prevented him from working for ten weeks. During the next three years he limped slightly, and experienced "tightening feelings" in the right calf, with stiffness on occasions. Eventually pain occurred in the calf on exercise, and he was unable to walk far without resting. His foot was cold in the winter months. In October, 1928, he complained of persistent burning pain in the right big toe, and he was admitted to hospital with commencing gangrene of this toe. In spite of periarterial sympathectomy and removal of the toe, amputation through the right thigh was necessary in May, 1929. In April, 1930, a similar series of symptoms occurred in the left lower limb, and in November, 1930, amputation through the left thigh was performed.

November, 1931, marked the commencement of trouble in the left upper limb. The hand began to perspire excessively and itch, and the fingers became cold and dead when exposed to the cold air. The condition of the hand became gradually worse, and by February, 1932, there was spreading moist gangrene of the little and ring fingers, and the pulp of the terminal phalanx of the thumb. The patient was in persistent pain, and sat holding his hand. The pulse could not be felt in either radial or ulnar arteries.

The inferior cervical and first thoracic sympathetic ganglia on the left side were removed under general anaesthesia by the route described. While the ganglia were being dissected away the pulse rate became rapid (135), but settled again after interference with the sympathetic had ceased. Recovery was uneventful. The typical signs of sympathetic loss to the head and upper limb on the left side were evident. There was a pin-point pupil, enophthalmos, increase of surface temperature, and absence of sweating to a sharp line of demarcation at the level of the second thoracic segment. For some few days after the operation near vision was misty, and, on reading, the words split into syllables. Distant vision was normal. The effect of the operation upon the hand was excellent. The pain disappeared immediately and the hand became warm. Lines of demarcation occurred, and the gangrenous portions were removed. The gangrenous part of the pulp of the thumb separated and the terminal phalanx was left healthy.

The patient makes the astounding statement that in the following summer he worked his wheel chair to Morecambe and back, a distance of 120 miles, during a week-end! He experienced no trouble with his upper limb, in spite of the hard work entailed. In December, 1932, he was examined, and the condition of the left upper limb was found to be very satisfactory. A faint pulse could now be felt in the radial artery. In the beginning of 1933 the circulation in the right upper limb became defective and gradually deteriorated, and in April, 1933, after knocking his index finger, septic lesions occurred which failed to heal. The hand became painful and the fingers purplish in colour. The pulse could not be felt in the radial or ulnar arteries.

In June, 1933, the inferior cervical and first thoracic ganglia were removed on the right side by the posterior approach, as before. Recovery was uneventful, and the result of the operation excellent, as on the other side. He was discharged from hospital three weeks after operation, and is at the present time (November) carrying out his work as an artificial flower maker.

SUMMARY

1. A brief description of thrombo-angiitis obliterans, or Buerger's disease, is given.

2. A case is described in which both upper limbs were saved from gangrene by sympathetic ganglionectomy. Both lower limbs had been lost previously from the disease.

3. The posterior route through the chest, for the removal of the inferior cervical and first thoracic ganglia, is considered to be better than the anterior approach. The exposure is superior, and incomplete removal of the first thoracic ganglion, liable to occur by the anterior route, is by this means unlikely.

4. Removal of these ganglia on both sides was not accompanied by any permanent ill effects on the brain, eyes, or heart.

I am grateful to Mr. Goyder for permission to publish this case, which was under his care.

REFERENCES

- ¹ *Amer. Journ. Med. Sci.*, 1908, cxxxvi, 567.
- ² *Proc. Mayo Clinic*, November 19th, 1930, p. 337.

RELATION OF THROMBOPHLEBITIS MIGRANS TO THROMBO-ANGIITIS OBLITERANS

BY

A. L. D'ABREU, M.B., CH.B., F.R.C.S.

ASSISTANT IN THE SURGICAL UNIT OF THE WELSH NATIONAL SCHOOL OF MEDICINE, CARDIFF; LATE SURGICAL REGISTRAR, GENERAL HOSPITAL, BIRMINGHAM

In this country thrombophlebitis migrans is usually regarded as a malady quite separate from the general vascular disease known as thrombo-angiitis obliterans. Buerger¹ insists that phlebitis migrans is part of a widespread disease affecting both veins and arteries. He states: "The association of thrombosis of superficial veins of the upper and lower extremities with other evidence of obliteration of the larger arteries occurs in a sufficiently large number of cases to make the affection of the veins almost pathognomonic." After a full description of a series of these cases some of his conclusions are as follows:

1. The disease thrombo-angiitis obliterans is often associated with thrombophlebitis of the superficial veins of the arms and legs.
2. The clinical disease of the superficial veins may be subsiding or it may dominate the clinical picture. . . .
3. Migrating thrombophlebitis may give no symptoms, the signs referable to the deep vessels being of most importance.
4. Patients may suffer at one time from migrating thrombophlebitis, at another from the progress of the occlusive changes in the deep vessels.

