SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

TREATMENT OF VARICOSE VEINS

BY

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Varicose veins afflict such a huge number of people that here lies a tremendous therapeutic field, and for those who make themselves proficient in this line there are plenty of patients waiting to be treated; and very grateful they will be for the excellent results now to be obtained in this important branch of minor surgery.

Aetiology

The aetiological factors most concerned in the development of varicose veins are:

Occupational.—Prolonged standing, especially in hot rooms, is particularly harmful. It is sometimes said that a chronic ulcer of the leg is a better recommendation for a cook than endless testimonials.

Pregnancy.—Here is provided a mechanical and a hormonal cause. The veins of pregnancy regress greatly after delivery, so it is unwise to inject them till well after delivery. It is well to bear in mind that miscarriages, delivery mishaps, phlegmasias, and even the baby's blemishes will be ascribed to these injections. It is better during pregnancy to rely upon support of the swollen veins by adhesive strapping or bandages and treat only those which persist after childbirth.

Heredity.—Venous complaints tend to run in families and may take the form of varicose veins, thrombophilia, embolism, ulceration, and so on.

Phlebitis.—It is probable that even the mildest phlebitis leads to shrivelling of the venous valves, and this starts a spreading venous incompetency. More severe phlebitis will give rise to fibrosis of the muscularis with resulting mural incompetency. Sometimes obstructions in the deep veins cause dilatation in the superficial venous tree, but it is certain that valvular and muscular incompetency are the root of the trouble in almost all post-phlebitic cases. Certain debilitating diseases not actually complicated by phlebitis also seem to lead to the development of varicose veins.

Trauma.—An injury to a superficial vein sometimes causes a traumatic thrombosis, and, following on this, valvular or muscular weakness in the injured vein may lead to the development of varicose veins. It is possible also that violent exercise may result in the rupture of a valve in the vein, and vigorous athletes are often given this explanation for their varicose veins in later life. The bursting of the posterior tibial vein ("ruptured plantaris") is an athletic injury which occasionally leads to varicose veins.

Classification

Classification of varicose veins is extremely difficult, and yet it is very important from a therapeutic and prognostic point of view. First of all grouping may be made according to the veins affected.

Internal Saphenous Group.—These originate in the groin, but often are only visible below the knee. The vein from groin to knee being too deep to be visible or even palpable, it often happens that it is overlooked and left untreated, with the result that recurrence is inevitable if treatment is directed to the visible veins only.

External Saphenous Group.—These veins terminate at the popliteal space, and the largest veins and complications develop on the outer side of the ankle.

Gluteal Group.—These drain into the internal iliac veins. They are generally very superficial and extremely tortuous, and appear on the back of the thigh.

Pudendal Group.—These show themselves above the pubis and in the scrotum and vulva, and are really in the internal saphenous group, as they drain into the saphenous vein. They sometimes constitute an important pathway following iliac thrombosis, the blood passing from the affected leg across the midline into the saphenous vein on the opposite side. In these cases the varicose veins should be preserved, in other cases injected.

Deep Veins.—Possibly the word "varicosity" should not be used in connexion with these veins, as, although incompetent, they are so supported by muscles that they do not distend. Some of the most troublesome complications occur in this group. Their presence can be inferred when venous circulatory effects develop out of all keeping with the visible superficial varicose veins. In this group lie the worst cases from all points of view.

The varicose veins themselves can be of many types.

Telangiectatic veins lie so close to the skin that the blood is clearly visible. These veins are often so small that they are difficult to inject. The injection with a very fine needle of a soapy solution made into "suds" seems suitable for these veins because one has visible proof of injection through the translucent vein walls.

Small isolated groups of tortuous veins without any great pressure, and only appearing on long standing or in hot weather, are very well treated by injection alone.

Veins with high-pressure contents—often with an impulse on coughing; injection alone gives very temporary results and must be supplemented by well-placed ligatures.

Concealed varicose veins occur in fat or oedematous legs, the veins not being apparent because of being buried in the subcutaneous fat and showing only when they expand in places into cystic dilatations. These veins are easily palpated through the skin, and when the oedema is callous they can be felt as channels in the subcutaneous induration. Thorough treatment by ligature and injection produces satisfactory results.

