

# Journal of Pediatric Sciences

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Journal of Pediatric Sciences 2013;5:e188

**How to cite this article:**

**Kumar R, Kumar P, Prajapati NC, Kumar D, Goyal A, Abbas J, Vijayran M.  
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# Diphtheria: Is it really OUT?

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## Abstract:

**Objective:** To study the clinical spectrum of presentation in children admitted with suspected diphtheria. **Material and Methods:** Case records of 115 cases with suspected diphtheria admitted from April 2009 to October 2011 in the Department of Paediatrics S N Medical College, Agra were analysed. A working Performa was designed to include the clinical presentation, investigation findings, immunization status and outcome of the treatment. **Results:** Majority of cases 99/115 (86.09%) had acute presentation with characteristic gray-white membrane, rest 16/115 (13.9%) had late presentation. The acute presentation was on an average after 48-96 hours of onset of illness. Sites of membrane were - pharyngotonsillar in 71(71.71%), pharyngolaryngeal in 20(20.20%) and nasal in 8(8.08%). Sore throat, dysphagia, bull neck, cervical lymphadenopathy, respiratory distress and hoarsness of voice was present in 91(91.92%), 64(64.64%), 54(54.54%), 50(50.5%), 34 (34.34%) and 28 (28.28%) cases respectively. Only 6% cases received DPT doses appropriate for age, 2% were partially immunised and 92% cases were unimmunised. Confirmation of diphtheria microbiologically (KLB on peripheral smear) was observed in 11/99 (11.11%) of those having acute presentation. The clinical presentation and outcome of both KLB positive and KLB negative patients was almost similar. Sixteen cases who presented late, presented with neurological and/ or cardiac complications. All of them had history of fever, sore throat, dysphagia 2 to 4 weeks prior to onset of these complications. Their presentation was palatal palsy, palpitation and polyneuropathy in 16(100%), 7(43.75%) and 1(6.25%) cases respectively. None of these cases were fully immunised with DPT, 25% cases were partially immunised and 75% cases were unimmunised. **Conclusion:** Diphtheria is the first differential diagnosis in patients presenting with membranous tonsillopharyngitis. The present study clearly depicts that diphtheria is still not a lost entity. There is a need to have high index of suspicion for diphtheria in cases presenting with membranous tonsillopharyngitis. Poor routine immunization is probably the reason and need to be strengthened.

**Keywords:** Diphtheria, Vaccine preventable diseases

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## Introduction

Diphtheria is a localised infection of mucous membranes or skin caused by *Corynebacterium diphtheriae* and is usually associated with a characteristic pseudo-membrane at the site of infection. Some strains of *C. diphtheriae* produce diphtheria toxin, a protein that can cause myocarditis, polyneuropathy, and other systemic toxic effects.

The disease associated with high morbidity and mortality can be prevented by vaccination. Since the implementation of expanded program on immunization in 1978 there is a drastic decline in vaccine preventable disease including diphtheria.

Centre for Disease Control and Prevention (CDC 2010) (1) defines diphtheria as-

(a) Probable: In the absence of a more likely diagnosis, an upper respiratory tract illness with

- an adherent membrane of the nose, pharynx, tonsils, or larynx; and
- absence of laboratory confirmation; and
- lack of epidemiologic linkage to a laboratory confirmed case of diphtheria.

(b) Confirmed: An upper respiratory tract illness with an adherent membrane of the nose, pharynx, tonsils, or larynx; and any of the following:

- isolation of *Corynebacterium diphtheriae* from the nose or throat; or
- histopathologic diagnosis of diphtheria; or
- epidemiologic linkage to a laboratory confirmed case of diphtheria.

Recently there was sudden increase in children presenting with suspected diagnosis of diphtheria from Agra and neighbouring areas. The present study is a retrospective analysis of the case record of patients admitted with suspected diphtheria in order to understand the presentation and treatment outcome.

### Material and Methods:

Case records of all cases admitted with suspected diphtheria from April 2009 to October 2011 in the Department of Paediatrics S N Medical College, Agra were analysed. A working performa was designed to include the clinical presentation, investigation findings, immunization status and outcome of the treatment.

A total of 115 cases of suspected diphtheria were admitted in the study period. Diagnosis was made clinically and all cases were investigated (throat swab for KLB microscopic examination and culture sensitivity). Details of clinical presentation, investigation findings, immunization status and treatment outcome were recorded.

### Results:

A total of 115 cases were admitted in Department of Paediatrics S N Medical College Agra from April 2009 to October 2011. Out of total 115 cases 64 (55.65%) were male and 51 (44.35%) were female. Most common age group affected was between 1-5 years constituting 65 (56.52%) followed by 44 (38.26%), 5(4.34%) and 1 (0.86%) in the age groups of >5 years, 6 month - 1yr and <6 month respectively. Majority 99 (86.09%) cases presented with acute febrile illness with characteristic gray-

white membrane, while rest 16 (13.91%) patient presented with neurological and/or cardiac complication. Among acute cases 71 (71.71%) of pharyngotonsillar, 20 (20.20%) of pharyngolaryngeal and 8 (8.08%) of nasal involvement were seen. The clinical profile of acute cases is presented in Table 1.

