THE SCOPE OF OPERATION IN TREATMENT OF VARICOSE VEINS

BY

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The introduction of injection methods of treating varicose veins focused attention on an important and rather neglected disease which is responsible for much ill-health, disability, and inefficiency. During the past fifteen years or so not only has the stimulus of the newer methods shown the value of injection treatment but the experience gained has clearly indicated the place of operation in dealing with varicose veins. At the present time it is true to say that every case of primary uncomplicated varicosity, however severe, can be "cured." By "cure" is meant the obliteration of the entire varicose circulation either by injection or by operation, or by a combination of these two methods. Using the word "cure" in this restricted sense, then, there are few cases which cannot be "cured" relatively quickly and completely. This paper is based upon the personal experience gained in treating over 1,300 patients for varicose conditions of the lower limbs. An evaluation of the place of operation must not, however, be taken to imply any serious criticism of the efficiency of injection for the majority of cases. But time has shown that if *all* cases are to be treated efficiently, irrespective of the nature and extent of the disease, then operation must still have a place in the scheme of treatment.

Untreated varicosity is almost always a progressive condition. The speed of progress is determined by many factors: family history, build, age at onset, pregnancies, the nature of the veins themselves, the patient's occupation, etc. If the condition remains untreated, complications such as congestive phenomena, dermatitis, ulceration, bone involvement, the various types of phlebitis, and disabilities due to scarring, etc., may develop. With existing methods of treatment it should be possible to avoid all varicose complications. The cause of varicosity is still unknown, but the evidence suggests that hereditary and endocrine factors are probably the most important ones. The surgeon cannot cure or influence this innate tendency to varicosity, but by treatment he can bring about a cure of existing varicosities, and by obliterating the varicose circulation the progress of the disease can be slowed.

This paper is particularly concerned with the operative treatment of primary varicosity in the uncomplicated stage. Uncomplicated cases include all those up to the congestive stage but exclude those beyond this—namely, dermatitis, ulceration, phlebitis, etc. Surgical treatment may, of course, be required for some of these complicated cases, and although many of the principles which are described are also applicable, with modifications, to the advanced group of cases, the complicated ones are not considered here in detail. The term "primary varicosity" excludes all cases in which the varicosity develops secondarily to an obstruction of the deeper vessels—e.g., femoral thrombosis (Payne, 1938).

Varicose veins may be treated by injection in most cases, by operation alone in a few, and in some by operation and subsequent injection. The proportion of cases requiring either operation or operation and injection will, of course, be determined by the severity and nature of the condition.

Aim of Treatment

The *anatomical* aim of all forms of radical treatment, whether by injection or by operation, is to bring about obliteration of the varicose vessels either by thrombosis and organization or by actual removal. The *physiological* counterpart of this is the functional obliteration of the varicose circulation with its stagnation and congestive phenomena and the tendency to a to-and-fro movement of the blood. The *clinical* counterpart is the relief of symptoms, the removal of mechanical factors favouring the progress of the disease, and the elimination of the risks of possible complications. The anatomical, physiological, and clinical aims of treatment can be attained either by injection or by operation, or by a combination of operation and injection. No single method is suitable for all types of cases, but together they make it possible to treat every type of case that is met with clinically. Naturally the more severe or extensive cases are those which are likely to require operative treatment, but severity and extent are by no means the only criteria.

Indications for Operation

The indications for operative treatment may be absolute or they may be relative. Absolute indications are those conditions which offer no effective alternative to operation. Relative indications are those conditions in which operation may have advantages when compared with injection. In practice it will be found that cases fall into three groups from the point of view of treatment: first, those in which operation offers the only real prospect of cure; secondly, those in which operation offers better chances of more permanent cure; and, thirdly, those cases in which there are no indications for operation but which can be treated effectively by means of injections. The aim of operation is to obliterate all incompetent veins which are not likely to respond readily to subsequent injections. Throughout this paper the word "varicosity" is used to include all types of veins associated with valvular incompetence, irrespective of the presence or absence of tortuosity, gross dilatation, or thinning of the vein wall.

1. Absolute Indications

Anatomical Extent.—Involvement of the main internal saphenous vein above the level of the knee-joint is usually an indication for operative treatment, and the nearer the pathological change approaches the saphenous opening the stronger will be the indications for operation. This

assumes the presence of valvular incompetence in the affected vein, with reflux of blood on coughing, etc. Tortuosity and moderate size will in general be factors in favour of injection. Straight thick-walled veins (see Ectasia, below) or colossal tortuous veins will be factors in favour of operation.