Extremely numerous and tortuous veins without remarkably high intravenous pressure are often found in fat women past the child-bearing age, affecting the whole leg from groin to ankle. These veins are very tortuous and involve all the three superficial systems, which are interlinked by varicose connecting veins. Injection here is beyond human patience, and even when supplemented by ligation the results are often disappointing because of the gluteal anastomoses and incompetent deep veins.

Superficial veins in association with deep incompetency, with or without a history of femoral thrombosis, should be very cautiously treated, and their abolition may not help the complications. It has been my custom, if there are no contraindications, to treat these cases by injections alone, and to carry these out from below upwards so as to thrombose the venous pools lying below the ulcerated or eczematous areas. The injections are generally supplemented by support of the leg by an elastic stocking or bandage.

Solutions Used in Injection Therapy

Many solutions have been suggested since perchloride of iron was first used in France nearly ninety years ago. At the present time the favourite solutions are:

Quinine (12 per cent.) and Urethane (6 per cent.).—The maximum dose is 2 c.cm. This solution has a powerful sclerosing effect. It is not painless; it can excite allergy; and personal idiosyncrasy is a danger. In busy clinics the patients seem to faint rather frequently, and the women patients often have very violent uterine colic on the way home and premature menstruation next day.

Salicylate Solutions.—Sodium salicylate and lithium salicylate (30 per cent.) with tutocain (1 per cent.) in doses up to 5 c.cm. are the favourites. Pain is produced, idiosyncrasy is encountered, vertigo and tinnitus may occur, and allergy may develop. As with quinine, the tissues slough badly when the solution escapes. The solutions blacken on standing, but this can be countered by adding a trace of sodium pyrosulphite.

Soapy Solutions.—Sodium morrhuate and gynocardate (5 to 10 per cent.)—dose up to 5 c.cm.—are the favourites. They cause no pain and the tissues tolerate a fair amount of leakage of the solution without sloughing. The main disadvantages are the allergic manifestations of urticaria, eczema, severe sacralgia, and sometimes highly dangerous anaphylaxis. The veins also recanalize more often with these solutions. Two annoying features are the irregularity of effect even in the same patient and delayed response, sometimes as long as a month after the injection. In superficial telangiectatic veins a severe reaction may cause sloughing of the injected veins. Sodium morrhuate is therefore preferable when intravenous pressure is not high and when injections are not likely to be numerous. A newcomer in this group is ethamolin (ethanolin oleate), which is painless and seems to produce a uniform and steady response and not to slough the tissues easily. I have not used it for any lengthy period, and it takes a long time to learn the disadvantages of any solution, but it certainly appears to be an improvement on the earlier solutions. Like all other organic compounds it must have allergic disadvantages. Fortunately those are not so important now because of the reduced number of injections required after ligation of the main vein. All the soapy solutions have the advantage that blood does not ooze from the puncture after the needle is withdrawn.

Strong solutions of glucose (50 per cent.) and salt (30 per cent.) have gone out of favour and are only occasionally used in allergic cases.

Technique of Injection

The patient should be either lying down if the veins are large or sitting if small. The standing position is fraught with danger. The crouched position of the

FIG. 1.—Method of steadying needle in cork while stroking the bevel with sharpening-stone.

operator and the unsteadiness of the patient render accurate work difficult. Standing the patient on a high table only makes matters worse, because fainting is common and a serious fall may result. Any change of position of the patient, releasing of a tourniquet, or emptying of the vein after the insertion of the needle is dangerous, as it may lead to dislodgment of the needle and misplacement of the injection.

One of the main essentials is a perfectly sharp needle. The points are so easily bent over by a slight knock that the needle should be scrutinized before use and sharpened with a needle hone if necessary (Fig. 1). The needle

should be size 12 for all good-sized veins, 16 for smaller ones, and 20 for the tiny blue veins just under the skin.

Order of Injection

It is logical to inject the higher veins first because they feed the lower ones. However, in cases in which femoral thrombosis has occurred years previously injections should be in the reverse order and only the veins below the knee injected, the object being to obliterate the lower venous pools, leaving the superficial veins in the thigh as possibly useful channels.

