

### Discussion

Difficulties arise in the interpretation of the results of conservative treatment for internal haemorrhoids because of the frequent spontaneous remissions in symptoms that may occur in such cases, and also perhaps because of the fact that treatment by any method is often accompanied by simple advice on the avoidance of constipation, which might produce a slight amelioration in the condition. The number of patients so far treated in our trial does not allow of a full evaluation of all the factors, but all those in this series had had episodes of symptoms twice a year or more. A review at six months therefore seems reasonable to evaluate therapy; and the random selection of patients into treatment groups minimizes errors of interpretation associated with multifactorial analysis.

Treatment by injection is generally painless and well tolerated by the patients. None of the complications which can arise from this treatment (Goligher, 1967) were encountered in these patients. On the other hand, treatment by ring ligation may be very uncomfortable, and was the reason for four patients refusing further treatment. Six other patients complained of some discomfort, often lasting for several days, and two patients lost time from work. One of these patients developed painful groin glands two days after treatment. This disadvantage of treatment, however, was rewarded by a better objective end-result.

There was no doubt that the major symptom of bleeding was often dramatically relieved by injections of phenol in oil; injections of almond oil alone were much less effective in this respect. Indeed, any improvement in the group treated by simple oil injections could well have resulted from spontaneous remission in view of the length of time elapsing before bleeding stopped. Objective assessment of injection therapy after six months, however, was disappointing, and even with the more efficacious phenol-in-oil injections there was only about a 50% improvement. This is in marked contrast to the results after rubber ring ligation, which were satisfactory in the majority of patients with the larger type of haemorrhoids, though not so satisfactory for first-degree piles. These objective assessments are supported by the reported symptomatic failures of treatment by both injection methods, though it should be emphasized that some patients who failed to respond to injections of almond oil alone secured relief with subsequent injections of 5% phenol in oil.

The results from the present study indicate the need for further evaluation of the conservative treatment of this common condition. One hundred patients have now been admitted to the trial, and those treated are to be observed after six months and one year. These preliminary results, however, indicate that the conventional treatment by injections may not be as satisfactory as is generally supposed. The long-term results of treatment by the ring applicator are generally encouraging, though our experience shows that this treatment is usually a good deal more uncomfortable for the patients and is not well tolerated by all of them. If it is to be used it is important to keep well above the pectinate line with the ligation, and to prescribe analgesics such as pethidine 100 mg. for the first two or three nights after application of the ring. The rubber ring treatment is better confined to prolapsing piles alone; for first-degree piles where bleeding is the main symptom injections with 5% phenol in almond oil remain the treatment of choice. There seems to be no advantage in the use of almond oil alone.

### Summary

The treatment of haemorrhoids by conservative methods has been examined. Injection therapy with the use of phenol in almond oil was effective in controlling bleeding, but with almond oil alone it was not. A comparison between the results of injection therapy and the technique of rubber ring ligation showed objectively better results after six months with ligations. However, ligation was sometimes followed by pain, and a few patients refused to continue with this form of treatment.

These preliminary alternatives indicate that phenol in oil is still the best treatment for early first-degree piles. The results of ligation for second-degree piles are encouraging, but further evaluation is required.

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## Iliac Vein Compression.—Its Relation to Iliofemoral Thrombosis and the Post-thrombotic Syndrome

F. B. COCKETT,\* M.S., F.R.C.S.; M. LEA THOMAS,\* M.A., M.R.C.P., F.F.R., D.M.R.D.; D. NEGUS,\*† M.A., F.R.C.S.

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It is 50 years since Homans (1917) first described the symptoms of swelling, ulceration, and pain which follow extensive thrombosis in the deep veins of the leg, and the "postphlebotic syndrome" has since been extensively investigated and documented. That venous thrombosis destroys the valves of the affected vein is established (Edwards and Edwards, 1937); that such valvular incompetence in the deep veins of the leg impairs the efficiency of the "muscle pump" has been proved by measurements of pressure changes in the veins of the foot or ankle (Pollack *et al.*, 1949; Walker and Longland, 1950). The pattern of venous damage and recanalization has been demonstrated by phlebography (dos Santos, 1938; Bauer, 1940; Luke, 1941). The relation of "gravitational" ulcers to incompetent ankle perforating veins is established. The role of venous valvular incom-

petence in the aetiology of the "postphlebotic syndrome" is clear.