Presence of Saphenous or Other Varices.—A large single varix or multiple varices do not give certain or permanent results with injection methods. All varices are commonest in the thigh, especially at the saphenous opening. A further point in favour of operation in these cases is that in many the dilatation is situated on veins which show mainly ectasia and are thick-walled, dilated, and straight, but incompetent.

Ectasia.—By ectasia is meant dilatation and increase in size of a vein associated with valvular incompetence, but the vein remains relatively straight and its walls are very thick. Ectasia thus differs from true varicosity, since in the latter the vein becomes tortuous and thin-walled; but valvular incompetence is just as pronounced in ectasia as in the case of tortuous veins, and the progress of the disease and the complications are common to both groups. Ectasia is especially likely to be found in young athletic males, but it is certainly not unknown in women. The condition may involve only the internal saphenous vein or it may involve all the superficial veins of the lower limbs. In practice ectasia is often found in the main saphenous vein in the thigh, while the calf veins show either a combination of ectasia and varicosity or pure varicosity. The presence of ectasia has important bearings upon the question of treatment. Veins which show ectasia do not respond at all well to injection methods; and I have had patients referred to me who have had twenty or more injections in such veins without producing any thrombotic response. Furthermore, if thrombosis does occur these ectatic veins are especially likely to recanalize during the course of a few months. And it is a fact of clinical observation that the more thin-walled and tortuous a vein the more certainly will it respond to injections and the more permanent will be the obliteration, whereas the thicker and straighter the vein the less likely is it to thrombose, and if thrombosis does occur it is much less likely to be as lasting as in the case of tortuous thin-walled vessels.

Size of Veins.—Huge masses of tortuous veins are often best treated by excision, especially when they are the size of the index finger or thumb. Thrombosis of such colossal veins occasionally produces considerable pain and discomfort, and the resolution of the huge thrombosed mass may take from four to six months to complete. Nevertheless, mere size is not necessarily a contraindication to injection treatment; but operative treatment has the advantages of being quicker and less painful and of giving a better cosmetic result.

Failure of Response to Injections.—From time to time cases are seen which have given no appreciable response to injection treatment. It is usually found that cases that have not responded to adequate amounts of injection fluids are examples of ectasia rather than of true varicosity. In a few cases colossal varicosities do not thrombose owing to the diluting effects on the injection solutions.

Recanalization after Injections.—There is no doubt that it is possible for recanalization of an injected and thrombosed vein to occur. Recanalization is particularly likely to develop when injection treatment has been carried out and patent proximal but incompetent veins are left untreated between the site of injection and the saphenous opening. It is also likely to develop in ectatic veins in which the thrombosis has been incomplete or transient, and it may occur when incomplete treatment has been given to a huge sponge-work of veins with large numbers of

collateral channels. In all cases this recanalization is due to the reflux of blood from above and to the opening up of the thrombosed or partially thrombosed veins. Thus recanalization means either that unsuitable veins have been injected or that injection treatment has been inadequate, and it is invariably associated with patent proximal and incompetent veins. An incompetent internal saphenous vein in the thigh, whether associated with ectasia or varicosity, is often overlooked by the patient and by his doctor, especially when much subcutaneous fat is present. The patient complains of the obvious varicosity in the calf, but the incompetent thigh veins may not have been noticed. Injections to the calf veins in such a case may be followed by recanalization.

2. Relative Indications

The presence of certain conditions or factors may be relative indications in favour of operation as opposed to injection.

Rapidity of Development.—In certain cases the varicose condition develops very rapidly and almost as an acute process. This may happen at any age, but some of the most rapid cases I have seen occurred in women at the time of the menopause. Injection treatment in such cases is little more than symptomatic, and there is really a contest between the therapeutic thrombosis and the development of fresh varicosities. Operation in such cases may be the only practicable solution.

Family History.—The family history of varicosity and its complications must be taken into consideration when weighing the advantages of injection and operation. A bad family history obviously favours the more radical method.

Age.—The age of the patient must of course be considered. Relatively rapid development at an early age will favour operative treatment.

Occupation.—Employment which involves a good deal of standing rather than rhythmical walking may have to be taken into account as a factor favouring operative treatment. But the question of employment will rarely be the only indication for operation.