He found that in all cases of thrombophlebitis migrans which he studied, the pulses eventually became imperceptible. He based these conclusions upon exhaustive clinical and pathological examinations of limbs, many of which required amputation, and found that both superficial and deep veins, in addition to the arteries, exhibited those curious inflammatory and thrombotic changes so typically seen in thrombo-angiitis obliterans.

In this country we have been slow, or perhaps reluctant, to recognize the apparent unity of the disease processes. Moorhead and Abrahamson² in 1928 described phlebitis migrans as a new disease complex, because in their four cases visceral as well as superficial veins were involved. They write: "It is interesting, though perhaps inapposite, to draw attention to cases quoted by Buerger in which recurrent phlebitis of superficial veins was the precursor of thrombo-angiitis obliterans. Such a sequel has not been encountered by us, and it is likely that Buerger's cases did not belong to the group with which we are dealing." The case described below is reported because the patient for many years clearly belonged to the group described by Moorhead and Abrahamson, with migrating thromboses that involved visceral and superficial veins, and yet ultimately he presented all the features of thrombo-angiitis obliterans, from which he died.

A. B. Walker³ in 1932 published a paper on thrombophlebitis migrans, and collected fifteen cases in which, up to that time, apparently no arterial disease coexisted; he quotes, however, a case recorded by Campbell and Morgan⁴ in which apparently a thrombosis of the posterior cerebral arteries accompanied multiple venous thromboses elsewhere. N. Kletz,⁵ in recording cases of migratory phlebitis, mentions the association with thrombo-angiitis obliterans; he utters the important warning that "though the prognosis has been regarded by most writers as uniformly favourable, this is not so." He records a fatal case, and to this may be added the one described below. F. Parkes Weber⁶ refers to a case he recorded with Schwarz in 1908 under the heading of "Arteritis Obliterans of the Lower Extremity." The patient subsequently developed the typical symptoms of thrombophlebitis

migrans. In the case recorded below the venous thromboses preceded by many years the objective signs of arterial involvement.

CASE REPORT

A man, aged 52, a country mason and married, was admitted to the General Hospital, Birmingham, under the care of Dr. J. M. Smellie, on February 7th, 1933, for the investigation of migratory thromboses of wide distribution and of many years' duration. The first attack of phlebitis occurred when he was 12 years old, in the left leg. He was admitted to St. Thomas's Hospital, London, eight years later, where portions of the left internal saphenous vein were removed. There were frequent recurrences of phlebitis, and on the outbreak of war he was certified as unfit owing to the condition of his legs. In 1914 the superficial veins of the abdomen were attacked by painful thromboses, and became dilated and obvious. By 1927 the condition had improved somewhat, but attacks of phlebitis in the legs and on the abdominal wall were frequent. In 1931 severe exacerbations forced him to bed for three months. During this period and in the preceding years he had many attacks of haemoptysis, mild in degree with no apparent cause, but associated with some pain in the chest. He continued to improve and relapse periodically until his admission to hospital in 1933.

On examination he was a well-built man of healthy appearance, apyrexial, with a blood pressure of 142/78, and a regular pulse of 76 to 80 beats per minute. The lungs and heart were free from physical signs of note. Both legs showed dilated tortuous veins, with a scar in the right thigh from the operation thirty-two years ago, and with many areas of healed thrombosis on both sides. The abdomen was traversed by dilated superficial veins with evidence of old clotting, but now free from recent thrombosis. A full investigation was carried out: the blood count was normal; there was no leucocytosis; the van den Bergh test, a blood sugar tolerance curve, a gastric test meal, and the Wassermann reaction were all within normal limits. No source of sepsis could be found on clinical or radiological examination. He was discharged with a diagnosis of "thrombophlebitis migrans," and a good prognosis was given.

Readmission and Operation.—On March 28th, 1933, he was readmitted to the hospital, twenty-four days after his discharge. He was complaining of severe cramp-like pains in the right hip and the right foot, the latter showing purple discoloration up to the middle of the dorsum. The foot was cold, and showed slight oedema. The right femoral artery pulsated, but the pulse in the popliteal and dorsalis pedis arteries was imperceptible. A lumbar sympathectomy was considered, and an intravenous T.A.B. vaccine test was done: the fact that although the general body temperature rose to 101.8° F. the temperature of the affected limb scarcely rose (78–80°) contraindicated sympathectomy. The pain became excruciating, and required large doses of morphine for its relief. As the gangrene began to spread, at the direction of Professor Seymour Barling I amputated the leg through the middle of the thigh by means of equal anterior and posterior flaps; in view of the diseased state of the vessels no tourniquet was employed, but the bleeding was extremely slight. The large veins contained organized clots, and the femoral artery showed severe occlusive changes.

