

Anaphylactic shock occurring outside hospitals

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In a retrospective study, all cases of anaphylactic shock (AS) occurring in a hospital catchment area during a 13-year period were analysed. Twenty cases were found, giving an incidence of 3.2 cases per 100,000 inhabitants per year, and one patient died. The precipitating agents were penicillin (7 cases), aspirin (3), food (2), and bee or wasp sting (8). The drugs had all been given orally. Penicillin-related AS was much commoner than its incidence reported by the Danish national health authorities. In three cases, previous anaphylactic reactions had occurred to the agent in question. We concluded that AS rarely occurs outside hospital, but that oral penicillin is a more important cause than was previously thought. Many recurring episodes of AS should be preventable, since hypersensitivity tests for both penicillin and hymenoptera venoms are available, and hyposensitization with respect to the latter is feasible.

Key words: anaphylaxis; epidemiology; prognosis.

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Anaphylactic shock (AS) is caused either by acute hypersensitivity or by non-IgE mediated mast cell mediator liberation (7). Both mechanisms produce the same clinical picture, which includes anxiety, palpitations, urticaria, respiratory distress, and cardiovascular collapse (2).

AS occurring outside hospitals has only rarely been investigated, and the present retrospective study aims at describing AS in a geographically defined area, with particular regard to epidemiology, aetiology, clinical features, and prognosis.

PATIENTS AND METHODS

During a 13-year period (1 Jan 1973-31 Dec 1985), all patients who, on the basis of anamnesis and physical examination, were diagnosed at the Medical Department, Thisted Hospital, Denmark, and by the investigators as having AS were included in the study. The hospital records of all patients discharged with a diagnosis of *collapsus anaphylacticus* were studied. Data on age, sex, precipitating agent, mode of

administration, previous exposure, previous allergic disease, clinical picture and course were analysed. In addition, records were examined of patients discharged with a diagnosis of allergic and toxic reactions, adverse reactions to drugs, and shock not caused by cardiovascular disease or trauma. The department used the WHO classification for coding diagnosis (ICD-codes). Information on patients who died from AS within the well-defined area covered by the hospital was obtained from the national health authorities (National Registry of Deaths). During the study period the population of this area was constant at about 48,500.

RESULTS

Twenty patients were included, 13 males and 7 females (median age, 49 years; range 29-77 years; sex difference not significant). Nineteen patients were admitted to hospital, while one died from AS before admission. No patient was admitted more than once. The 19 patients survived without sequelae. The incidence of AS

was thus 3.2 per 100,000 inhabitants per year (95 % confidence limits: 1.9–4.9), and the calculated mortality rate was 5 per 100 cases (95 % confidence limits: 0.1–24.9).

The precipitating agents were drugs in 10 patients, food in two, and insect stings in eight (one of whom died from AS). The responsible drug was penicillin in seven patients, and aspirin in the remaining three. In two of these last cases it was doubtful which drug was the precipitating agent, since aspirin was administered together with other drugs. In all cases the drugs were administered orally. Celery and shrimps caused the two cases of food-induced AS, while bees and wasps were responsible for the eight insect stings. The single death was caused by a bee sting.

Table 1 shows the frequency of AS-related symptoms and signs at admission. In 11 cases the first symptoms occurred within 5 min of exposure, in two between 5–15 min after exposure, and in four more than 15 min later, with a maximal time from exposure to occurrence of symptoms of 2 h. Time of onset was not recorded in the remaining three patients. Only one patient had a history of atopic disease, while 15 had previously been in contact with the precipitating agent. Three of these last mentioned patients had had one or more anaphylactic reactions to the precipitating agent (one each to aspirin, shrimps, and bee sting). No history of allergy was obtained in the patient who died.

The recorded diagnoses at discharge were as follows: *collapsus anaphylacticus*, 12; bee sting, 5; allergy, 1; non-traumatic shock, 1; complications from medication, 1. These different diagnosis were not due to disagreement about the

diagnosis of AS between the department and the investigators, but to wrong recording of the diagnosis at discharge. None of the drug-induced cases were reported by the department to the national health authorities (Adverse Drug Reaction Board).

DISCUSSION

Since AS is usually serious enough to warrant hospitalization, the incidence found in our study may well correspond to the true incidence, even though patients suffering a sudden unwitnessed death may have escaped the investigation. An incidence calculated from the discharge diagnoses, however, would have led to a gross underestimation, since only 12 of 20 cases were coded correctly. This must be taken into account in the evaluation of investigations based on other registers employing the ICD-codes, as for instance the national register of hospitalized patients. The diagnosis of AS is clinical, and as such subject to error, but the fact that the symptomatology (Table 1) and interval from exposure to appearance of first symptoms of the patients in our study were similar to those in other AS studies indicates that the inclusion criteria employed were relevant. In the two patients without cardiovascular shock on admission, the diagnosis was based on the occurrence of fainting, gastrointestinal symptoms, and urticaria. The preponderance of males, though not significant, corresponds to findings in other studies (2, 5). The reason for this sex difference is unknown. As in other studies, there were few children and young people with AS, which in cases of immune-mediated AS, could be explained by the shorter exposure period (5). Atopic disease (only one case in this study) has been found with varying prevalence by previous workers (6).

The finding that three cases of AS were due to intake of aspirin was not surprising (6), and it was not unexpected that penicillin was the most common cause of AS due to drug intake (4). However, in the whole of Denmark from 1969 to 1982 (3) only 13 episodes of AS and 23 episodes of other types of anaphylaxis due to penicillin were reported to the Adverse Drug

TABLE 1

Symptoms and signs in anaphylactic shock in 19 patients at admittance

Symptom	Number of patients
CNS	17
Respiratory	12
Cardiovascular	17
Gastrointestinal	8
Skin*	13

*urticaria or angioneurotic oedema

Reaction Board, and in the light of our findings this indicates considerable under-registration.

It was not surprising that insect stings were associated with AS to the same degree as penicillin, since hymenoptera venoms are a well-known cause of AS (5). Other causes of AS include radiographic contrast media, blood products, and dextrans (1, 6, 8), but one would not expect to find many cases of AS due to these substances outside hospitals. However, one might have expected cases due to vaccines, hypersensitivity testing, and hyposensitization. In contrast to most other studies (2, 4, 6, 8), our drug-induced cases were all from oral administration. This may be explained by differences in routes of drug administration, both between countries and between hospital and general practice.

As in other studies on the relationship between AS and drugs (4) and bee stings (5), most of our patients had previously been exposed to the precipitating agent. However, only three had previously developed a reaction such as might have led to preventive measures being taken. Since hypersensitivity tests for both penicillin and hymenoptera venoms are available and desensitization with respect to the latter is possible, it would seem that recurrent episodes of AS can be prevented, though prevention of initial episodes does not seem possible.

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