Geographical Considerations.—If a patient is going to a part of the world where he cannot get skilled attention, operative treatment may give better prospects of prolonged and permanent freedom from recurrences and complications.

Congestive Phenomena.—The presence of purplish discoloration and distended varicose on the feet and over the internal malleolus or inner and lower part of the shin indicates a serious degree of reflux in the saphenous system. These congestive phenomena must be taken as warnings that the saphenous circulation is inefficient and that the next stage will be dermatitis or ulceration. Incompetence of the main saphenous vein in the thigh is present in many of these cases. On these grounds there are often strong indications for operative treatment.

Other Complications of Valvular Incompetence.—The other complications of valvular incompetence—dermatitis, ulceration, and phlebitis, etc.—are not considered in detail, but it is obvious that when dermatitis and ulceration occur the indications for operative treatment already given may apply with added force.

Future Pregnancies.—Patients sometimes come under observation who have had trouble with veins or with phlebitis in a previous pregnancy and are contemplating another. Others who are contemplating a first pregnancy have had similar trouble. In some cases operative treatment may offer the greatest freedom from varicose trouble during pregnancy and the puerperium and in the future.

The Aim of Surgery

Whatever method of treatment is employed its object is always the same—namely, to obliterate the whole varicose circulation. This object may be attained partly by ligation and section of veins, partly by excision, partly by thrombosis between ligatures or excisions, partly by subsequent injections, or by injections alone. The treatment of each patient must be assessed in the light of the clinical history and of clinical examination. If there are indications in favour of operative treatment an attempt must be made to determine both its scope and the part to be played by subsequent injections. At the close of any operation the surgeon should be satisfied that any remaining veins can be treated readily and effectively by means of injections. No case is too severe for a combined attack by operation and injection, and at the completion of treatment it should be possible to say that 100% or nearly 100% of the varicose circulation has been put out of action in one way or another.

Pre-operative Treatment

The patient is admitted to hospital the night before operation. In an extensive and bilateral case both lower limbs are shaved, as well as the abdomen below the level of the umbilicus. The patient then stands in a good light and the veins are marked in with skin ink, the composition of which is as follows:

B.	Ac. pyrogall.	..	..	..	..	1 gr.
	Sp. vin. meth.	..	..	..	..	20 c.cm.
	Liq. ferri perchlor.	..	..	..	..	2 c.cm.
	Acetone	..	..	..	..	10 c.cm.
	Ac. hydrochlor.	..	..	..	..	1 drop
	Ft. sol.					

The main veins are inked in throughout their entire course, and all large varices and collaterals are indicated, as well as any other veins upon which it is decided to operate. The marking-in must include veins on both the front and the back of the lower limbs.

The whole region is prepared with spirit and iodine and wrapped in sterile towels. The skin preparation is repeated the following morning. The importance of careful preparation and asepsis in all operations on the subcutaneous veins cannot be too strongly stressed. Special attention must be directed to areas of skin showing atrophic change over underlying attached veins and to areas showing congestive phenomena. Areas of definite dermatitis or ulceration should be covered completely by sterile gauze rolls.

Anaesthesia

General anaesthesia is the method of choice, and gas-oxygen and ether are usually adequate. There are two objections to the use of local anaesthesia for multiple ligation or excision operations: first, in a bilateral case of average severity, in which operation has to be carried out at five or six sites in each limb, local anaesthesia takes considerably more time; secondly, although ligation can readily be performed under local anaesthesia, it is more difficult to use this method for the excision of an irregular mass of large tortuous veins in the thigh or calf.

Operative Technique

The nature of the operative procedures to be carried out will have been decided on at the time of examination and reviewed when marking in the veins. Whenever operative treatment is indicated I believe that minimal operations should be avoided. By "minimal" is meant a ligation at the saphenous opening and possibly at one other site. Operations of this type, even when combined with subsequent injections, rarely lead to complete obliteration of the varicose circulation. On the other hand, there is nothing

to suggest that surgery should be maximal. What should be aimed at in the individual case is a series of operations which will lead with subsequent injections to thrombosis and obliteration of the whole varicose circulation.

Position.—The patient is placed on the operating table in the dorsal position and the whole region below the umbilicus is again cleaned, and the feet or any other parts where operation is not required are covered with sterile towels. All anterior sites must be dealt with first, and if posterior veins are present the patient must be turned over on to his face.

