

Information Consolidation Package on Diphtheria

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Abstract- *Diphtheria is a potentially fatal infection mostly caused by toxigenic Corynebacterium diphtheriae strains and occasionally by toxigenic C. ulcerans and C. pseudotuberculosis strains. Diphtheria is generally an acute respiratory infection, characterized by the formation of a pseudomembrane in the throat, but cutaneous infections are possible. Systemic effects, such as myocarditis and neuropathy, which are associated with increased fatality risk, are due to diphtheria toxin, an exotoxin produced by the pathogen that inhibits protein synthesis and causes cell death. Clinical diagnosis is confirmed by the isolation and identification of the causative Corynebacterium spp., usually by bacterial culture followed by enzymatic and toxin detection tests. Diphtheria can be treated with the timely administration of diphtheria antitoxin and antimicrobial therapy. Although effective vaccines are available, this disease has the potential to re-emerge in countries where the recommended vaccination programmes are not sustained, and increasing proportions of adults are becoming susceptible to diphtheria. Thousands of diphtheria cases are still reported annually from several countries in Asia and Africa, along with many outbreaks. Changes in the epidemiology of diphtheria have been reported worldwide. The prevalence of toxigenic Corynebacterium spp. highlights the need for proper clinical and epidemiological investigations to quickly identify and treat affected individuals, along with public health measures to prevent and contain the spread of this disease.*

Keywords- Diphtheria, Corynebacterium, Corynebacterium, Immunization, Terminological, Reconstitution, Metamorphosing, Treatment, Organisation, Requirements, Bacteria.

I. INTRODUCTION

Diphtheria is an acute, toxin-mediated, infectious disease caused by the bacterium *Corynebacterium diphtheriae*. Despite the Universal Immunization Programme of India, which offer 3 doses of the Diphtheria, Pertussis and Tetanus vaccine starting at 6 weeks of age followed by 2 booster doses at 18 months and between 54 and 72 months of age, there have been a number of reports of either re-emergence or persistence of diphtheria from several Indian states including

Assam in the last 5-10 years. The data on vaccine-preventable diseases provided by the

Government of India to the World Health Organization indicates persistence of diphtheria without much decline over the last 10 years. India alone accounted for 83.3% of the global burden of Diphtheria in 2014.

II. DEFINITIONAL ANALYSIS

1. Diphtheria is a potentially fatal, contagious disease that usually involves the nose, throat, and air passages but may also infect the skin. Its most striking feature is the formation of a grayish membrane covering the tonsils and upper part of the throat.
2. An infectious disease caused by the bacterium *Corynebacterium diphtheriae* and characterized by fever, swollen glands, and the formation of a membrane in the throat that prevents breathing. Infants are routinely vaccinated against diphtheria, which was once a common cause of death in children.
3. localized infection of mucous membranes or skin caused by toxigenic strains of *Corynebacterium diphtheriae*; it is characterized by the presence of a pseudomembrane at the site of infection; diphtheria toxin, produced by *C. diphtheriae*, can cause myocarditis, polyneuritis, and other systemic toxic effects.

III. WHAT IS DIPHTHERIA?

Diphtheria is now a rare bacterial infection in the US and most other countries thanks to the success of universal coverage with routine childhood vaccinations. Since the 1980s there have been no more than five cases of the infection in any one year in the US, and just one report of diphtheria in the last two decades.

IV. DIPHTHERIA INCIDENCE IN INDIA (2004-2014)

National Health Profiles data of Government of India (CBHI, 2011) showed that the number of reported cases of diphtheria in Assam increased from 894 (no death) in 2011 to 1450 (no death) during 2013 while seventeen deaths reported

out of 506 cases during the year 2014. Though frequent sporadic cases have been diagnosed in recent years, the last reported outbreak in Dibrugarh district of Assam was in 2009, where adults were primarily affected.

Here we report three outbreaks in two consecutive years in Dibrugarh district of Assam, India. Diphtheria outbreak locations, Dibrugarh district, Assam, India (Source: Google map).

V. WHAT ARE THE RISK FACTOR

moon in developing countries where immunization rates are low. In these countries, children under age 5 and people over age 60 are particularly at risk of getting diphtheria.

VI. WHAT IS DIPHTHERIA OVERVIEW

Diphtheria (dif-THEER-e-uh) is a serious bacterial infection usually affecting the mucous membranes of your nose and throat. Diphtheria typically causes a sore throat, fever, swollen glands and weakness. But the hallmark sign is a sheet of thick, gray material covering the back of your throat, which can block your airway, causing you to struggle for breath.

