much greater at a low fluid intake than on high fluid intake —probably the reason for improvement during the earlier hospital admission.

Quinidine was then totally withdrawn and there had been no further symptoms of muscle weakness up to December, 1957, when the patient was last seen. To date the frequency of attacks of paroxysmal tachycardia has not caused anxiety.

The Table shows the results of fatigue testing on some muscle groups five days after quinidine had been withdrawn and on the fifth day after full dosage had been resumed. There was no detectable change in vital capacity.

Results of Fatigue Testing

Test	Following Withdrawal of Quinidine	5 Days After 9 gr. (0·6 g.) of Quinidine Daily Recommenced
	Possible Frequency Before Weakness Prevented Further Repetition of Test	
Standing on one leg from sitting on 12-in. (30-cm.) stool	Right 6. Left 3	Both legs together only
Biceps lift 1¼ lb. (680 g.)	,, 24. ,, 19	Right 2. Left 4
Rise on one toe (i.e., action calf)	,, 14. ,, 14	,, 4. ,, 4
Triceps lift—1¼ lb. (680 g.)	,, 11. ,, 7	,, 5. ,, 5
Deltoid to full elevation—¼ lb. (113 g.)	,, 20. ,, 20	Not at all

Discussion

The mechanism of action of quinidine in the above case is not clear, but there are some reported studies which would suggest possible modes of action. One possibility is that quinidine acts at the motor end-plate by interfering with the acetylcholine mechanism. This may correlate with the recognized potentiating effect of quinine in myasthenia gravis.

Another possible mechanism which has received much attention recently is the effect of quinidine on ionic transfers across the cell membrane (Holland, 1957; Kärki *et al.*, 1957). It seems that quinidine, at concentrations comparable to those which might be expected in the above case, greatly inhibits both sodium and potassium shifts across the cell membrane. This applies both in restoration of a distributed normal equilibrium and also in the ionic shifts associated with depolarization, such as by acetylcholine. Presumably if these effects are pressed to a sufficient extent it will not be possible to disturb the ionic balance rapidly, as is required in muscle action, and paralysis will therefore occur.

However, if this explanation holds for quinidine action on cardiac muscle in arrhythmias, it is remarkable that the effect noticed in this case is so unusual considering the repetition rate of skeletal muscle action (5–10 per second even at minimal activity) compared with the cardiac rate.

If the mechanism of action is by disturbance of the balance between intracellular and extracellular electrolytes associated with a raised intracellular sodium level, this may be comparable to the mechanism described by Conn *et al.* (1957) in periodic paralysis. The distribution of weakness in the case described has a closer similarity to this disease than it has to myasthenia gravis.

The ability of quinine to suppress muscle cramp may have a similar explanation to the mechanism of paralysis in the case described.

References

Conn, J. W., Louis, L. H., Fajans, S. S., Streeten, D. H. P., and Johnson, R. D. (1957). *Lancet*, **1**, 802.
Holland, W. C. (1957). *Amer. J. Physiol.*, **190**, 492.
Kärki, N., Burn, G. P., and Burn, J. H. (1957). *Lancet*, **1**, 565.

Medical Memorandum

Allergic Primary Pulmonary Aspergillosis and Schönlein-Henoch Purpura

Pulmonary aspergillosis is a clinical classification which at times has been loosely applied to lung disease where the fungus has been recovered in the sputum. However, the presence of aspergillus in the sputum alone may be of little significance in arriving at a diagnosis (Moolten, 1938; Van Ordstrand, 1940; Donaldson *et al.*, 1942; Coe, 1945; Delikat, 1955), for such fungus may originate in the nasal sinuses. A *certain* diagnosis can be established only with the recovery of aspergillus in secretion trapped at bronchoscopy (Stevenson and Reid, 1957) or tissue biopsy (Hiddlestone *et al.*, 1954) or at necropsy. A futher complication lies in the ambiguous use of the term "pulmonary aspergillosis" in cases where the fungus is a harmless commensal leading a saprophytic existence in a lung already damaged by bronchiectasis, tuberculosis, bronchial carcinoma, or pneumoconiosis (Heppleston and Gloyne, 1949). In this connexion massive doses of antibiotics are stated to predispose to the growth of such fungi (Abbott *et al.*, 1952; Darke *et al.*, 1957). The term pulmonary aspergillosis should therefore be exclusively reserved for conditions where the fungus is primarily responsible for the patient's ill-health. Many such authenticated cases are to be found (Hetherington, 1943; Gerstl *et al.*, 1948; Hertzog *et al.*, 1949; Hinson *et al.*, 1952; Hiddlestone *et al.*, 1954), and at least four distinct varieties of primary pulmonary aspergillosis are described: (1) mycetoma or granuloma, (2) septicaemia (Just, 1931), (3) bronchopneumonia, and (4) allergic.

