However heroic, dramatic, or pragmatic the treatment may be, the necessity for an organized approach to the treatment of war neuroses is obvious. The task is indeed a colossal one, for the number of neurotic soldiers will be legion, and it is the duty of the medical profession to have available every device which will cure or palliate disability and reduce the postwar liabilities which a neurosis imposes upon the individual and upon the community.

STATUS ASTHMATICUS ASSOCIATED WITH OTHER ALLERGIES

Report of a Case

J. WARRICK THOMAS, M.D., and F. B. HOUSE, M.D.

Asthmatic symptoms may be divided into two types: (1) bronchial asthma, which usually responds to the routine measures for symptomatic relief, including ephedrine or epinephrine, and (2) status asthmaticus, the more severe form or shock type, which is characterized by extreme exhaustion and severe dyspnea bordering on collapse.

In the case reported severe status asthmaticus was recurrent and was complicated by sinus infections, drug allergy, and dermatitis medicamentosa due to neoarsphenamine. The case illustrates the complicated management of recurrent attacks of asthmatic bronchitis and episodes of status asthmaticus requiring heroic measures for the control of symptoms. On several occasions it was doubtful whether the patient would recover from the attacks of status asthmaticus.

CASE REPORT

History. A housewife, aged 38, was first seen at the Clinic on March 18, 1940. In May and June for twenty years she had rose fever with sneezing and rhinorrhea. In 1939 her symptoms began in March during the tree hay fever season and were associated with wheezing. The following September she had several attacks of asthma, and a month later she began to have attacks of coughing and wheezing every night. Since the onset of the nocturnal attacks she had lost five pounds and had become irritable and nervous. During the winter months she had a chronic postnasal drip. She noted that damp weather made her symptoms worse.

Aspirin and phenacetin made her wheeze, and codeine was thought to cause trouble also. She suspected that ham, cabbage, and milk caused water brash and nausea. Chocolate and eggs were also incriminated. She took ephedrine by mouth to control her asthma. The only other drug used regularly was mineral oil for a mild constipation.

One sister had a history of hay fever.

Physical Examination. The physical examination revealed an asthenic and underweight person. Her chest was symmetrical; the lungs were normal to percussion,

with diminished breath sounds at the bases and numerous sibilant and sonorous râles. Gross dental neglect and caries were revealed on oral examination. Routine laboratory studies were within normal limits.

A diagnosis of perennial allergic rhinitis, bronchial asthma, seasonal hay fever (spring), and drug allergy was made.

After an allergy survey the patient was put on the following regimen: (1) avoidance of dust and other inhalants, (2) hyposensitization with an inhalant extract, (3) preseasonal grass and ragweed hyposensitization, and (4) epinephrine 1/1000 for control of symptoms.

Subsequent Course. The patient reported noticeable improvement in May, nocturnal coughing and wheezing being controlled with ephedrine. In July she began to have occasional attacks of coughing in the afternoon, and by the end of September she was having considerable asthma.

On October 5, 1940 the patient was admitted to the hospital with temperature elevation, severe coughing, and marked wheezing. A diagnosis of status asthmaticus was made. Helium, oxygen, aminophylline intravenously, and other emergency measures were administered to control the symptoms. By the sixteenth hospital day she had improved and was discharged.

On November 2 the patient was readmitted with severe asthma and was given emergency treatment. Sputum examination showed abnormal numbers of fusospirochetal organisms. This finding was confirmed by examination of secretion obtained by bronchoscopic aspiration, and a course of neoarsphenamine was recommended.

A 0.15 Gm. dose of neoarsphenamine was given on November 7, and a second dose of 0.30 Gm. two days later. The patient was then discharged. At our suggestion her local physician administered three more injections of 0.30 Gm., the last injection being given November 23.

She was slightly nauseated after the third injection, with some fever the next afternoon. Three days later a slight rash appeared on her arms and chest. This was not thought to be related to the injections of neoarsphenamine, and it disappeared in a week. There was no reaction to the fourth injection. The day after the fifth injection she had a temperature elevation with nausea and vomiting. Three days later the itching reappeared and was followed by an erythematous morbilliform rash without exudate or desquamation. The rash then became generalized on the trunk and extremities but did not involve the face, palms, soles, or scalp. A diagnosis of dermatitis medicamentosa from the use of neoarsphenamine was made. The only other drug taken was cough mixture with codeine, which was continued throughout the entire course of the rash. On the sixth day after the injections the eruption faded, although the pruritus remained. There was also edema of the forearm extending from the elbow to the wrist and pitting on pressure. The next week the patient began losing hair from the scalp, and at her next appointment two weeks later a "great deal" of hair had come out of the scalp without any loss from the axillae, pubis, or eyebrows.

When the patient returned in February 1941, she reported almost complete freedom from asthma for the two month interval. Although she still had some postnasal discharge, pollen hyposensitization for grass and ragweed was deferred; coseasonal treatment was to be undertaken if the symptoms increased during the season.