A few early reports (Leriche, 1927; Jennings, 1933) suggested that in some cases iliac vein thrombosis might subsequently cause obstruction to the venous return from the limb. In 1950 a series of nine such cases of post-thrombotic occlusion of the iliac vein was described (Wanke and Gumrich, 1950). Similar iliac vein obstruction has been reported by Eufinger *et al.* (1961), Courty *et al.* (1962), Langeron and Lamoril (1963), and Goldstein *et al.* (1964).

\* St. Thomas's Hospital, London S.E.1.  
 † Present address: Department of Surgical Studies, Middlesex Hospital, London W.1.

More recently we have called attention to the fact that severe compression of the left common iliac vein by the right common iliac artery which passes over it may occur in certain cases. It was also shown that this may be the main aetiological factor in both the initiation of the iliofemoral thrombosis and in the failure of the vein to recanalize properly, leaving the patient with a permanent main iliac vein obstruction.

A predominantly left-sided incidence of such obstruction was described, 29 cases were reported, and we suggested the name "iliac compression syndrome" (Cockett and Lea Thomas, 1965). Since that paper a further 31 patients have been investigated, and a more detailed study of the condition has been made. This report will describe the clinical features of the condition, the investigations used in its diagnosis, and its pathological and anatomical features.

### Patients Studied

Fifty-seven patients with post-thrombotic iliac venous obstruction have been investigated. A detailed analysis of their clinical history, signs, and progress has been made, and from this the following facts emerge: the inferior vena cava (and therefore both legs) was involved in 9 patients; one leg only was affected in the remaining 48 patients, the left leg being affected in 39 and the right in 9. The condition was more common in females (37:20).

### Clinical Features

Clinically there is an acute episode of iliofemoral thrombosis, usually in young adult life (mean age 26.5 years), which is followed by a long chronic phase of the disease. Thrombosis was related to pregnancy (white leg of pregnancy) in 16 patients. In 12 it was preceded by a febrile illness, usually pneumonia or pleurisy. It is probable that most of these episodes represented pulmonary embolism. The onset followed an operation in 17 patients, usually appendectomy or hysterectomy. There was no precipitating cause in seven patients.

The acute thrombophlebitis was accompanied by one pulmonary embolus in 16 patients. Repeated pulmonary emboli are excessively rare during the chronic stage of the disease.

Repeated episodes of calf thrombosis during the chronic phase occurred in 18 patients.

*A family history of deep-vein thrombosis was present in 13 patients.*

The onset and natural history of the disease can be summed up under the headings acute and chronic phase, as shown in Table I.

TABLE I

	Acute Phase	Chronic Phase
Age	Young, usually 20-30	Lasts for the rest of patient's life
Onset	Sudden swelling of left leg (usually) after a major or minor operation, illness, or pregnancy. In some cases swelling of right leg, or of both legs, one preceding the other	1. Chronic swelling and aching of whole leg 2. Tendency to recurrent episodes of thrombosis 3. Venous claudication 4. Chronic resistant venous ulceration at ankle
Embolus	In about 25% the onset is heralded by one pulmonary embolus	5. Recurrent or repeated embolism—very rare

Dilated collateral veins in the groin and lower abdomen were observed in 36 patients. These veins may be absent or, in the obese, impossible to see. Their absence is therefore not significant.

Varicose veins were present in 30 patients.

Ulceration of the lower calf or ankle was present in 30 patients. The relation of ulceration to duration of symptoms is

shown in Fig. 1. Chronic ulceration with rest pain requiring continuous analgesics was present in five patients, and in four of these amputation was necessary.

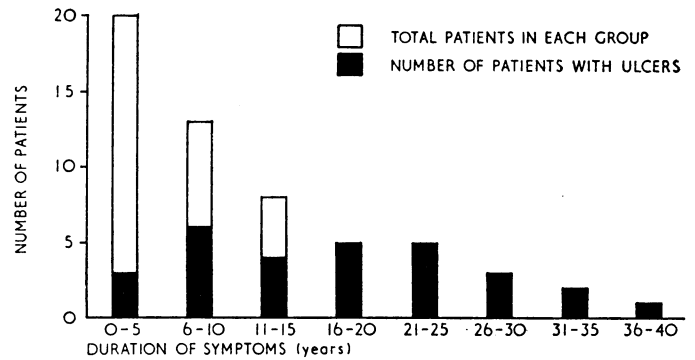


FIG. 1.—Incidence of ulceration related to length of symptoms in 57 patients with post-thrombotic iliac vein obstruction.