The following case history demonstrates the bizarre clinical pattern exhibited by a boy who suffered from the allergic type of pulmonary aspergillosis.

Case Report

The patient, a boy aged 15½, had been well until the age of 4 years, when he developed bronchial spasm. Minor attacks of a similar nature occurred intermittently until he was 12, when after a minor haemoptysis and wheezing his chest was *x*-rayed but failed to show any radiological abnormality. He remained in good health until 15 years of age, when he began to lose weight, felt fatigued, and was slightly short of breath on exertion. About this time he began to expectorate up to a quarter of a cupful of thick green sputum which contained yellow-brown hard plugs that could be crushed to the consistency of toothpaste. He visited a mass miniature radiography unit and was found to have bilateral shadowing in both lung fields.

In view of his symptoms and the radiological shadows he was admitted to hospital. On examination he was found to be non-toxic and almost afebrile apart from occasional spikes of temperature (99° F.—37.2° C.). A series of 25 sputa were negative for acid-fast bacilli on direct examination and culture, though eosinophils were repeatedly found in large numbers. His Mantoux test 1:100 was only faintly positive, and a haemogram showed a persistent eosinophilia of 16–22%. Intradermal tests for allergens were negative apart from a faint response to mixed pollens. His maximum voluntary ventilation was 35 litres a minute. Throughout his three months in hospital the radiological shadows migrated to every zone of his lung fields—clearing and recrudescing in a dramatic fashion. Pulmonary eosinophilia was diagnosed, antispasmodics and prednisolone were given, and he was discharged in good health.

One month later he was readmitted suffering from cough, dyspnoea, bronchial spasm, and fatigue, with radiological evidence of a lung abscess in the right upper lobe. His sputum was examined for fungi, and eight consecutive specimens were loaded with *Aspergillus fumigatus*. The bronchial secretion which was aspirated at bronchoscopy contained *A. fumigatus*. A blind biopsy taken from the lower lip of the right upper lobe bronchial orifice showed chronic inflammatory cell infiltration predominantly eosinophilic in nature. Intradermal tests for all allergens and moulds, including *A. fumigatus*, were repeated, again with negative results (Hinson *et al.*, 1952). A diagnostic inhalation of *A. fumigatus* was given as an aerosol, and after 15 seconds a violent attack of status asthmaticus occurred which had to be aborted by adrenaline. Therapeutic inhalations of brilliant green 1:500.000 supplemented by two courses each of 7,000,000 units of nystatin and prednisolone were given. His health rapidly improved, treatment was discontinued, and he was discharged home.

Four months later he was once again admitted to hospital with a pyrexia of 100° F. (37.8° C.), bronchial spasm, cough, and haemoptyses which lasted for 10 days. A fresh development was swelling and extreme tenderness of the ankles, knees, wrists, and left shoulder-joint. About this time symmetrical purpuric spots appeared over the extensor aspects of his thighs, arms, and the lower third of his legs. The above symptoms were accompanied by recurrent episodes of severe nausea, vomiting, and abdominal colic with tenderness and slight rigidity. These attacks required repeated injections of morphine and atropine for relief. A diagnosis of Schönlein–Henoch purpura was now made.

Urine examinations showed a trace of albumin but no erythrocytes or casts were ever detected. All haematological findings were negative apart from a persistent peripheral eosinophilia, and *A. fumigatus* was again found in his sputum on a number of occasions. On pulmonary examination crepitations were audible in different zones of the lung fields corresponding to the fresh migrating radiological pulmonary shadows. The Schönlein–Henoch purpura responded extremely well to prednisolone therapy.

Once again the patient was treated with two courses of nystatin and prednisolone. The latter has been continued in a maintenance dose of 5 mg. twice a day supplemented by an injection of 20 units of corticotrophin once a month. A year later the boy remained in good health and at work. Repeated sputum examinations have proved negative for fungi and eosinophils and the eosinophil level of his haemogram remains within normal limits. However, serial chest radiography has occasionally demonstrated transient migrating, though smaller, opacities in both lung fields.

