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DIPHTHERIA IN COPENHAGEN

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EPI-NEWS is appearing earlier than planned, because of the finding of diphtheria in a Copenhagen family.

An 18-year-old man with a 3-day history of sore throat was admitted to hospital on 23rd December 1998, with severe oedema of the neck, necrotizing tonsillitis and grey membranes of the lower pharynx and larynx. Diphtheria or necrotizing pharyngitis due to haemolytic streptococci was suspected, and treatment with antibiotics and diphtheria antitoxin was started. Toxin-producing *Corynebacterium diphtheriae* was demonstrated on 27th December. The patient's 23-year-old sister had died on 7th December. Her illness had started as a sore throat some two weeks earlier. She was treated with antibiotics by the general practitioner after a rapid test had shown group A haemolytic streptococci. She was admitted to hospital on 6th December and died the next day with multi-organ failure, including heart failure due to myocarditis. Serum taken on 7th December subsequently showed a high content of diphtheria antitoxin. The mother stated that her daughter had never been vaccinated because of brain damage following meningitis at the age of three months, which was confirmed by determination of tetanus antitoxin. The son is thought to have followed the usual childhood vaccination programme, comprising three Di-Te-Pol vaccinations, but no documentation of this is available. Neither of the two patients, nor their family, had recently been abroad.

Actions taken

The following measures were instituted on 28th and 29th December: Family members and close contacts were informed of symptoms, had throat swabs taken, were given antibiotics (Zitromax® 500 mg x 1 for 3 days for adults) and were vaccinated if they had not been revaccinated within the last year. In addition, microbiology departments throughout the country were informed, as were infectious diseases and ENT departments, medical officers of health and the medical on-call system in the Copenhagen area. General measures have not been introduced.

Transmission

Diphtheria is spread by droplet infection and transmission requires

close contact. Infection from e.g. eating utensils may occur.

An outbreak of diphtheria in Sweden, which began in Gothenburg in 1984, comprised 17 cases of clinical diphtheria, with three deaths, as well as 65 carriers found among about 10,000 persons tested. Both healthy carriers and convalescent patients may remain infectious for many months. The incubation period is reckoned to be 2-5 days, but may be longer.

Symptoms and signs

Classic diphtheria is characterized by symptoms of throat infection of sudden onset, with exudates and a mild fever. The exudates may just be a small spot on one tonsil, or may involve both tonsils, uvula, soft palate and pharyngeal wall. They are grey-white, adherent and membranous, and attempts to remove them cause mucosal bleeding. Cervical lymph nodes are often enlarged and oedema of the neck may occur in serious cases. The larynx may also be affected. Nasal diphtheria may produce blood-stained secretions.

Diphtheria may also be non-respiratory and affect wounds, conjunctivae, eyes and genitalia. Myocarditis may appear during the 2nd week and symptoms from other organs during the 2nd to 6th week. A neuritis is typically seen, which may cause paralysis of the soft palate. The mortality is 5-10%, depending on how quickly treatment is started.

Investigation

Examination for *C. diphtheriae* is by taking charcoal swabs from the nasopharynx, tonsils and larynx, or from any exudates, and sending these in Stuart's medium to the local clinical microbiology department. The request form should state clearly that the specimen should be examined for diphtheria.

Comments

It must be regarded as overwhelmingly probable that the sister died of diphtheria, which took an especially violent course because she had never been vaccinated. The brother had been partially protected by his childhood vaccinations, but had presumably suffered a massive exposure. It is worth noting that no family members or close contacts had been abroad. It is not known how the sister was infected, nor, therefore,

when the infection was brought to Denmark. About 3 weeks elapsed between the two illnesses; this is longer than the usually stated incubation period, but could be due to either partial protection from vaccination or transmission via a third person. The last single case of diphtheria in Denmark occurred in 1985 in an incompletely vaccinated 8-year-old girl, who died. How she was infected was never ascertained, but the major outbreak of diphtheria in Gothenburg took place at about the same time. Diphtheria vaccination was introduced in Denmark in the 40's and entered the childhood vaccination programme in 1950. This programme has kept the population largely free from diphtheria. In 1996 the following measures were instituted in Denmark in connection with diphtheria outbreaks in the former Soviet Union:

- Di-Te revaccination for 5-year-olds
- Use of a combined Di-Te vaccine in wound treatment
- Revaccination with Di-Te vaccine for foreign travel.

In recent years, Danish population studies have shown a relatively low specific immunity against diphtheria, especially in middle-aged women. Other western countries have found similarly low antibody levels in older age groups; this has not given rise to epidemics, although isolated cases have been seen. It must be assumed that the population immunity preventing any actual development of an epidemic in the country is sufficiently high, not least because of the revaccination recommendations. Since 1996 about 300,000 Di-Te revaccination doses have been issued per year. The two present cases illustrate the importance of observing the current vaccination recommendations and maintaining vigilance to rapidly diagnose and treat any new cases. Suspected diphtheria is statutorily notifiable, both by telephone and on form 1507. The notification requirement also applies to mere clinical suspicion, and in this case it is the characteristic membranous exudate that should trigger notification.

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