Diphtheria is extremely rare in the United States and other developed countries, thanks to widespread vaccination against the disease.

VII. ABOUT DIPHTHERIA

Diphtheria is a bacterial infection that spreads easily and occurs quickly. It mainly affects the nose and throat. Children under 5 and adults over 60 years old are particularly at risk for contracting the infection. People living in crowded or unclean conditions, those who aren't well nourished, and children and adults who don't have up-to-date immunizations are also at risk.

Diphtheria is very rare in the United States and Europe, where health officials have been immunizing children against it for decades. However, it's still common in developing countries where immunizations aren't given routinely. In 1993 and 1994, more than 50,000 cases were reported during a serious outbreak of diphtheria in countries of the former Soviet Union.

VIII. DIPHTHERIA: THE PLAGUE AMONG CHILDREN

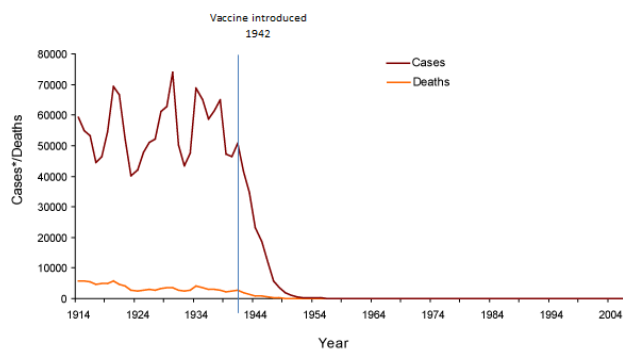
Diphtheria once was a major cause of illness and death among children. The United States recorded 206,000 cases of diphtheria in 1921, resulting in 15,520 deaths. Diphtheria death rates range from about 20% for those under age five and over age 40, to 5-10% for those aged 5-40 years. Death rates were likely higher before the 20th century. Diphtheria was the third leading cause of death in children in England and Wales in the 1930s. the introduction of effective immunization, starting in the 1920s, diphtheria rates have dropped dramatically in the United States and other countries that vaccinate widely. Between 2004 and 2008, no cases of diphtheria were recorded in the United States. However, the disease continues to play a role globally. In 2007, 4,190 cases of diphtheria were reported, which is likely an underestimate of the actual number of cases.

IX. TERMINOLOGICAL DEVELOPMENT OF DIPHTHERIA

In 1613, Spain experienced an epidemic of diphtheria. The year is known as "El Año de los Garrotillos" (The Year of Strangulations) in history of Spain. In 1735, a diphtheria epidemic swept through New England.

There was a constant circulation of military surgeons in the Prussian army through the Institute for Infectious Diseases, with staff drawn from the armies of all the federal states from the German Empire 22. The state-run scientific institutions were unable to work without the military surgeons like Emil Behring, Erich Wernicke or Dr. Weisser. Thus, for example, surgeon major Weisser was head of the bacteriological laboratory at the Imperial Health Office for several years 23. Moreover, Behring cooperated with hospitals and with the veterinary school in Berlin to get the necessary resources and information. Behring was not only excused military service and appointed to the Institute for Infectious Diseases in order to do research, he was also supported by Friedrich Althoff (1839-1908), Deputy Assistant Under-Secretary [Ministerialdirektor] in the Prussian Ministry for Cultural Affairs and financed by the Farbwerke Hoechst. In the next stage, the network between industry, state and science was enlarged.

Diphtheria cases* and deaths, England and Wales, 1914 – 2008



* notifications up to 1985, laboratory confirmed cases 1986-2008

Source: hpa.org.uk

X. SCOPE

Hib vaccine (lyophilised) for reconstitution with the DTPa-IPV vaccine (suspension). INFANRIX TM-IPV+Hib contains diphtheria toxoid, tetanus toxoid, three purified pertussis antigens pertussis toxoid (PT), filamentous hemagglutinin (FHA) and pertactin (PRN/69 kiloDalton outer membrane protein) adsorbed on aluminium salts. It contains three types of inactivated polio viruses (type 1: Mahoney strain; type 2: MEF-1 strain; type 3: Saukett strain) and contains purified polyribosyl-ribitol-phosphate capsular polysaccharide (PRP) of Haemophilus influenzae type b (Hib), covalently bound to tetanus toxoid. The diphtheria and tetanus toxoids obtained from cultures of Corynebacterium diphtheria and Clostridium tetani are inactivated and purified. The acellular pertussis vaccine components (PT, FHA and pertactin) are prepared by growing phase I Bordetella pertussis from which the PT, FHA and pertactin are extracted, purified and treated with formaldehyde: PT is irreversibly inactivated.

