The incidence of infection in the two groups was also noted with special reference to the occurrence of glycosuria. In the ultra-violet irradiation group three of the patients had mild infections—for example, nasal catarrh with or without mild pyrexia—and four had moderately severe attacks—influenza, adenitis, scarlet fever. Two of the latter four had to be admitted into hospital because of diabetic acidosis. Of the control group one patient had a mild enteritis and two had moderately severe attacks of adenitis necessitating their admission to hospital because of impending coma.

TABLE III*

	Total No.	Carbohydrate Tolerance			Percentage Expected Weight			Percentage Expected Height		
		Improved	No Change	Decreased	Improved	No Change	Decreased	Improved	No Change	Decreased
Receiving U.V.R. ...	10	4	—	6	4	1	4	—	2	7
Not receiving U.V.R.	4	1	—	3	1	1	2	—	1	2

*Cases receiving U.V.R.—data of height and weight from only nine cases. Cases not receiving U.V.R.—data of height from only three cases.

As regards other effects of the treatment, the mother of one patient stated that about one hour after irradiation the boy felt very limp, and that sugar had occasionally to be given because of the threat of hypoglycaemia. This particular patient was one whose carbohydrate tolerance per unit of insulin was reduced at the end of the year. Another patient (a boy of 13 years) stated that he felt better after ultra-violet irradiation treatment was commenced: in this case it had been noticed in previous years that during long spells of bright weather in the summer the insulin had to be reduced owing to a tendency to hypoglycaemic attacks.

SUMMARY

The effect of ultra-violet therapy on sugar tolerance, insulin requirements, growth, and general health was determined in ten diabetic children, aged $7\frac{1}{2}$ to $14\frac{1}{2}$ years, over a period of one year. The results, compared with those of a control series of four children who did not receive ultra-violet therapy, showed no significant improvement that could be attributed to the irradiation.

We should like to express our thanks to Professor G. B. Fleming for his interest in this investigation, and to the Medical Research Council for a personal grant to one of us (N. M.).

REFERENCES

- ¹ Pincussen, L.: *Biochem. Zeit.*, 1922, xxvi, 127.
- ² Andersen, A.: *Munch. med. Woch.*, 1923, lxx, 1484.
- ³ Saidman, J.: *Les Rayons Ultra-violet et Associés en Thérapeutique*, 1925, Doin, Paris, p. 736.
- ⁴ Rothmann, S.: *Zeit. f. d. ges. Exp. Med.*, 1923, xxxvi, 398.
- ⁵ Furniss, A.: *Brit. Journ. Actinotherap. and Physiotherap.*, 1931, v, 252.
- ⁶ Wilson, J.: *Clin. Journ.*, 1928, lvii, 97.
- ⁷ Rothmann, S.: *Strahlentherapie*, 1927, xxiv, 465.
- ⁸ Lucca, A., and Reviglio, G. M.: *Actinoterapia*, 1929, viii, 153.

We have received a specimen copy of the *Indian Journal of Pediatrics*, edited by K. C. Chaudhuri and published quarterly at Calcutta. This fifty-page issue contains six original articles, including one on "Feeding in Chronic Diarrhoea" and another on "Milk-free Diet in Pyuria and Eczema"; case reports; proceedings of societies; book reviews; and an abstract of current medical literature.

A CASE OF AXILLO-BRACHIAL EMOLECTOMY

BY

G. E. LARKS, CH.M., F.R.C.S.ED. AND ENG.

SURGEON AND MEDICAL SUPERINTENDENT, PLYMOUTH CITY HOSPITAL

The paucity of references in this country to the subject of arterial embolectomy suggests that the record of a single successful case is still worth the making.

CASE RECORD

A retired male railway worker, aged 64, was admitted to the Plymouth City Hospital complaining of vague abdominal pains and recently developed constipation. His history was one of good health, except that he had had a perianal abscess two years previously, and "phlebitis" in the right popliteal region six weeks before admission. Nothing abnormal could be detected in the popliteal region. He was well nourished, of a full-blooded appearance. Radiological evidence of carcinoma of the upper end of the sigmoid colon was obtained, and this was confirmed at operation on July 25th, 1933. Abdominal section by a paramedian incision was made and the growth located; through a left lateral oblique muscle cutting incision it was widely mobilized, and the first stage of a Paul-Mikulicz resection was performed. On August 5th, 1933, eleven days after operation, the patient complained of a sudden loss of power in the right arm and hand, accompanied by tingling pain and numbness. This occurred while he was washing himself. I saw him at 11 a.m., when he was still complaining of pain and numbness, and was rubbing the limb "to improve its circulation." The whole limb distal to the middle of the arm was pale and cold, with a blotchy cyanosis in the upper part of the cold area. The radial pulse was palpable, the brachial pulse could not be felt or heard at the elbow or in the arm, but about the level of the termination of the axillary artery a forcible pulse could be felt.