Intervals of Injection

Seven days between injections seems the best time, and following any sharp reaction a postponement of another seven days is wise. It is often quite justifiable to inject more than one vein at a time, dividing the sclerosing dose between two or three veins. It is well to start a course cautiously, preferably using a non-pain-producing solution for the first injection and choosing a particularly easy vein. Later on, when confidence is established, more difficult and more painful injections will not lead to the disappearance of the patient.

Contraindications to Injection

General conditions, such as old age, diabetes, high blood pressure, and so on, should deter one unless in very special circumstances.

Thrombophlebitis.—When there has been a previous femoral thrombosis injections should only be carried out if varicose veins are producing complications and it is seen that there are definite plexuses close to the affected skin, and then the injections should not be pursued very far. When the patient has a thrombophilic history and a very murky past as regards thrombosis and embolism on the slightest provocation or an attack of thrombophlebitis migrans, then it would be madness to give any sclerosing injections. I have often seen calamitous results from other irritant injections (novasurol, uroselectan, etc.) in such people. The bland thrombosis coming on in tortuous cystic veins of long standing with very little inflammatory reaction is not a contraindication to injection as in the vicious types, and one can even go so far as to inject the other leg while the thrombosis is resolving in the affected leg, under ambulatory treatment.

Septic Conditions.—It is most unwise to inject through infected eczematous skin, and it is egregious to counsel injecting through the septic floor of an ulcer. Naturally any febrile condition (lymphangitis, cellulitis, etc.) is a contraindication.

It is wise not to inject at the time of menstruation, and pregnancy is a complete contraindication to injection treatment.

Treatment by Ligation and Injection

The position of injection treatment at the present time is that it is only effective alone in the milder cases with low pressure in the veins and no positive Brodie (Trendelenburg) sign; and it is a most valuable adjuvant to the high ligation treatment. This latter treatment would be quite ineffective by itself, but, combined with injections, most beautiful and probably permanent results are obtained: the injection treatment now makes a simple surgical operation effective, and we are at last saved from the humiliation of almost 100 per cent. failure of the older operations, even the most ruthless, which in Teutonic hands sometimes verged on surgical atrocities (cf. Schede and Rindfleisch-Friedel operations).

Ligature is the treatment of choice when the veins are large, show an impulse on coughing, and fill from above after lying down (Brodie test). The treble tourniquet test of Ochsner and Mahorner is very useful for deciding if the saphenous vein should be tied in more than one place. The tourniquet is placed as shown (Fig. 2)

FIG. 2.—Positions of the tourniquet used to discover the situation of incompetent veins communicating with the deep system. *N.B.*—Veins shown represent some of the different types met with, and arrows mark the four points of possible ligation.

and tight enough to stop the flow through superficial veins. If on walking the veins now disappear the inference is that the only incompetent valve is at the saphenous opening, and a ligation of the saphenous flush with the femoral vein is all that is required. If with the tourniquet in the groin the veins do not disappear on walking the same test is applied with the tourniquet in mid-thigh—then finally just above the knee. By these tests another level for ligation of the saphenous is found below the incompetent communicating vein thus discovered. If the veins do not disappear in any of the positions, then the external saphenous requires attention or there are incompetent deep veins. The four possible sites of ligation are therefore as shown in Fig. 2, but it must be remembered that the high ligation is essential in all cases, the lower ligatures being complementary.

There is no need to describe the technique of the lower ligatures, but the high ligation must be done exactly as follows. The patient is instructed to take a bath on the day of the operation and shave the pubic hair away on the side to be ligated. The line of the incision is infiltrated with novocain 1 per cent. containing 5 drops of liquor adrenalini to the ounce. The incision may be transverse or oblique at the level of the flexure of the groin (Fig. 3), placed over the saphenous opening, which is an inch internal to the pulsating artery. The saphenous vein is then dissected out and at its upper end a number of radicles joining it and the femoral vein in this region are dissected out and double-tied and divided. The important named veins thus tied are the superficial epigastric, the circumflex iliac, and the superficial external pudendal veins. Sometimes the deep external pudendal comes into view also and is dealt with. The veins here are very variable in their distribution, so a good view must be obtained, and it is necessary in some cases to tie and

divide as many as eight branches. All the minor veins being dealt with, the saphenous is divided and 2 c.cm. of ethamolin is injected into the distal end, after which the vein is ligated below the puncture and the proximal end tied securely with transfixion. (Fig. 4.)

