bodies to any of the three types of poliomyelitis virus. Two injections of vaccine were given at an interval of four weeks and antibody levels determined two weeks after the second dose.

Antibody titres of 4 or greater were produced by all subjects to types 2 and 3 and by all except 12 to type 1. In general the responses were similar to those previously reported in children aged 1 to 9 years, although there was some indication that the older group did not respond to type 1 as well as the younger group.

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VENOUS DRAINAGE OF ANTERIOR TIBIO-FIBULAR COMPARTMENT OF LEG, WITH REFERENCE TO VARICOSE VEINS

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The surgical treatment of varicose veins of the lower limbs at the present time usually consists of some combination of ligation, stripping, and injection of the long and short saphenous systems. Provided care is taken in the choice and use of these methods, good results are to be expected.

It early became clear that ligation of the long and short saphenous veins at the saphenous opening and in the popliteal fossa respectively would not control all cases even when combined with stripping of the main vein. Some at least of the poor results have been due to failure to appreciate and deal with incompetent perforating veins in various parts of the lower limbs, such as those described by Cockett (1955).

In examining this problem our attention has been drawn to the relatively constant pattern of the venous drainage of the superficial tissues of the anterior part of the leg—i.e., in the skin and superficial fascia overlying the anterior tibio-fibular compartment. Some of these anterior compartment veins tend to drain, independently of the long and short saphenous systems, into the deep veins of the leg. Hence superficial varicosities may be encountered in this compartment without any corresponding saphenous varicosity, although incompetence in these "perforating" veins may, by virtue of connexions with the long and short saphenous systems, give rise to recurrent varices in these veins. Such "non-saphenous" varicosity is uncommon and yields to ligation of the perforating veins where they pierce the deep fascia.

This paper both records an investigation into the anatomy of these anterior leg veins and reports the

results of the treatment of varices thereof. The investigation was carried out on 19 dissecting-room legs and on three legs amputated at operation. The position and relationship of the perforating veins as they pierced the deep fascia of the anterior tibio-fibular compartment were recorded. The amputated legs were dissected after injection with latex to show the deep connexions of these anterior perforating veins.

Anatomical Details

A series of veins perforating the deep fascia investing the anterior department of the leg was found in all cases; a typical arrangement is illustrated in Fig. 1. The perforating veins varied between 4 and 10 in number and were situated in an irregular linear distribution, between 2 and 5 cm. behind the crest of the tibia. One constant vein piercing the extensor retinaculum in front of the ankle-joint has been termed the "pre-malleolar vein," and another perforating vein midway up the leg the "mid-crural vein." The remainder were scattered more or less evenly between the level of the superior tibio-fibular joint and the ankle. In the dissecting-room specimens the diameter of the perforating veins varied from about 2 mm. down to vessels little larger than thick thread.

The pre-malleolar vein constantly afforded communication between the superficial veins of the dorsum of the foot and the deep veins of the leg. The mid-crural vein usually had no communication with the long or short saphenous veins, but occasionally was found to anastomose with an anterior branch of the long saphenous passing over the subcutaneous border of the tibia (Fig. 2). This pre-malleolar vein is distinct from the lateral ankle-perforating vein described by Dodd and Cockett (1956), which winds around the fibula, draining into the peroneal vein. The remaining perforating veins were usually devoid of visible anastomosis with the long and short saphenous veins and appeared merely to drain localized areas of the skin.

The three amputated legs dissected after injection showed that the veins of the anterior tibio-fibular compartment drain into the venae comites of the anterior tibial artery

FIG. 1.—Diagram showing origins of perforating veins found on dissection in anterior tibio-fibular compartment of leg. X indicates sites of perforation of deep fascia.

FIG. 2.—Dissection of amputated specimen, showing sites at which perforating veins pass through deep fascia.

beneath the extensor muscles of the leg. In one dissection a communication was also noted to pass through the interosseous membrane to join a plexus of veins around the peroneal artery deep to the flexor hallucis longus. These perforating veins are subsidiary to the tributaries of the long and short saphenous veins, which are responsible for the main drainage of the compartment, and are of importance only when they become incompetent or feed an incompetent saphenous system.