By the middle of March the patient had had two attacks of asthma requiring epinephrine. The next month her cough, sputum, and postnasal discharge increased. At otolaryngologic consultation irrigation of the sinuses was advised, which provided partial relief for a few days. Sulfathiazole was considered but not given.

In May she began to have mild attacks of asthma nightly, which were controlled by small amounts of epinephrine. On May 12 she was admitted to the hospital for the

third time with asthmatic bronchitis and discharged six days later. A four week course of sulfathiazole was given, was well tolerated, and produced slight improvement. She took epinephrine regularly.

Dental consultation was requested, and many carious and infected teeth were found. A 4 plus Vincent's infection about the gums and teeth was demonstrated. This examination was repeated two years later, and the 4 plus infection was again revealed. A number of teeth were removed at the dentist's suggestion.

On May 24 hyposensitization was begun with autogenous sinus washings and a stock rhinopathogen vaccine. On June 19 the patient presented the mother plaque and typical findings of pityriasis rosea. The rash caused little inconvenience to the patient and subsided in time.

On September 8 she reported that only two severe asthmatic attacks occurred in the two months after the vaccine treatment.

On September 24 she was admitted to the hospital for the fourth time with severe asthmatic bronchitis and associated cyanosis. Upon discharge six days later she was much improved and suffered from mild wheezing only.

Because of maxillary sinusitis a left antrotomy was done to establish drainage October 27, 1941. A right antrotomy was done March 27, 1942 (sixth admission).

The symptoms of wheezing, nasal discharge, and postnasal drip continued throughout the winter. The patient was admitted to the hospital May 17, 1942 with a severe attack of asthma. The asthma continued to be poorly controlled, and exacerbations were usually associated with acute respiratory infections.

On December 30, 1943 she was admitted to the hospital for the eighth time with the same complaints, increased bronchial secretion, and probable infection as there was slight temperature elevation. She was given sulfadiazine, which was tolerated four days. Upon discharge January 3, 1944 she complained of some swelling of the ankles, which was not considered significant. She was advised to continue sulfadiazine under the direction of her local physician.

On January 8 she reported that her feet and legs were swollen to twice their normal size. There was redness of the legs and hips and erythema in the cubital fossae. Two days after medication was discontinued at our suggestion, the edema and redness of the legs had almost subsided, and the erythema was fading.

On January 10 the patient reported that she had required eight injections of epinephrine 1/1000 to relieve her asthma over a period of twenty-four hours. The swelling of the feet, presumably due to sulfadiazine, had entirely subsided. The only significant findings in the chest were consistent with bronchial asthma. She was advised to continue the epinephrine and was given supplemental vitamins, including 10 milligrams of thiamin chloride three times a day. The patient formerly was given a prescription of dilaudid, 1 gr. in a 4 ounce mixture, with instructions to take 1 teaspoonful when necessary for control of the cough. The preparation was tolerated by the patient and controlled the symptom.

TREATMENT

When a patient does not obtain relief from epinephrine in large doses and when other drugs fail to control the symptoms, more drastic measures of therapy must be considered.[1]

Environmental factors. The patient should be placed in a room free of the offending allergens and should be hospitalized if the manifestations are severe enough to require multiple therapeutic measures.

Feedings should be small but nourishing, with the lightest meal in the evening. The diet should eliminate all known food allergens.

Psychotherapy. Encouragement of the patient and the elimination of his fears aid in satisfactory treatment. Complete rest is beneficial, and visitors should be discouraged and limited to the family.

Helium and oxygen, measured in a ratio of 80 per cent to 20 per cent, is very helpful in some cases. A special apparatus may be used which leaves the patient free to talk and eat.

Ether and oil in equal parts is usually administered slowly by rectum. The average adult dose ranges from 4 to 7 ounces, while that for children from 0.5 to 2 ounces.

Aminophyllin, administered intravenously and very slowly in doses varying from 3.75 gr. to 7.5 gr., contributes to the relaxation and sense of well-being of the patient. A tolerance for the drug is frequently built up, and another form of treatment is required. Extravasation causes intense local burning, irritation, and possible ulceration. The drug may produce a reaction and must be administered cautiously.

Glucose and epinephrine, administered intravenously and very slowly, usually causes symptoms to subside partially or completely. Fifty per cent glucose is usually administered in 50 cc. doses with 0.1 cc. of epinephrine (adrenalin). Extravasation causes not only thrombosis but also an area of potential necrosis or ulceration.

Amyl nitrite is occasionally administered to relax bronchial musculature. A perle of the drug is crushed in a sponge, and the patient inhales the vapor until his face is reddened or until there is peripheral capillary dilatation.

Oxygen may be administered by catheters in the nose or by an oxygen tent, usually at the rate of 4 to 7 liters per minute. Relief of cyanosis and some general improvement may be expected. Oxygen is most beneficial when anoxemia is present.

