

A LOCALIZED OUTBREAK OF DIPHTHERIA IN ELAZIG, EASTERN ANATOLIA

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INTRODUCTION

With effective programmes of immunization, diphtheria has become an uncommon disease in western developed countries during the last fifty years (4,5,12). But it still continues to be one of the major public health problems in developing countries like Turkey, India, Afghanistan and Jordan (9,10,15,17). Since widespread routine immunization campaigns have recently started in Turkey (8), diphtheria is seen as sporadic cases and small outbreaks (9). However, five patients with diphtheria were admitted to our hospital in December 1987 and we have decided to report this localized outbreak.

MATERIAL AND METHODS

During the one-month period from December 1, 1987 to December 31, 1987, 5 patients were suspected of having diphtheria on clinical grounds. All cases came from the same primary school.

Since direct smear examination of greyish-white membrane which was prepared for Gram or Neisser's stain proved to be unreliable, throat swabs were also cultured on blood agar, Loeffler's and tellurite agar media in all cases. Serum tellurite medium, broth medium and biochemical studies were used for identification of *Corynebacterium diphtheria* strain. Toxinogenicity was tested by in vitro Elek plate. A detailed history of immunization status, close contacts and symptoms were recorded. Findings were reviewed and analysed.

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Patients were isolated in the hospital and at their homes for different periods according to the seriousness of each case. During these periods they were appropriately treated for diphtheria.

COURSE OF OUTBREAK

CASE 1 : On December 1, 1987, a ten-year-old boy attended the pediatric outpatient clinic of the Research Hospital with a seven-day history of fever, sore throat and respiratory difficulty. He had received no immunizations. Physical examination revealed an acutely ill child with typical thick greyish-white tonsillar membrane and evidence of severe laryngotracheal obstruction. In direct smear examination of diphtheric membrane, diphtheria-like organisms were seen. Toxinogenic *C. diphtheria*, *intermedius* type was identified. During the period of second and third hospital week he developed neurological complications (such as polyneuritis, paralysis of palate, diaphragm and lateral rectus) and clinical and electrocardiographic signs of myocarditis. Treatment consisted of emergency tracheostomy, 40.000 units of diphtheria antitoxin, penicillin, digitalization, sedation, strict bedrest and supportive care. Thereafter, he recovered, slowly.

CASE 2 : On December 7, 1987, an eleven-year-old male friend of CASE 1 from a different class of the same school was admitted to hospital with a five-day history of nausea, fever and sore throat. He had received two injections of primary immunization while he was an infant. The child with membranous tonsillitis was accepted as a moderate clinical case of diphtheria. Toxinogenic *C. diphtheria intermedius* was isolated from throat swab culture. Auscultation of the heart and ECG findings were within normal limits. He had no neurological complications. He was treated with 20.000 units of diphtheria antitoxin, penicillin and supportive care.

CASE 3 : On December 15, 1987, an eight-years-old girl from the same class of school as CASE 1 was admitted to our pediatric unit with a week-old history of sore throat. Vaccination status of the child with slight membranous tonsillitis and positive throat swab could not be definitely determined. In addition to toxinogenic *C. diphtheria intermedius*, group A beta hemolytic streptococci, grew at her swab culture. According to physical and laboratory findings, she was a mild clinical case without evidence of myocarditis and neurological complications. Treatment consisted of 20.000 units of diphtheria antitoxin and penicillin.

CASE 4 : A twelve-year-old unimmunized boy from the same school was admitted to hospital on December 28, 1987, with a history of fever and sore throat of 3 days' duration. From his membranous tonsillitis, direct smear examination and throat swab culture proved to be positive for. Cardiac and neurological complications were not detected. He was corynebacteriae treated with 20.000 units of diphtheria antitoxin and penicillin.

CASE 5 : A ten-year-old girl from the same school was admitted to hospital on December 28, 1987, with a history of fever and sore throat of 3 days' duration. She had received two injections of primary immunization during her infancy. The child was mildly ill with membranous tonsillitis. She was also simultaneously infected by *C. diphtheria intermedius* and group A beta hemolytic streptococci. Signs of cardiac and neurological complications were absent. Treatment consisted of 20.000 units of diphtheria antitoxin and penicillin.