Incisions.—It is preferable to start proximally and to work distally. The first ligation will be at the saphenous opening and the last in the lower third of the saphenous vein in the calf. Incisions must be planned in relation to the natural folds or creases, the nature of the local operation to be carried out, and the condition of the skin and subcutaneous tissues. Incisions in the line of the limb or in the line of the veins should be avoided.

The Affected Vein in Relation to Operation.—What is to be done at any particular site? This must be determined by the nature of the vein at that site. Ligation and division is indicated in the case of a straight or relatively straight vein, particularly if this is thick-walled, and in the case of a single large tortuous vessel. A single varix should be excised, the main vein ligatured above and below, and any collaterals also ligatured. A mass of tortuous veins with many anastomosing channels calls for a free excision. In many cases it will be found that ligation is required at the saphenous opening, in the mid-thigh, just above the level of the knee-joint, and in the lower third of the leg. In the upper third of the calf a more extensive excision is often required on account of anastomosing channels or multiple ectatic veins.

(a) *Ligation.*—The vein is exposed by an incision placed obliquely across its direction, the margins of the wound retracted, and the vein ligatured with No. 1 catgut at the upper and lower limits of its exposure. The intervening one to two inches of the vein is excised, and the amount of this depends upon the exposure. The operation is thus not merely a ligation, but is a ligation together with the removal of the exposed segment of vein. In the case of very thick and relatively straight incompetent veins, more rather than less should be excised. If a localized varix is present in association with a straight vein, this is an indication for local ligation above and below together with excision of the varix. At the same time any entering collateral vessels, often deep veins, must also be ligatured. The number of ligations must be determined by the nature of the veins, their extent, and the probability of response to injections of the remainder. Care is needed in planning incisions. An exposure which enables the main vein and two or three large collaterals to be ligatured at the same time is preferable to one which only allows ligation of the main trunk.

(b) *Excision.*—A more extensive excision will be required under the following conditions: (1) colossal and usually tortuous veins, especially if adherent to overlying atrophic skin; (2) a mesh-work or sponge-work of big tortuous veins with large numbers of collateral and anastomosing channels; (3) the presence of several parallel or anastomosing ectatic veins.

In planning each operation regard must be paid to the nature and extent of the veins, the condition of the skin, and the position of the resulting scar. The local exposure should be adequate, and any adherent skin should be included in an ellipse. All veins are ligatured at the upper and lower limits of the wound, and the intervening tissue, together with the skin and subcutaneous tissue, is excised.

Closure of Wounds.—Haemostasis must be perfect. Subcutaneous fat must be closed with interrupted catgut sutures and all dead space obliterated. The skin is closed with interrupted sutures of fine silkworm-gut. In all cases care

must be taken to avoid having a ligatured vein stump immediately adjacent to the skin incision. This can always be secured by careful planning of the skin incisions.

Dressings.—The various wound sites are covered with gauze or towels at the close of each local operation. At the completion of the whole operation each wound site is painted with iodine. Gauze pads are placed over the inguinal wounds and the limbs firmly bandaged with roller gauze from the ankles to the groins. A thick layer of wool is applied and the limbs are bandaged upwards, ending in a spica at the groins.

Post-operative Care

Position.—As soon as the patient is returned to bed the limbs are placed on pillows and between towelled sandbags, and covered with a cradle. The dorsal position and the limited movement possible until the stitches are removed are usually the patient's most serious complaints during the post-operative period.

Pain.—The operation causes very little pain. Morphine is required on the first night but rarely afterwards, and after the second day the patient is usually very comfortable. Those with very large veins may get more discomfort from sites of intervening thrombosis than from the actual wounds themselves.

Dressings.—After all extensive operations dressings should be carried out on the third day. This is especially necessary where large excisions have been performed, and early dressings may avoid the risk of a collection of serum. The renewal of dressings and the reduction in bulk also add to the patient's comfort. Usually only one dressing is required before the removal of the stitches, but occasionally a second is necessary on the fifth or sixth day.

Stitches.—These are removed on the seventh or eighth day, depending on the number and size of the incisions. If a second dressing is carried out about the fifth or sixth day it is often possible to remove alternate stitches at this stage.