*These patients are suffering from a permanent venous obstruction at the main venous outlet of the limb. The symptom of venous claudication occurs in this group only, and is not present in patients with valvular incompetence or with post-thrombotic involvement of the peripheral deep veins alone. It presents as an ache felt in the calf. Occasionally it spreads to the thigh, and is produced by walking and particularly by climbing. It takes longer to develop than that of arterial claudication, and is usually less severe but sufficient to make further progress difficult or impossible after  $\frac{1}{4}$  to 1 mile (400 to 1,600 m.).*

### Illustrative Case Reports

*Case 1.*—A 22-year-old electrician was involved in a road traffic accident at the age of 19. One week after plating of his fractured right tibia he developed an iliofemoral thrombosis of his left leg. The whole leg was swollen and painful. This resolved to a large extent in the next few weeks, during which he was treated with anticoagulants. The swelling persisted to a less extent and was accompanied by aching in the left calf on walking. This became severe halfway through his working day, and incapacitated him to the extent that he had to change to a more sedentary job with consequent loss of income. Examination showed a swollen left leg; the below-knee volume was 11.5% greater than the right leg. He developed aching in the left calf after three minutes of marking time. Phlebography showed recanalization of the left common iliac vein with gross stenosis at its junction with the inferior vena cava, and dilated presacral collateral veins (Fig. 2). There was a pressure gradient of 6 mm. Hg between left and right femoral veins, and on exercise the pressure in his left femoral vein rose by 7 mm. Hg to 15 mm. Hg. Operation confirmed the presence of a fibrotic stenosis at the junction of the left common iliac vein with the inferior vena cava, under the right common iliac artery. This was accompanied by the presence of adhesions within the lumen of the vein, and by gross perivenous fibrosis.

*Case 2.*—A married woman aged 49 had the following history. Bilateral deep-vein thrombosis after childbirth at age 28. Two years later ulcers appeared on both legs. Bilateral ligation of the popliteal veins was performed at the age of 34, and, in the same year, a right lumbar sympathectomy. At 36 she had a left lumbar sympathectomy and at 37 bilateral ligation of "ankle perforating veins." The ulcers reappeared on both ankles at the age of 45. She complained of swelling of the legs, which was worse on walking and was accompanied by severe aching in both calves. Housekeeping was difficult and social life non-existent. Marking time caused calf pain after two and a half minutes. Phlebography showed post-thrombotic stenosis of the proximal inch (2.5 cm.) of both common iliac veins, most pronounced on the left (Fig. 3). On exercise there was a rise in pressure of 14 mm. Hg in both femoral veins. Operation showed fibrosis and stenosis of both common iliac veins; the stenosis was most noticeable on the left but was also present on the right, where both veins were compressed and narrowed under the right common iliac artery.

### Investigations and Methods

The following investigations were used in this study of iliac venous obstruction: (a) iliac venography, (b) femoral venous pressure, (c) venous claudication time, (d) limb volume, (e) the construction of Marco-resin casts of the vena cava and aortic bifurcation in situ in post-mortem material, and (f) dissection of the inferior vena caval bifurcation in post-mortem material.

**Iliac Phlebography.**—Two methods of investigation were used: (1) bilateral simultaneous petrochanteric intraosseous phlebography and (2) bilateral simultaneous percutaneous iliac phlebography. Of the 57 patients in this series 32 were investigated by the intraosseous technique alone and 21 by the percutaneous femoral technique alone. In four patients femoral venopuncture failed, and intraosseous phlebography was performed on this side, combined with percutaneous femoral phlebography on the other side. There were no failures by the intraosseous method. Fifteen patients had postoperative phlebograms by the same technique as used at the initial examination. The technique we use for serial petrochanteric phlebography has been described (Cockett and Lea Thomas, 1965). The only changes made in the technique since it was originally published are that we now inject 40 ml. of Conray 420 on each side and fewer films are taken. Conray 420 combines high radio density with low viscosity. In percutaneous iliac phlebography needles are introduced into the common femoral veins in the groins, and, with the patient in the supine position, injections of 40 ml. of Conray 420 are made by hand. In both examinations the films are taken with cut film serial changer, 10 films being taken at the rate of one a second. Filming is started halfway through the injection in petrochanteric phlebography, and simultaneously in percutaneous iliac phlebography. The details of both methods are to be published (Lea Thomas and Fletcher, 1967).