DISCUSSION

Diphtheria is a life-threatening infectious disease with obstruction of upper respiratory tract if community immunization, early diagnosis and rapid treatment are not accomplished, especially in developing countries. Eighty percent of cases occur in unimmunized individuals under 15 years of age (7). The incidence is highest among lower socioeconomic groups in crowded conditions in winter months (7,15,17).

In accordance with other reports (1,2,3,6,9,14,17), this localized outbreak was seen in the winter month of December and all of the cases were under 15 years of age. There was a history of close contact in all patients, as they all attended the same school. None of the cases had received complete immunization.

The clinical findings and complications of diphtheria were similar to descriptions of standart textbook (7) and of several other reports (1,2,11,13,14,15,16,17). They were characterized by fever, nausea, sore throat, membranous tonsillitis, laryngotracheal myocarditis and neurological manifestations.

Because we rapidly isolated and treated the patients in the hospital and at their homes until they were free of infection and made a field survey at the affected area (the results of the field survey will be reported in a separate article) the outbreak was restricted at the

source of infection. There after, an intensive immunization campaign was started in the same primary school.

As a result, we strongly believe that in the control of diphtheria, satisfactory community vaccination and rapid control of an outbreak by prompt treatment of carriers (who can be detected with afield survey) and cases are very important and effective.

Table 1 : Summary of cases

Case	AGE		Sex	Severity	Vaccination		Complications	Outcome
	yr.				Status	Therapy		
CASE 1	10	Male	Severe	Nil	Nil	1. 40000 ümits of antitoxin 2. Penicillin for 20 days 3. Emergency tracheostomy 4. Digitalization, sedation 5. Strict bed-rest	1. Respiratory obstruction 2. Myocarditis 3. Neurological camp.	Recovery
CASE 2	11	Male	Moderate	Partial	Partial	1. 20000 ümits of antitoxin 2. Penicillin for 10 days	—	Recovery
CASE 3	8	Female	Mild	?	?	1. 20000 ümits of antitoxin 2. Penicillin for 10 days	—	Recovery
CASE 4	12	Male	Mild	Nil	Nil	1. 20000 ümits of antitoxin 2. Penicillin for 10 days	—	Recovery
CASE 5	10	Female	Mild	Partial	Partial	1. 20000 ümits of antitoxin 2. Penicillin for 10 days	—	Recovery

ÖZET

Aralık 1987 tarihinde, bir aylık süre içinde Elazığ'da yerel bir difteri salgını olmuştur. Aynı ilkokuldan beş çocuk etkilendi. Bu çocukların hiç birisine yeterli dozda karma aşı yapılmamıştı. Mikrobiyolojik incelemeler sonucunda *Corynebacterium diphtheria intermedius* suşları elde edildi. Tanı konulan ilk hastaya larinkotrakeal obstrüksiyon nedeniyle acil trakeostomi uygulandı ve aynı çocuk kardiyak ve nörolojik komplikasyonlar geliştirdi. Diğer dört çocuk hafif ve orta klinik olgular olarak kabul edildiler ve herhangi bir komplikasyon geliştirmediler. Tüm olgular hastanede izole edildiler ve difteri antitoksini, penisilin ve diğer destekleyici yöntemlerle tedavileri yapıldı.

ABSTRACT

A localized outbreak of diphtheria in Elazığ, Eastern Anatolia

During the one-month period of December 1987, a localized outbreak of diphtheria occurred in Elazığ. Five children who attended the same primary school were affected. None of the children had received complete immunization. Toxinogenic *Corynebacterium diphtheria intermedius* strains were identified. The first patient with laryngotracheal obstruction was subjected to emergency tracheostomy. He also had cardiac and neurological complications. The other 4 patients were accepted as mild and moderate clinical cases and didn't develop any diphtheritic complications. The cases were isolated in hospital, where diphtheria antitoxin and penicillin were administered.

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