Subsequent Nursing.—Sandbags are not required after the removal of the stitches, and the patient is allowed to have the limbs off the pillows one to two hours daily, and this time is gradually increased. He is allowed up for half an hour on the ninth or tenth day, and by the twelfth to the fourteenth day he should be able to walk short distances and be ready to leave hospital. At this stage the various wound sites are dressed with gauze and covered with elastoplast, which encircles the limbs except in the region of the groins. These dressings are left on about a week, by which time all wounds are firmly healed. In order to get rid of the remains of skin paint, iodine, and desquamating epithelium the patient should have a warm soapy bath on two or three successive evenings. At the end of a month from the time of operation recovery from its effects is complete.

Post-operative Injections

Patients are seen three to four weeks after operation. By this time it is possible to tell which veins are thrombosed and which are still patent. It is probable also that only small tortuous veins will have been left for injection after a well-planned operation. Personally I prefer to use quinine urethane for this on account of the greater certainty of its thrombosing action. At this stage injections may be carried out daily, alternating the limbs, but longer intervals will be required when larger veins have to be treated. The details of injection treatment using quinine urethane solution have previously been described (Payne, 1936). Treatment on these lines can usually be completed in from two to four weeks.

In the few cases in which no injections are required the patient may return to work three to four weeks after opera-

tion. If injections have to be carried out subsequent to operation the question of resumption of work must be decided by the probable length of the treatment and the nature of the patient's work. It is usually possible for patients to carry on with other than very heavy work throughout the period of injections.

Subsequent Review of Patients

It is advisable, whenever possible, to see patients at intervals of three, six, and twelve months after completion of treatment. Even the most severe case of varicose veins can be treated by operation and injection and the whole varicose circulation obliterated in from six to eight weeks, with the certainty of at least many years' freedom from any important recurrence. But the *tendency* to varicosity is inherent and persisting, and the more severe the initial condition, and the younger the patient's age at onset, the greater will be the need for periodic review at intervals of a year or so. Once varicosity is established, mechanical factors also come into play and tend to involve adjacent veins. The obliteration of the varicose circulation not only gets rid of the affected veins but also slows or retards the progress of the condition by eliminating aggravating mechanical factors.

Prognosis

The cases which have been discussed in this paper are chiefly those in which a complete obliteration of the varicose circulation would have been impossible without operation, and they therefore represent the more severe types. The *tendency* to varicosity is inherent and persisting, and the most important factors attending the prognosis in the individual case are as follows:

1. A bad family history of varicosity and its complications.
2. The rapidity of development of the condition.
3. The age of onset. Rapid development during adolescence is usually a bad prognostic sign.
4. The actual age of the patient. In general the older the patient the slower the progress of the disease.
5. The nature of the veins. The sponge-like type of diffuse veins with little anatomical arrangement is one of the worst possible forms. Another bad type is extensive ectasia involving all the superficial veins. In these types extensive operative treatment is alone likely to cure the condition.
6. The period of onset in women, whether during adolescence, pregnancy, or the menopause.
7. The possibility of further pregnancies in women.
8. The nature of the subcutaneous tissues. A large amount of flabby lax subcutaneous fat is a bad prognostic sign when compared with a small amount of firm subcutaneous tissue.
9. Occupation. Employment involving a great deal of standing or irregular walking is much more harmful than that which involves regular rhythmical exercise.
10. Treatment. Obviously one of the most important factors governing the prognosis is the completeness of treatment. The tendency to varicosity cannot be eliminated; but by securing complete obliteration of the varicose circulation the progress of the disease is slowed and retarded by the elimination of aggravating mechanical factors.

Summary and Conclusions

The adequate treatment of primary uncomplicated varicose veins involves the complete obliteration of the varicose circulation.

Injection treatment will secure this in most cases; but operation, or more often a combination of operation and subsequent injections, is necessary for some cases, particularly the more advanced ones.

No case is too severe for the combined treatment.

The absolute and relative indications for operative treatment are given.

The details of pre-operative treatment, operation, and post-operative care are described, and subsequent injection treatment is outlined.

The whole varicose circulation can be completely obliterated in from six to eight weeks from the time of operation, and the patient rendered fit even for heavy work.

Patients with the severe type of varicosity should be reviewed at intervals of a year or so whenever possible.

The factors governing prognosis are outlined. Of the controllable factors the most important is the completeness of the obliteration of the varicose circulation.