The three polioviruses are cultivated on a continuous VERO cell line, purified and inactivated with formaldehyde. The Hib polysaccharide is prepared from Haemophilus influenzae type b, strain 20,752 and is coupled to tetanus toxoid. After purification the conjugate is lyophilised in the presence of lactose as stabiliser. INFANRIX TM-IPV+Hib meets the World Health Organisation requirements for the manufacture of biological substances, of diphtheria, tetanus, pertussis and combined vaccines, of inactivated poliomyelitis vaccines and Hib conjugate vaccines. A 0.5 ml dose of vaccine contains not less than 30 International Units (IU) of adsorbed diphtheria toxoid, not less than 40 IU of adsorbed tetanus toxoid, 25 µg of PT, 25 µg of FHA, 8 µg of pertactin, 40 D antigen units of type 1 (Mahoney), 8 D antigen units of type 2 (MEF-1) and 32 D antigen units of type 3 (Saukett) of the polio virus. It also contains 10 µg of purified capsular polysaccharide of Hib covalently bound to approximately 30 µg tetanus toxoid.

XI. DIVISION & SUBDIVISION

Bacteria

- 1) Gram positive
- 2) Gram negative
- 3) Gram mean
- 1) Gram positive
- A) Actino bacteria
- B) Imicator
- C) Teneri cuter
- A) Actino bacteria
- a) Adino bacteria teridea
- b) Rubro bacteria
- c) Sermo leophilia
- d) Corio bacteria
- e) acidinari crab bacteria
- f) Natrili ruptania
- a) Adino bacteria teridea
- 1) Actinomy cetaler
- 2) bifidi bacterieler
- 1) Actinomy cetaler
- k) Coryne bacterian
- l) Coryne bacterium
- m) Coryne diphtheria
- 1) Coryne diphtheria
- 2) Coryne diphtheria intermedias
- 3) Coryne diphtheria gravis
- 4) Coryne diphtheria belpanthi

XII. CLASSIFICATORY TREATMENT

This Section is intended to take note of how the subject concerned and its divisions and subdivisions are treated by different schemes of classification. The first point of by different classificationists. Diphtheria is the disease of diphtheria. So the place of interest is to find out the rank of the subject in the whole universe of subject, as recognized.

- Diphtheria as recognized by most of the classificationists is:
 - Universe of subjects
 - Technology (Applied Sciences)
 - Medical Sciences, Medicine
 - Diseases

12.1. Treatment of Diphtheria

616.931	3	Diphtheria
616.931		Bacillary Diseases
616.931		Bacillary Diseases, dysentery , Protozoa.
616.9		Other diseases
610		Medicine
600		Technology applied sciences

XIII. JOURNALS

Sr.no	Journal name	ISSN	print	Publishar
1	European Journal of Clinical Microbiology and Infectious Diseases, Irish Journal of Medical Science	1435-437	0934-9723	Springer-Verlag
2		0021-1265		Springer London
3	Reactions Weekly	1179-2051	0114-9954	Springer International Publishing
4	The Indian Journal of Pediatrics	0973-7693	0019-5456	Springer India
5	European Journal of Epidemiology	1573-7284	0393-2990	Kluwer Academic Publishers
6	Cancer Immunology, Immunotherapy	1432-0851	0340-7004	Springer-Verlag Springer
7	Pediatric Drugs,	1179-2019	1174- 5878	Springer International Publishing
8	Retrovirology	1742-4690		BioMed Central
9	Drugs,	1179-1950	0012-6667	Springer International Publishing Kluwer Academic Publishers-Plenum
10	Pharmaceutical Research	1573-904X	0724-8741	Publishers
11	Transgenic Research	1573-9368	0962-8819	Kluwer Academic Publishers, Springer International Publishing
12	Immunity & Ageing	1179-1950	0012-6667	Springer International Publishing
13	The Journal of Membrane Biology	1432-1424	0022-2631	Springer-Verlag
14	Journal for ImmunoTherapy of Cancer	2051-1426		BioMed Central
15	Journal of Clinical Immunology	1573-2592	0271-9142	Springer US Kluwer Academic Publishers-Plenum Publishers
16	Bulletin of Experimental Biology and Medicine Irish Journal of Medical Science	1573-8221	0007-4888,	
17		0021-1265		Springer London
18	Experientia	1420-9071	0014-4754,	Birkhäuser-Verlag
19	Journal of Cancer Research and Clinical Oncology	1432-1335	0171-5216	Springer-Verlag
20	Biomolecular NMR Assignments		1874-2718 , 1874-270X	Springer Netherlands
21	Antonie van Leeuwenhoek	1572-9699	0003-6072,	Kluwer Academic Publishers