Glucose and saline, usually in the form of 50 per cent glucose, may be used intravenously to lessen the secretion of tenacious bronchial mucus. Five to 10 per cent glucose and saline, administered intravenously in amounts of 500 to 1000 cc., will prevent dehydration in patients who are unable to take fluids by mouth.

Opiates are contraindicated in most cases as they inhibit the expectoration of mucus, frequently cause nausea and vomiting, and often produce a severe diminution of the respiratory rate. Deaths have been reported from the use of morphine by Vaughan.[2]

Avertin may be given in doses of 60 to 90 mg. per Kg. body weight. It is usually administered to promote rest and relaxation if the patient becomes adrenalin-fast and does not react to the usual dosage of 0.5 to

1 cc. of epinephrine. The effect of the anesthesia can be counteracted by intravenous injections of coramine.

Bronchoscopic examination is occasionally instituted in severe cases of status asthmaticus to facilitate aeration by the removal of the mucus plugs. This may be a lifesaving measure. However, death may occur from a reaction to the local anesthesia.[3]

Rapid hyposensitization with the offending allergens has been tried with satisfactory results by Waldbott and Asher.[4] It is very dangerous unless instituted under properly controlled conditions.

COMMENT

A number of factors complicated this patient's problem. She was very nervous and unstable. She was able to keep the mild attacks of asthma under control if her husband or some other member of the household was present. If she was alone, she became panicky, and the asthma was sufficiently exacerbated to require hospitalization.

A word of caution: In view of possible reactions certain specific drugs should be prescribed with caution to allergic patients, except as a last resort. By questioning the patient before prescribing a specific drug, an occasional history of reaction to the drug will be discovered. Particular reference should be made to neoarsphenamine and similar drugs.[5] This case clearly illustrates the complicating factors that may result from sensitivity to a drug. After taking neoarsphenamine the patient was confined to bed and developed a marked exfoliative dermatitis with almost complete loss of hair of the head. In addition sulfadiazine caused a swelling of the legs and ankles.

The case further illustrates that episodes of shock may temporarily control asthmatic attacks or exacerbations. After the drug reaction the patient was free from asthma for two months. This mechanism has been frequently observed in the treatment of hay fever patients. If a constitutional reaction is experienced during the course of treatment, the results of treatment may be more satisfactory during the pollen season, and symptoms may not appear.

In the presence of pansinusitis surgery may be necessary to establish adequate drainage and usually controls the infection. However, surgical measures may not control such infections unless allergy management is instituted simultaneously.

There is some disagreement as to what constitutes a true Vincent's infection. Some workers feel that a discolored, dirty grey membrane must be present around the gums, as well as a huge number of organisms. Others believe that the consistent and continuous finding of a large number of fusospirochetal organisms in smears from the gums is suffi-

cient evidence for a diagnosis. Since we found a large number of these organisms in the bronchoscopic aspirations, we considered that this finding with bronchitis and temperature elevation warranted the administration of neoarsphenamine.

During one hospitalization the patient was given morphine without adequate consideration by an intern. Fortunately, the patient experienced no unfavorable reaction except nausea and mild vomiting. As previously mentioned, morphine and allied preparations should not be given; if given, they should be administered with extreme caution. This patient received minute doses of dilaudid in a cough syrup, which was more satisfactory than any other method for controlling the bronchial or pharyngeal irritations which tend to aggravate the cough and at times precipitate recurrent episodes.

SUMMARY

When a mild form of asthma proceeds to status asthmaticus, heroic measures must be instituted. The patient should be hospitalized for intensive treatment.

Opiates are contraindicated; similar effects may be produced by chloral, bromides, barbituric acid derivatives, avertin, ether and oil. Drugs should always be administered with caution to asthmatic patients. In this case a constitutional reaction followed the administration of neoarsphenamine for the control of a Vincent's infection and was complicated by an exfoliative dermatitis with loss of hair.

Every effort should be made to eradicate foci of infection. In this case the necessary measures were the extraction of teeth, the treatment of a Vincent's infection of the lungs, and surgery to establish adequate drainage in a pansinusitis.

REFERENCES

1. Thomas, J. Warrick: Treatment of certain allergic manifestations as medical emergencies. Ohio State M. J. 36:372-375 (April) 1940.
2. Vaughan, W. T., and Graham, W. R.: Death from asthma; warning. J.A.M.A. 119:556-557 (June) 1942.
3. Thomas, J. Warrick, and Fenton, Meryl M.: Fatalities and constitutional reactions following the use of pontocaine. J. Allergy 14:145 (January) 1943.
4. Waldbott, G. L., and Asher, M. S.: Rapid hyposensitization. J. Allergy 6:93-97 (November) 1934.
5. Thomas, J. Warrick: Bronchial asthma following the inhalation of powdered neoarsphenamine. Arch. Dermat. & Syph. 47:675-679 (May) 1943.