Progress.—Two days after the operation severe pain commenced in the left foot, which became cold, numb, and discoloured, with signs of incipient gangrene; the pulse in the popliteal and dorsalis pedis arteries became imperceptible. Six days later the flaps on the amputated limb broke down, and coincidentally the patient developed a severe hypostatic pneumonia, from which he died twelve days after operation.

The Post-mortem Findings.—The heart was normal, with no disease of the coronary arteries; the aortic arch showed early atheroma. The lungs contained patches of bronchopneumonia, with many small dark-red areas suggestive of recent infarcts. The only evidence of vascular disease in the brain was a small area of old softening in the left optic thalamus. An unexpected finding was a complete fibrotic atrophy of the left lobe of the liver, with a compensatory enlargement of the right lobe. The localized affection of the liver suggested a vascular cause. The other abdominal viscera were normal. The vessels of the abdomen were carefully examined: the aorta and the inferior vena cava were densely bound together by inflammatory fibrous tissue, which

included many enlarged lymph glands. This inflammatory matting of artery and vein extended down into both lower limbs. On slitting up the aorta a ragged mass of ante-mortem thrombus stretched from a point three inches above the bifurcation; as this was followed down, the large vessels of the arterial and venous systems, from the common iliacs downwards, were found to be completely thrombosed. The inflammatory and thrombotic changes were unusually extensive, although Buerger reports cases involving the aorta. Telford and Stopford⁷ record that at operation for a perforated duodenal ulcer in a patient known to be suffering from thrombo-angiitis obliterans, the left common, internal, and external iliac arteries were palpated as pulseless immobile cords.

Histology of the Vessels.—The veins showed organized and canalized thrombi, and the arteries a similar process, both recent and old. The appearances were typically those described so exhaustively by Buerger, and the inflammatory background of the pathological state was well marked.

COMMENTARY

This patient had for forty years suffered from migrating thromboses: these involved the legs, the superficial veins of the abdomen, and the lungs, as shown by the attacks of haemoptysis (haemoptysis occurred in three of the four cases reported by Moorhead and Abrahamson). The onset of severe pain in the leg, succeeded by gangrene, the findings at operation and in the post-mortem room, and the histological appearances of the vessels leave no doubt that the ultimate diagnosis of thrombo-angiitis obliterans was correct. This conforms with Buerger's extended experience of these cases. A diagnosis of "thrombophlebitis migrans" seems to be an inadequate one, and may carry with it a false prognosis of benignity. Perhaps recorded cases of "thrombophlebitis migrans" in English literature, if observed over sufficiently long periods, may be seen ultimately to belong to the wider class of "thrombo-angiitis obliterans." Because of the somewhat doubtful position of "thrombophlebitis migrans" in vascular pathology, it is thought that this case should be reported.

I am grateful to Dr. J. M. Smellie and to Professor Seymour Barling for permission to publish these notes; to Dr. F. Mason Lamb, who conducted the post-mortem examination, which I attended, and who reported on the histology of the vessels; and to Dr. A. Brian Taylor for his helpful co-operation.

REFERENCES

- ¹ Buerger, L.: *The Circulatory Disturbances of the Extremities*, 1924, Chapter LVIII.
- ² Moorhead and Abrahamson: *British Medical Journal*, 1928, i, 586.
- ³ Walker, A. B.: *Lancet*, 1932, ii, 936.
- ⁴ Campbell and Morgan: *Guy's Hospital Reports*, 1930, xxx, 34.
- ⁵ Kletz, N.: *Lancet*, 1932, ii, 938.
- ⁶ Weber, F. Parkes: *Ibid.*, 1932, ii, 1077.
- ⁷ Telford and Stopford: *British Medical Journal*, 1924, ii, 1035.

INCREASED INTRAOCULAR TENSION IN YOUNG PERSONS AS A CAUSE OF SEVERE FRONTAL HEADACHE

BY

R. L. RAYMOND, M.B., CH.M.

FLIGHT LIEUTENANT R.A.F.M.S.

The four cases to be described are published in the belief that they represent a symptom-complex which is not commonly recognized. Each of these patients came complaining of frontal and temporal headache of varying degree and radiation; each was a young man between 20 and 30, and before the typical glaucoma age. In each case frontal sinusitis, tic douloureux, incipient herpes ophthalmicus, migraine, etc., were considered, and as far as possible eliminated. In each case the pain was increased by pressure on the eyeball, and the tension of the eyeball, as estimated by digital examination, was thought