COMMENT

Schönlein–Henoch purpura is an acute disorder clinically characterized by a specific recognizable exanthem, gastro-intestinal symptoms, painful swollen joints, a frequently associated haematuria, and a tendency to recurrence of one or more of this triad of symptoms (Gairdner, 1948). Though the aetiology remains obscure (Davis, 1948), there is ample evidence that the condition is due to a hypersensitive reaction to an allergen which may be bacterial, non-bacterial, or antibiotic. Occasionally the allergen may be an article of food (Ackroyd, 1953). Jensen (1955) suggested that in this condition the degree of renal disorder depends on the nature of the allergen. If bacterial it may simulate acute glomerulonephritis, whereas in non-bacterial types the kidney lesion may be absent.

The above case showed no definite evidence of renal involvement, though a trace of albumin was present on several occasions. In this connexion Cohen (1957) has reported a typical case complicated by severe and progressive renal involvement in which the downhill course was apparently unaffected by cortisone but was dramatically reversed by prednisolone. A favourable response to steroids has been reported by some workers (Just, 1931; Adamson *et al.*, 1953; Lewis and Philpott, 1956; Stefanini and Martino, 1956; McLachlan, 1958), whereas others have met with disappointing results (Oliver and Barnett, 1955; Witts, 1956; Bywaters *et al.*, 1957).

The diagnosis was established by the finding of *A. fumigatus* in bronchial secretion, the presence of eosinophilic cell infiltration on bronchoscopic biopsy, and the remarkable well-being of the patient in the presence of extensive migrating radiological chest shadows (Ross, 1951). We can find no previous mention of Schönlein–Henoch purpura being recorded in association with pulmonary aspergillosis. An interesting feature was the complete absence of correlation between skin and bronchial mucosal response to a specific allergen like *A. fumigatus*.

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REFERENCES

Abbott, J. D., Fernando, H. V. J., Gurling, K., and Meade, B. W. (1952). *Brit. med. J.*, **1**, 523.
Ackroyd, J. F. (1953). *Amer. J. Med.*, **14**, 605.
Adamson, D. G., Walker, W., and Macintosh, A. E. (1953). *Brit. med. J.*, **2**, 656.
Bywaters, E. G. L., Isdale, I., and Kempton, J. J. (1957). *Quart. J. Med.*, **26**, 161.
Coe, G. C. (1945). *Ann. intern. Med.*, **23**, 423.
Cohen, A. S. (1957). *Brit. med. J.*, **1**, 143.
Darke, C. S., Warrack, A. J. N., and Whitehead, J. E. M. (1957). Ibid., **1**, 984.
Davis, E. (1948). *Blood*, **3**, 129.
Delikat, E (1945). *Lancet*, **2**, 370.
Donaldson, J M., Koerth, C. J., and McCorkle, R. G. (1942). *J. Lab. clin. Med.*, **27**, 740.
Gairdner, D. (1948). *Quart. J. Med.*, **17**, 95.
Gerstl, B., Weidman, W. H., and Newmann, A. V. (1948). *Ann. intern. Med.*, **28**, 662.
Heppleston, A. G., and Gloyne, S. R. (1949). *Thorax*, **4**, 168.
Hertzog, A. J., Smith, T. S., and Goblin, M. (1949). *Pediatrics*, **4**, 331.
Hetherington, L. H. (1943). *Amer. Rev Tuberc.*, **47**, 107.
Hiddlestone, H. J. H, Rosser, T. H. L., and Seal, R. M. E. (1954) *Tubercle (Lond.)*, **35**, 15.
Hinson, K. F. W., Moon, A. J., and Plummer, N. S. (1952). *Thorax*, **7**, 317.
Jensen, B. (1955). *Acta med. scand.*, **152**, 61.
Just, E. (1931). *Mitt. Grenzgeb. Med. Chir.*, **42**, 540. Quoted by R. A Bruce, *Tubercle (Lond.)*, 1957, **38**, 203.
Lewis, I. C., and Philpott, M. G. (1956). *Arch. Dis. Childh.*, **31**, 369.
McLachlan, R. M. (1958). *Tubercle (Lond.)*, **39**, 35.
Moolten, S. E. (1938). *J. Mt. Sinai Hosp.*, **5**, 29.
Oliver, T. K., and Barnett, H. L. (1955). *A.M.A. Amer. J. Dis. Child.*, **90**, 544.
Ross, C. F. (1951). *J. Path. Bact.*, **63**, 409.
Stefanini, M., and Martino, N. B. (1956). *New Engl. J. Med.*, **254**, 313.
Stevenson, J G., and Reid, J. M. (1957). *Brit. med. J.*, **1**, 985.
Van Ordstrand, H. S (1940). *Cleveland Clin. Quart.*, **7**, P66.
Witts, L. J. (1956). In Price's *Textbook of the Practice of Medicine*, 9th ed., p. 775, edited by D. Hunter. Oxford Univ. Press, London.

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