At 11.30 a.m., five hours after the onset, under local anaesthesia, the artery was exposed by an incision along its course, care being taken to preserve branches. The artery was mobilized; the site of lodgement of the embolus was easily detected, just proximal to the offset of the profunda artery. There was a local increase in the diameter of the non-pulsating axillo-brachial artery for about $1\frac{1}{4}$ inches. Proximal to this the axillary artery seemed to beat unusually powerfully; distally lay the brachial artery, contracted and pulseless. Light intestinal clamps, rubber-covered, were gently applied above and below the embolus, and a small incision, $\frac{1}{3}$ inch or so in length, was made into healthy artery above the upper end of the embolus, which was immediately partially extruded. It was carefully withdrawn. The distal clamp was released, and blood flowed from the distal end. The proximal clamp was then released somewhat, and blood flowed freely. With the clamps again controlling, the incision in the artery was closed by three mattress sutures of paraffined silk evertng the edges of the wound, and apposing the intima, and narrowing the arterial lumen as little as practicable. Throughout the operation the wound was sponged occasionally with 2 per cent. sodium citrate.

The clamps were released, and a good pulse was immediately palpable at the elbow, and a definite though less forcible pulse at the wrist. The wound was closed and healed perfectly. No splint was used, but the limb was swathed in wool. Shortly after operation the limb was definitely warmer, and twelve hours after operation there was a warm limb of apparently normal colour, with a radial pulse of good quality, though somewhat less forcible than that of the other arm. The pulse remained of good quality and the limb of normal appearance. At the present time, twenty-three weeks after operation, the right radial pulse is slightly less forcible than the left; there is, however, no difference in appearance or function between the two limbs.

Since the arterial operation the patient has undergone two further operations to restore the continuity of the intestine. Less drastic measures failing to produce closure of the colostomy, excision with end-to-end anastomosis was performed. He is now in good general health, and living his normal routine of retired life.

COMMENTS

There is a steadily increasing literature, mainly Scandinavian and American, concerning embolectomy. Of 216 operations culled by Einar Key¹ in 1929, from his own experience and the literature, 145 were Swedish. There were eighty-six successes. In 1922, in a pioneer paper which stimulated interest and activity in embolectomy, Key² had gathered thirteen successes out of forty-five cases. He states that to Ssabanagew (1895) is usually credited the first attempt, though unsuccessful; and to Labey the first success in 1911.

Emboli are somewhat less common in the upper than in the lower extremity. Curiously, Jefferson's³ case—the first success in England and recorded in 1925—a case published by A. Gray Banks⁴ in 1931, which I was fortunate enough to see, and the case here recorded were all in the upper extremity; all were also post-operative occurrences.

The diagnosis presents no difficulty. The sudden onset of tingling pain, numbness, and loss of power, with waxy pallor, coldness in the limb, and absence of the pulse make the diagnosis obvious. The absence of warmth and oedema excludes venous thrombosis, and a nerve lesion needs only to be considered to be immediately excluded. It is noteworthy that the accompanying pain is often very severe. The embolus tends to lodge at the site of the giving off of a large branch (in this case the profunda), or a bifurcation. If the site is accessible a swelling may sometimes be felt in the line of the artery. The stethoscope may help to localize the block by auscultating along the vessel towards the obstruction.

When exposed at operation the picture is unmistakable: a local swelling with the vessel thin and contracted beyond it, and proximal to it beating powerfully in a manner that recalls the downward thrust of a main limb artery ligated in an amputation. The operation follows the usual lines of arterial surgery. While special arterial clamps are helpful they are not essential, and no instrument is called for that is not usually available in every theatre. In addition to the materials for arterial suture, it is advisable to have a suitable soft rubber catheter in paraffin, to which a syringe containing 2 per cent. sodium citrate can be attached. The arteriotomy wound can then be flushed, if necessary, to get rid of small adherent particles of thrombus. There is no agreement as to the best site at which to open the vessel. Incision immediately proximal to the clot, if anatomically convenient, has the advantage that it is through healthy artery of convenient size for suture. The embolus may extrude itself, as in this case, or may need to be "milked out," or extracted with forceps. In closure intimal apposition is secured by everting the edges of the arterial wound with a mattress suture, which may be interrupted or continuous.