The main mistakes made in this operation are: (1) failure to tie all the small branches, thus providing channels for recurrence; (2) the saphenous vein is sometimes in two almost equal parts, uniting in the saphenous opening, and the operation may be carried out on only one of these branches; (3) the femoral vein might be tied, mistaking the main saphenous vein for a tributary such as the external superficial femoral.

On completion of the ligature the wound is carefully stitched with very fine sutures, and a firm dressing is applied with elastoplast in such a way as to prevent any contamination of the wound from above. The patient is told to refrain from bathing and to return in a week, when the stitches are removed and a lower ligation is done if it has been indicated by the tests, and, if not, injection of the unthrombosed veins is begun. Most gratifying is

FIG. 3.

FIG. 3.—Situation of oblique and transverse incisions, showing how high these must be placed. F = Femoral artery. S = Saphenous vein. P = Poupart's ligament.

FIG. 4.

FIG. 4.—A very common arrangement of the veins at the saphenous opening. P = Superficial external pudendal. E = Superficial epigastric. I = Circumflex iliac. E.S.F. = External superficial femoral. I.S.F. = Internal superficial femoral.

the speed with which these thrombose and disappear, and seldom are more than six injections required to thrombose the whole varicose arborization.

The complication most to be avoided is sepsis, which in this region abounds, so it is important to carry out the operation in favourable surroundings and with a good light, and not entirely single-handed. With patients who can afford it a night and a day in a nursing home is probably safest, and in the case of very stout patients this stay might be extended to two or three days. It is important, however, not to keep the patient in bed, as this leads back to the mortality rate of 1 or 2 per cent. from pulmonary embolism which characterized the old-time operations. The ambulatory nature of the treatment prevents embolism, which is due to soft "deposition" thrombi, the sequel of venous stagnation.

Complications of Injection Therapy

Fainting is troublesome, and is avoided by injecting the patient reclining or sitting back with eyes averted, and by clean quick work with a well-sharpened needle.

Allergic collapse is counteracted by injecting 3 minims of adrenaline diluted with 2 c.cm. of water into the varicose veins and raising the leg. Naturally, early allergic warnings such as urticaria should not be ignored, and the injection solution must be changed.

Excessive reaction and ascending phlebitis should *not* be treated by rest in bed, because the few deaths from embolism after injection have all occurred in this way. The clotted veins must be covered with pads of sorbo sponge a quarter of an inch thick and above the highest clot with a pad half an inch thick, and the whole leg then bandaged firmly with elastoplast from toes to the highest pad. Very firm pressure is needed, and the patient's protests about the tenderness of the veins must be ignored, because in a few hours the most remarkable comfort will be experienced. The bandages are worn till all inflammation has gone.

Necrosis is best treated in the same way, and the treatment is best not left till the skin has broken and the secret is out. Great comfort is secured, and the separation of the slough is not observed by the patient. Healing occurs very smoothly and, the lesion being out of sight, reproaches are fewer and the frequent regrettable changes of doctor may be avoided.

REVISION OF THE "BRITISH PHARMACOPOEIA"

In a lecture to the Pharmaceutical Society of Great Britain on April 9 Dr. C. H. HAMPSHIRE, secretary of the British Pharmacopoeia Commission, described the work which has been proceeding steadily since 1936 with a view to the publication of the new volume of the *British Pharmacopoeia* in 1941. Dr. Hampshire stated that the work of most of the committees has reached a stage at which publication of recommendations is possible; already four reports have been published and others are in preparation. None of the matter recommended for inclusion can be regarded as finally approved; everything is subject to reconsideration in the light of comments and of additional information which may be received.

Publication of the next issue is likely to be delayed by the war, though the work of revision goes on, and addenda may be published from time to time. The policy of the Commission has been to make the *Pharmacopoeia* conform so far as possible to current international agreements.