22	Experientia	1420-9071	0014-4754,	Birkhäuser-Verlag
23	Journal of Medical Case Reports	1752-1947		BioMed Central
24	Journal of General Internal Medicine	1525-1497	0884-8734	Springer-Verlag
25	Journal of Biosciences	0973-7138	0250-5991	Springer India
26	Biomolecular NMR Assignments	1874-270X	1874-2718	Springer Netherlands Kluwer Academic Publishers
27	Journal of Biomolecular NMR	1573-5001	0925-2738	
28	Infection	1439-0973	0300-8126	Urban & Vogel
29	Pediatric Radiology	1432-1998	0301-0449	Springer-Verlag
30	Reactions Weekly	1179-2051	114-9954,	Springer International Publishing

IVX. CONCLUSION

Diphtheria are common, costly and easily diagnosed if the proper criteria are applied. Although the exact cause of diphtheria is still elusive, theories regarding their pathophysiology are useful in understanding some of the symptoms and response to treatment. Individualized selection of a treatment plan should result in successful management of diphtheria for most patients.

diphtheria treatment has been described over the centuries (even millennia!). Their writings, from ancient times to the present, mirror the evolution of scientific thought, with diphtheria metamorphosing from a disease attributed to supernatural causes to a molecular disorder. With this long history, notwithstanding, it is extremely surprising that effective anti diphtheria drugs had been, until very recently, limited in number. Indeed, in comparison to other areas of pharmacology, the therapeutic approaches to diphtheria have advanced minimally over the past 100 years. Fortunately, in the last decades, there have been big steps in understanding the pathophysiology of diphtheria and in the development of antimigraine drugs. Evidently, new approaches need to be explored (e.g. drugs that inhibit the trigemino-vascular system) in order to obtain selective drugs with less cardiovascular adverse effects.

REFERENCES

- [1] <https://www.google.co.in/#q=diphtheria+definition>. Data retrieval on 13/12 Symptoms(2016)
- [2] <http://www.healthofchildren.com/D/Diphtheria.html> Data retrieval on 18/12 Word Origin and History for diphtheria (2016) <http://www.dictionary.com/browse/diphtheria> Data retrieval on 22/12 Epidemiology, Symptoms(2017) <http://www.fpnotebook.com/ent/mouth/Dphthr.htm> 3/1
- [3] History (2017)

- [4] <https://www.apollohospitals.com/patient-care/health-lifesty/diseases- and conditions>
- [5] /diphtheria
<http://www.fpnotebook.com/ent/mouth/Dphthr.htm> 7/
- [6] History (2017)
<http://www.healthcentral.com/encyclopedia/hc/diphtheria> 11/1 Doctors(2017)
<http://www.netdoctor.co.uk/conditions/infections/a5684/diphtheria> 13/1 Theories of Diphtheria(2017)
http://www.medicalnewstoday.com/articles/159534.php#what_is_diphtheria 14/1What is the difference between a symptom and a sign(2017)
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2284310> (17/1)
<http://www.sciencedirect.com/science/article/pii/S0140673601181018>(19/1) Types of Diphtheria (21/1)
<http://www.victorianweb.org/victorian/science/biology/bacteriology/klebs.html> Theories of Diphtheria (2017)
- [7] https://en.wikipedia.org/wiki/Paul_Ehrlich 23/1Rachel Osborne (25/1)
- [8] <http://www.sciencedirect.com/science/article/pii/S0163445389920392> 2 Virulence Factors(2017)
http://www.encyclopedia.com/media/educational-30/1magazines/diphtheriaScope_and_Distribution (2017)
<http://www.healthline.com/health/diphtheria>. (1/2)
- [9] <http://www.mayoclinic.org/diseases-conditions/diphtheria/symptoms-causes/dxc-20300514>(2/2)
- [10] <http://www.immunize.org/catg.d/p4203.pdf> (4/2)hospital(2017)
- [11] <http://www.healthcentral.com/encyclopedia/hc/diphtheria-3168726/>(16/2) Symptoms,(2017)
- [12] <https://medlineplus.gov/ency/article/001608.htm>(20/2)
- [13] How Is Diphtheria Diagnosed (2017)
http://www.medicalnewstoday.com/articles/159534.php#what_is_diphtheria (22/2)Skin (cutaneous) diphtheria(2017)
<http://www.immunize.org/catg.d/p4203.pdf> (25/2)
- [14] Causes (27/2)