**Femoral Venous Pressure Measurements** have been described in detail (Negus and Cockett, 1967). Pressures were measured at rest in 17 patients with phlebographic evidence of venous obstruction and on exercise in eight patients. The resting pressure measurements were performed during percutaneous iliac phlebography.

A standard stepping test was performed by 28 patients with venous obstruction and by nine patients with valve incompetence but no obstruction. The test consisted of marking time at 80 steps a minute, each foot being raised in turn to half the height of the opposite knee. The time at which aching of the calf prevents further exercise is called the "venous claudication time."

**Limb volumes** were measured in 16 patients with pelvic venous obstruction and in nine with venous incompetence. The methods were: (1) measurement of calf and thigh circumference and comparison of measurements in the normal and swollen leg—calf diameters were measured 6 in. (15 cm.) below the tibial condyles, and thigh diameters 12 in. (30 cm.) below the anterior superior iliac spine; and (2) measurement of limb volumes by water displacement by means of a specially constructed perspex "boot"; changes in the lower leg only were measured by this method.

**Corrosion casts** were made of the inferior vena cava and iliac veins, and of the aortic bifurcation by a modification of Tompsett's (1956) method.

**Dissection of the inferior vena caval bifurcation** was performed in 100 unselected cadavers. The details of these anatomical studies are to be published (Negus, Fletcher, Cockett, and Lea Thomas).

### Results

**Iliac Phlebography.**—The following abnormalities of the iliac veins have been demonstrated: (1) complete occlusion of the whole or part of one or other iliac vein, or the inferior vena cava; (2) recanalization of veins, shown by narrowing, irregularity, or duplication of the lumen; and (3) the presence of dilated collateral veins. Inferior vena caval occlusion was demonstrated in nine patients; in six of these the iliac veins were also involved. Occlusion of the left common iliac vein was shown in 19 patients; in 10 this was accompanied by occlusion or recanalization of the external iliac veins. Similar obstruction of the common iliac vein was seen only once on the right side. Recanalization of the common or external iliac veins, without occlusion, occurred 15 times on the left side and