The *Pharmacopoeia* was intended originally to provide a list of medicines and compounds and the processes for preparation, the idea being to keep so far as possible in line with current medical practice, but food and drug legislation has given it also the position of a book of standards, and has made it necessary that the definitions, tests, and analytical control should be as complete as possible. Dr. Hampshire mentioned that the next *Pharmacopoeia* would include many more galenicals and compounded preparations of special repute. Some of these are already described in the *Codex* of the Pharmaceutical Society, to which, at the last revision in 1932, many such preparations were transferred.

Substances which are the subject of patents were not formerly described unless licences to manufacture had been granted to a number of firms. The modified rule has now been made that certain substances may be included if the patent rights are due to expire within a few years after the publication of the *British Pharmacopoeia*.

Chemicals and Galenicals

The new organic chemicals include sulphanilamide (para-amino-benzene sulphonamide), which is recommended as the best-known member of the sulphonamide group free from patent complications. Mandelic acid and calcium mandelate are also included, as is calcium laevulic, used as a means of giving calcium by injection, and recommended for inclusion in order that methods of preparing and sterilizing injections may be defined. Concentrated infusions and concentrated aromatic waters were introduced for the first time into the current *Pharmacopoeia*. The principle of defining concentrated preparations which can be diluted by the pharmacist

at the time of dispensing has been applied more widely during the present revision. The proposed formulas for a number of syrups are now based upon the dilution of a tincture or liquid extract, or of a specially prepared concentrated solution with syrup.

In order to meet the difficulties which have arisen from the use of the various names and synonyms for ointment containing metallic mercury it is recommended that the ointment of mercury of the current *Pharmacopoeia*, containing 30 per cent. of mercury, should be continued with the synonym "mercury ointment," and that a diluted ointment of mercury, containing 10 per cent., and carrying the synonym "blue ointment," should be introduced, with the note: "When mercury ointment or mercurial ointment is prescribed or demanded, diluted ointment of mercury shall be dispensed or supplied, unless, on inquiry, it is ascertained that ointment of mercury is required."

The principal preparations of the vitamin group recommended for description are standardized concentration solutions of vitamins A and D. As regards sera and other biologically tested preparations, the *Pharmacopoeia* is kept closely in line with the regulations under the Therapeutic Substances Act, and extends to other parts of the British Empire, in which it is accepted as a legal standard, the control of biologically tested substances which is provided by the regulations themselves so far as Great Britain and Northern Ireland are concerned.

Correspondence

Owing to the restricted supply of paper the space devoted to correspondence has had to be curtailed. A number of letters received for publication have therefore had to be held over.

The Suprapineal Arachnoid Body

SIR.—This name has been suggested by Professor W. E. Le Gros Clark in his article on "A Vascular Mechanism related to the Great Vein of Galen" in the *Journal* of March 23 (p. 476) to denote a "vascular granulation" situated in the receding angle between the termination of the great vein of Galen and the straight sinus, and lying above and behind the pineal body. The granulation is described as "closely resembling a much enlarged arachnoid granulation" or Pacchionian body, and the hypothesis is put forward that this structure may play an important part in regulating the venous flow through the great vein of Galen or *vena cerebri magna*. A photomicrograph of a sagittal section through the granulation and adjacent structures in a human subject shows the general relations of the arachnoid body, and more particularly (1) the junction of the great vein of Galen with the commencement of the straight sinus, (2) the relation of the apical portion of the arachnoid body to the vein and sinus, (3) the superior vermis of the cerebellum on which the base of the conical arachnoid body rests, (4) longitudinal sections of portions of a fine nerve, which has been traced by the author "from the pineal gland to the floor of the straight sinus, which it reaches after passing through the suprapineal body." The apex of the granulation is stated to be adherent to the dura mater and to narrow quite definitely the entrance of the vein into the straight sinus, and the view is expressed that if the "sinusoidal vessels" of the granulation become distended the granulation will bulge upwards into the floor of the anterior end of the straight sinus—"the thin lower lip of the opening of the sinus being pressed in contact with the upper lip, where the latter forms a sharp angle with the dorsal wall of the vein of Galen." "In other words, the structure seems to form a ball-valve mechanism, whereby the venous return from the third and lateral ventricles may be impeded."

There are two principal points in this description and the hypothesis based upon these observations which are open to criticism.