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THROMBOSIS IN THE SUPERIOR LONGITUDINAL SINUS FOLLOWING CHILDBIRTH

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Thrombosis in the superior longitudinal (sagittal) sinus has long been known to pathologists as one of the conditions that may give rise to fatal cerebral symptoms in the puerperium or after abortion. With the exception of a case reported by Symonds in 1937 little has been written in English on the subject, for a good many years past, but five cases were published in the *Zeitschrift für Gynäkologie* between 1925 and 1928, and these and seven others were collected by Mondré (1928). Other verified instances are to be found among the numerous cases of paralysis associated with pregnancy collected by von Hösslin (1904, 1905). In none of these instances was the diagnosis made during life. Headache and gradually increasing coma were the outstanding symptoms; paralysis was not always observed; convulsions occurred in some cases; and amaurosis is mentioned by Zangemeister (1925) in his description.

Within the last few years cases in which the superior longitudinal sinus is obstructed have become subject to clinical diagnosis. This has resulted partly from observation of these puerperal cases, but chiefly it has been a consequence of Symonds's studies of "otitic hydrocephalus"—another condition in which this sinus is thrombosed. Now that they can be recognized clinically it appears that puerperal cases of sagittal sinus thrombosis end more often in recovery than in death, but so far only one non-fatal case has been published (Symonds, 1940; Martin and Sheehan, 1941). Clinical accounts are given here of three cases which are believed to be of this nature: death ensued in one of them, but it was not due to the thrombosis in the sagittal sinus. In addition to these three I have seen during the last five years two cases in which similar symptoms were associated with stillbirth, a case following abortion in which the right cavernous sinus was evidently thrombosed, and a case of long-standing residual disabilities from a puerperal illness which must have involved very extensive thrombosis in the superior longitudinal sinus.

The moment is appropriate for consideration of these cases because Batson's work, recently published, has provided the probable explanation of the means by which thrombosis following childbirth or abortion is determined to this seemingly extraordinary site.

Applied Anatomy

The diagnosis of thrombosis in the superior longitudinal sinus depends on the signs of raised intracranial pressure and the signs of obstruction of superior cerebral veins.

Signs of Raised Intracranial Pressure.—It will be recalled that the sinus is triangular in cross-section (see diagram).

Diagram showing the superior longitudinal sinus in cross-section.

In many subjects numerous trabeculae cross it, and in some instances a continuous membrane divides it horizontally for a portion of its length (O'Connell, 1934). At its upper angles irregular lateral diverticulae—the lacunae laterales—contain within their walls numerous Pacchionian bodies through which the cerebrospinal fluid is absorbed into the blood stream. If the circulation in the sinus is obstructed, or if the upper story of the sinus becomes filled with clot, absorption of the cerebrospinal fluid is prevented and the intracranial pressure consequently rises, with the production of headaches, papilloedema, and perhaps vomiting. The significance of this hydrocephalus as an indication of sinus thrombosis was recognized by Symonds (1937).

Signs of Obstruction of Superior Cerebral Veins.—The sinus receives the superior cerebral veins, and these enter its walls near the inferior angle. If a thrombus occludes the whole cross-section of the sinus opposite the entrance of a vein, or if it is situated in the trough of the sinus or extends down into the trough, it may obstruct one (or more) of these veins. Thrombosis of the affected vein is then likely to occur. Many thrombi, however, are not so situated as to obstruct veins. Moreover, it seems that an obstructed vein does not invariably become thrombosed, and this is doubtless because of the easy collateral circulation. When thrombosis of an obstructed vein occurs it gives rise to paralysis corresponding to the area of cerebral cortex which the vein drains, and this paralysis may or may not be ushered in by a series of convulsions: Convulsions seem to be less usual when venous thrombosis is secondary to obstruction in the sinus than they are when a vein is thrombosed primarily. By no means all cases of thrombosis of the superior longitudinal sinus are recognizable in the present state of our knowledge, and it is certain that a large thrombus may exist in the sinus without giving rise to any clinical signs.

Case I

This is an instance of the most straightforward type of case.

Fits seventeen days after delivery; right hemiparesis; papilloedema; complete recovery.

An 8-para aged 40 was confined on June 25, 1936, labour being normal and the puerperium uneventful. During the night of July 12-13 she had four fits, and next day was admitted to hospital. She was then conscious, but in a stuporous state, was very drowsy, and barely understood what was said to her. She had paresis of the right arm and slight drooping of the right side of the face; there was also slight weakness of the right leg, and the right plantar reflex was extensor. The temperature on admission was 100° F. and the pulse rate 110. There was no neck rigidity. Examination of the heart disclosed nothing abnormal. The blood pressure and urine were normal, as were