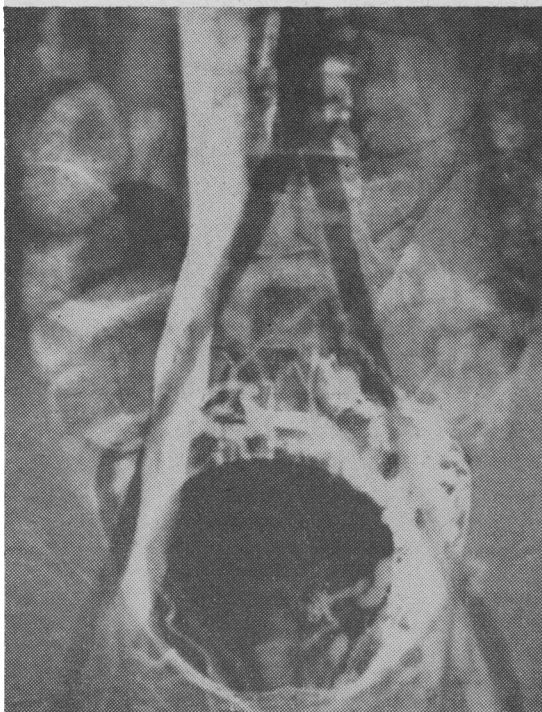


FIG. 2

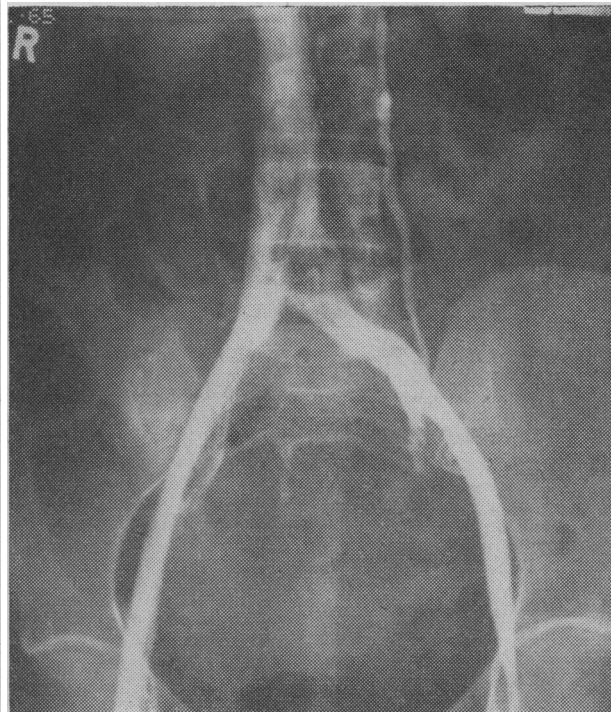


FIG. 3

FIG. 2.—Case 1. Combined aortogram and phlebogram, showing complete occlusion of the left common iliac vein with extensive presacral collaterals. FIG. 3.—Case 2. Phlebogram showing left iliac compression.

eight times on the right, and occlusion of the left external iliac vein occurred on six occasions. These results are summarized in Table II. Dilated collateral veins accompany obstruction of the iliac veins or inferior vena cava, and the collateral pattern can be divided into two groups. After venous obstruction at the vena caval bifurcation the presacral and lumbar veins become dilated. Obstruction of the external iliac vein causes dilatation of the obturator, pubic, and epigastric veins.

TABLE II.—Results of Iliac Venography. 57 Patients with Post-thrombotic Occlusion or Recanalization of the Iliac Veins

	No. of Cases	
	Left	Right
Inferior vena caval occlusion alone .. .. .		3
Inferior vena caval + iliac vein occlusion .. .. .		6
Common iliac occlusion .. .. .	9	0
Common iliac + external iliac occlusion .. .. .	4	1
Common iliac occlusion + external iliac recanalization .. .. .	6	0
External iliac occlusion .. .. .	5	0
Common iliac recanalization .. .. .	2	0
Common iliac + external iliac recanalization .. .. .	9	7
External iliac recanalization .. .. .	4	1
Total .. .. .	39	9

**Femoral Venous Pressure Measurements.**—Venous obstruction proximal to the site of measurement results in a pressure gradient between the obstructed and the normal leg. A gradient of more than 2 mm. Hg is significant of obstruction (Negus and Cockett, 1967). The mean pressure gradient in 15 patients with venous obstruction was 5.8 mm. Hg. The pressure in an obstructed vein rises considerably on exercise. A pressure rise of more than 3 mm. Hg is significant of obstruction (Negus and Cockett, 1967). In seven patients the mean exercising pressure rise was 9.9 mm. Hg.

**Venous Claudication Time.**—All patients with pelvic venous obstruction experienced pain in the calf within five minutes of starting the stepping test. In most cases this was sufficient to stop further exercise. No pain was felt by 17 patients with venous incompetence alone.

**Limb Volumes.**—(1) Thigh and calf circumferences were added, and the total in the normal leg was subtracted from that in the swollen leg. A mean figure of 0.83 in. (2.11 cm.) was obtained in patients with simple venous incompetence. Patients with venous obstruction had a mean figure of 2.15 in. (5.46 cm.). (2) Measurements of limb volume performed in the same two groups of patients are shown in Table III. Comparison of the volume of the normal and the swollen leg was performed at rest and after standard stepping exercise for five minutes.

TABLE III.—Measurements of Limb Volume. Difference in Volume of Two Legs at Rest as Measured by Water Displacement

	Observations	Volume Mean/Diff. (ml.)	Standard Deviation	Range
Normal subjects .. .. .	6	68.3	± 15.2	10–100
Venous incompetence .. .. .	6	139.0	± 39.8	–90–280
Venous obstruction .. .. .	16	226.0	± 72.0	–290–580
<i>Increase in Volume after Stepping</i>				
Normal subjects .. .. .	5	62.5	± 21.5	10–120
Venous incompetence .. .. .	6	79.33	± 25.0	50–240
Venous obstruction .. .. .	18	162.5	± 76.0	20–640

**Corrosion Casts.**—Eight out of nine corrosion casts of the inferior vena caval bifurcation demonstrated some degree of compression of the left common iliac vein.