**Table 1. Clinical presentation in acute cases.**

Clinical presentation	n	%
Fever	99	100
Sore throat	91	91.92
Toxic look	82	82.82
Nasal discharge with nasal obstruction	8	8.08
Dysphagia	64	64.64
Hoarseness of voice	28	28.28
Respiratory distress	34	34.34
Cervical lymphadenopathy	50	50.5
Presence of pseudomembrane	99	100
Neck swelling(bull neck)	54	54.54
Abnormal PR/HR rhythm	5	5.05

Only 6% cases received DPT doses appropriate for age, 2% were partially immunised and 92% cases were unimmunised. The acute cases presented to hospital within 48 to 96 hours of onset of illness. 11/99 (11.11%) of acute cases were positive for KLB. Culture and histopathology was negative in all cases. All acute cases treated with standard treatment protocols - antidiphtheritic serum and crystalline penicillin. Tracheostomy was done in 20 (20.20%) cases of pharyngolaryngeal diphtheria presented with severe respiratory distress. Out of 99 acute cases, 48 (48.48%) cases improved, 32 (32.32%) cases Left against medical advice and 24 (24.24%) patients expired. Mortality was mostly seen in patients of pharyngolaryngeal diphtheria.

Sixteen cases out of 115 cases had presented with complications. All of them had features of palatal palsy (coughing and choking associated with swallowing), seven cases (6.08%) had abnormal ECG, 1(0.87%) had polyneuropathy. All complicated cases had history of fever, neck swelling, dysphagia, hoarseness of voice in the past. None of these cases were fully immunised with DPT, 25% cases were partially immunised and 75% cases were unimmunized. They were treated symptomatically and conservatively. 11 (68.75%) improved and discharged, 2 (12.5%) cases left against medical

**Table 2. Clinical presentation in complicated cases**

Cases	n	%
H/o fever ,sore throat, dysphagia, cervical swelling 2-4 week before Admission	16	100
Nasal voice	11	68.75
Nasal regurgitation	13	81.25
Coughing/choking associated with swallowing	16	100
Irregular PR/HR rhythm	8	50
Bradycardia	2	12.5
Tachycardia	6	37.5
Irregular respiratory rhythm	1	6.25
Hypotension	2	12.5
Weakness in limbs(all)	1	6.25
Signs and symptoms of CNS & other diseases	0	0.0

advice and 3 (18.75%) cases expired. Clinical features of complicated cases given in Table 2.

## Discussion

Diphtheria was a prevalent and leading cause of morbidity and mortality in prevaccination era (2, 3). Since the implementation of expanded programme on immunisation (EPI) in 1978 and universal immunisation programme (UIP) in 1985 there was a considerable drop in diphtheria cases (4). The reported incidence of diphtheria in India during 1980 was about 39,231, it reduced to 5685 cases in 1985. In the year 2012 the incidence of diphtheria was 2525 (5).

A sudden upsurge in diphtheria like cases is a cause of concern. Cases have also been reported from the other parts of the country (6-8) and world (2, 3, 9). Tanu et al. observed 10 cases of diphtheria from September to October 1999 (6), R Nandi et al. (7) observed 101 cases of diphtheria over a period of five years (March 1997-March 2002) and Sailaja et al. observed 2685 cases of diphtheria from 2003-2006 in Hyderabad (8).

Poor routine immunization as observed in this study is consistent with poor routine immunization status in the state and the country. Children aged 12-23 months who have received 3 doses of DPT vaccine in India are 55.3 % (10) and 30% in Uttar Pradesh (11). The complete routine immunization of children aged

12-23 months in district Agra is 23.2 % and that of 3 doses of DPT is 25.3% (12).

Clinical presentation as observed in this study is no way different from observations from the other parts of the country. N C Sharma et al reported 71.8 percent pharyngeal, 20.9 per cent nasopharyngeal and rest 7.3 per cent nasal diphtheria cases (13).

Mortality in the cases was high as observed by J Singh et al (1997) who reported that out of 143 clinically suspected diphtheria cases 45 (32%) died (14). The mortality still remains high. Diagnosis and treatment facility can add very little to the outcome. The cases and mortality reported is only a tip of the iceberg and not a true reflection of community figures as it is a hospital based study.

The study highlights that diphtheria still remains an important entity associated with high morbidity and mortality. High index of clinical suspicion for management and improvement in immunisation against diphtheria are the key factors for prevention.

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