The recorded cases show that the time factor is of paramount importance in prognosis. Andrews and Harkins⁵ believe that operation after ten hours is usually too late to save the limb. Danzis⁶ stresses the time factor, and points out that in early cases 60 per cent. of good results may be expected, but that even at the end of twenty-four hours operation is not too late to lessen the chances of gangrene arising, or of removing the site of gangrene further distally than it would otherwise have been. Neuhof⁷ holds that the symptoms of vascular occlusion are due to the thrombus which forms in relation to the embolus, and that "early" operation is not really so early after all. In both the successful cases I have seen, however, the onset was apparently sudden, and gave no warning symptoms of impending vascular occlusion such as a developing thrombus might be expected to show.

There is no real doubt that early operation is imperative, and that the condition is one of real urgency: recognition of this may save many a limb. No conditions could have been more favourable than those in the cases of Jefferson, Gray Banks, and in the one recorded above; in each case there was a single embolus occurring in a patient, apparently in good general health, during post-operative convalescence in hospital.

SOURCE

The recorded cases divided themselves into two main groups: (1) those in which a cardiovascular lesion exists, and (2) post-operative or post-parturition. A few occur in acute infections. Jefferson emphasized the important part played by the heart as a source of small emboli, either from vegetation or intracardiac thrombosis. There seems little doubt that mural thrombi are not uncommon, and it is probable that they are more prone to occur with cases of infection or following operation. An origin from systemic veins or the right heart postulates the existence of a patent foramen ovale. There was no clinical evidence of heart disease in this case.

In this connexion it may be of interest to mention a case which I have seen since, of embolism of the popliteal artery, in which the probable source was demonstrated at necropsy. The man was 66, and moribund with cardiorenal failure. The left leg became cold, and no pulse could be found in the popliteal anterior or posterior tibial artery. No lump was palpable over the line of the artery, but by auscultation I was able to locate the block about the level where the artery passes through the adductor magnus to the back of the limb. The patient was only a few hours from death, so no operation was attempted. At necropsy I found the block at the level indicated, and in the ascending aorta an atheromatous plaque, 3/4 inch in diameter, which was ulcerating and partially free, and bearing on its surface a thin, shaggy, fibrinous layer—I think almost certainly the source of the embolus. A splenic infarct was also present.

REFERENCES

- ¹ Key, Einar: *Ergeb. d. Chir. u. Orthop.*, 1929, xxii, 1. (Quoted by Andrews and Harkins.)
- ² Idem: *Surg., Gynecol. and Obstet.*, 1923, xxxvi, 309.
- ³ Jefferson: *British Medical Journal*, 1925, ii, 885.
- ⁴ Banks: *Ibid.*, 1932, i, 57.
- ⁵ Andrews and Harkins: *Ann. of Surg.*, 1932, xcvi, 40.
- ⁶ Danzis: *Ibid.*, 1928, lxxxvii, 667.
- ⁷ Neuhof: *Ibid.*, 1932, xcvi.

On his retirement, after thirty-eight years' service as medical officer of health for Portsmouth, Dr. A. Mearns Fraser has received a personal tribute in the form of a cheque from a large number of subscribers. Sir Thomas Bramsdon, who made the presentation, remarked that at Dr. Fraser's appointment in 1896 he was the youngest medical officer of health who had ever held so important an office, and he had held it longer than any other in the United Kingdom. Under his guidance Portsmouth had attained a position second to none in the country as regards health matters, while Southsea had won a deservedly high reputation as a coast resort. Another important reform which Dr. Fraser had assisted in promoting was the inspection of meat, and the drawing up of regulations, which had been widely adopted. He had taken an active part in pressing for the clearance of slum areas, and for the purification of the Portsmouth water supply. In 1912 he had been invited by Mr. Lloyd George to become a member of the original Departmental Committee on Tuberculosis. Of its seventeen members only two were medical officers of health. A further activity of his was the drawing up of special regulations for the control of venereal diseases. Previous appreciative gifts had been made to Dr. Fraser by the Lord Mayor and Corporation, the Health Committee, the Corporation officers, and the Portsmouth Midwives Association.