Clinical Material

Varicosities of the anterior perforating veins of the leg alone are rare, but two patients have been seen in whom there was no involvement of either the long or the short saphenous systems (Fig. 3). In both patients the varicosities

such cases the ulceration may be due to varicose veins of the short saphenous being fed by a large mid-crural perforating vein. In other cases where there have been no varicose veins visible in the lateral side of the leg, phlebograms have shown a large pre-malleolar perforating vein in the base of the ulcer. Exploration of the ulcer, as described by Cockett (1955), with ligation of the perforating vein, has resulted in healing of ulcers which have been unhealed for many years in spite of various forms of treatment.

Treatment

Treatment of varicosities of the anterior veins, without involvement of the long or short saphenous systems, should be by ligation at the site where the vein perforates the deep fascia, followed by retrograde injection with a sclerosing agent, since stripping of these veins is not usually possible. It is advisable to perform phlebograms to determine the exact point of perforation, as the varicosities themselves are often some distance from this site, and there is no constant anatomical landmark as in the case of the long and short saphenous systems.

When occurring in association with varicosities of the saphenous systems, care must be taken to ligate the anterior communicating veins, in addition to the stripping and ligation of the main saphenous systems.

Summary

The anatomy of the venous drainage of the anterior tibio-fibular compartment is investigated in 19 dissecting-room specimens and three amputated legs. A number of constant perforating veins are described, including their connexions and communications, and their importance in the treatment of varicose veins is discussed.

Cases are reported in which varicosities have developed in these veins both independently and together with main saphenous varicosities. In successful treatment of such cases it is essential that these anterior leg veins are ligated separately.

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FIG. 3

FIG. 4

FIG. 5

FIG. 3.—Infra-red photograph of varicose veins related to anterior perforating veins. FIG. 4.—Phlebogram showing site of perforation of perforating vein (mid-crural). FIG. 5.—Phlebogram showing mid-crural perforating vein (A) communicating with a varicose branch of the short saphenous vein, and the pre-malleolar perforating vein (B) arising in tibio-fibular compartment of leg.

were not controlled by a tourniquet obliterating the long saphenous vein in the thigh or by occlusion of the short saphenous vein below the knee. The site of origin of this vein was shown on phlebography (Fig. 4) to occur in the middle third of the leg midway between the tibia and fibula—that is, the mid-crural vein described above. No connexions were visible between this vein and the saphenous systems. Ligation of the perforating vein where it pierced the deep fascia was performed in both patients with excellent results.

It is suggested that either the development of valvular incompetence in one of the anterior perforating veins leads to superficial venous dilatation in the anterior tibio-fibula compartment, or that in certain patients the veins appear to enlarge so as to form a "third" saphenous vein.

In a number of other cases varicosity of these anterior perforating veins occurred in conjunction with varicosities of the saphenous systems (as seen in Fig. 5), with consequent intercommunication. In recurrence of varicose veins following extensive ligation and stripping operations it may be that the varicosities fill from these anterior perforating veins, ligation of which would control such filling.

Ulceration on the lateral side of the leg is rare, and when it does occur is slow to heal and often breaks down. In

The Supplement to the Registrar-General's Statistical Review for the years 1952 and 1953 (H.M.S.O., 11s. 6d.) analyses statistics relating to patients in mental and mental deficiency hospitals. It is more detailed analysis than on previous occasions. In the tables first admissions to mental hospitals are distinguished from subsequent admissions, and a special chapter analyses the first admissions to mental hospitals in 1949-53 of men aged 20 and over according to diagnosis on admission and occupation. Serial tables are given for the first time showing trends in admissions, discharges, and deaths in the years 1949 to 1953 and the resident populations of the hospitals at December 31 in each of these years.