may cover the entire tonsil, or may spread to cover hard & soft palate & posterior portion of pharynx.



- **In the early stage pseudo-membrane may be whitish & may wipe off easily.**
- **The membrane may extend to become thick, blue-white to grey-black & adherent.**
- **Attempt to remove it results in bleeding.**
- **Patient with severe disease may have marked oedema over submandibular area along with lymphadenopathy giving a characteristic “bull-necked” appearance.**



Bull-necked appearance

LARYNGOTRACHEAL TYPE

- It is most often preceded by pharyngotonsillar disease, usually associated with fever, hoarseness & croupy cough at presentation.
- Initially it may be clinically indistinguishable from viral croup or epiglottitis.
- Prostration & dyspnoea soon follow because of the obstruction caused by membrane.
- Obstruction may even cause suffocation.



NASAL DIPHTHERIA

- **It is the mildest form of respiratory diphtheria, usually is localized to the septum or turbinates of one side of the nose**



CUTANEOUS DIPHTHERIA

- **It is common in tropical area.**
- **It often appears as a secondary infection of a previous skin abrasion or infection.**
- **The presenting lesion, often an ulcer, may be surrounded by erythema & covered with a membrane.**



PREVENTION

- **Immunization for diphtheria is to be done.**
- **It can be done by DPT vaccine i.e. for diphtheria , pertussis & tetanus.**
- **It is given 0.5ml intramuscularly.**
- **Now the PENTAVALENT vaccine is available which contain diphtheria, pertussis, tetanus, hepatitis-B and haemophilus influenza type-b.**
- **It is also given 0.5ml IM followed by booster doses of DPT.**
- **Diphtheria antitoxin prepared in horse serum is still the mainstay of passive prophylaxis.**

CONTROL

- **Early detection of a case.**
- **Isolation of suspected case or carrier for at least 14 days until proved free of infection.**
- **Treatment of diphtheria by diphtheria antitoxin IM or IV in doses ranging from 20,000 to 100,000 units or more.**
- **Community control can be done by active immunization.**

SOURCE

- **Park's Textbook of Preventive & Social Medicine → By K. Park (24th Edition)**



THANK YOU