**Dissection of the Inferior Vena Caval Bifurcation.**—Adhesions joining the anterior to the posterior wall of the left common iliac vein were found in 14 of 100 unselected cadavers.

### Discussion of Techniques of Investigation

Pelvic phlebography combined with femoral venous pressure measurement is the most reliable method of diagnosing iliac vein obstruction.

Though serial petrochanteric phlebography was our original method of choice (Cockett and Lea Thomas, 1965), further experience suggests that percutaneous iliac phlebography has several advantages: general anaesthesia is not essential, femoral vein pressures can be measured at the time of the examination, and a better demonstration of the iliac veins and collaterals is obtained.

Failure to puncture the femoral vein percutaneously is usually due to occlusion or narrowing of the vein after past venous thrombosis. In the obese or swollen limb, however, failure to puncture the vein cannot be accepted as evidence of abnormality. In four patients in this series left femoral venepuncture was unsuccessful, and intraosseous phlebography was therefore necessary. For this reason we regard the methods as complementary.

In both techniques serial films are essential to demonstrate the direction of flow in the collaterals bypassing the obstructive pelvic veins. Simultaneous injections are also needed to show both external and common iliac veins, and also the inferior vena cava. Inferior vena caval obstruction cannot always be diagnosed on clinical grounds, and the extent of the occlusion is important for surgical treatment. It may also be necessary to show the upper end of the occlusion by retrograde catheterization phlebography through the right atrium.

It had been hoped that measurement of limb volumes might provide a useful screening test, its advantage being that venepuncture is avoided. The results show that, while *in general* there is greater swelling at rest and a greater volume increase on exercise in the obstructed limb, individual variation makes these measurements unreliable as a clinical test.

The presence of venous claudication is a good indication of iliac venous obstruction. This test has the merit of complete simplicity. If the patient can mark time smartly for five minutes without discomfort subsequent phlebography and pressure measurements are unlikely to demonstrate obstruction.

### General Discussion

There are three possible sequelae to iliac vein thrombosis: (1) complete recanalization, (2) incomplete recanalization with an adequate collateral circulation, and (3) incomplete recanalization with an inadequate collateral circulation.

Complete recanalization is apparently very uncommon. We have demonstrated only three rather doubtful cases by phlebography.

Incomplete recanalization is most commonly the result of perivenous scarring which follows the acute inflammatory reaction of thrombophlebitis. This scar tissue forms a sheath around the vein. This post-thrombotic phlebosclerosis was first recognized by Rokitansky in 1852, and was described by Wanke and Gumrich (1950). Though in most instances recanalization results in the formation of potentially adequate venous channels, the fibrous sheath tends to prevent distension of the vein and its return to a channel of adequate size.

This perivenous fibrosis is particularly concentrated at points at which there is already some degree of venous narrowing by external compression. One such possible point is the passage of the femoral vein beneath the inguinal ligament (Wright, 1948). In the present series 18.5% of the post-thrombotic obstructions were localized to this region.

Localized iliac vein stenosis is more often found at the point where the left common iliac vein is crossed by the right common iliac artery. Thrombosis has long been suspected to occur more frequently in the left leg than in the right (Welch, 1887; Aschoff, 1924). In the present series the left leg was affected in 83.5% of those cases in which one leg only was involved. A localized stricture at the point where the left common iliac vein is crossed by the right common iliac artery was demonstrated by phlebography in 33 (65%) patients. This localized

stricture is the most common form of the "iliac compression syndrome" (Cockett and Lea Thomas, 1965). The sites where this localized iliac compression may occur are shown in Fig. 4.

The normal left common iliac vein is compressed to some degree where it is crossed by the right common iliac artery. This has been demonstrated by nine Marco-resin corrosion casts (Fig. 5). In only one of these casts was there no evidence of compression. Such compression may result in the formation of adhesions joining the anterior to the posterior wall of the vein (Fig. 6).

Such adhesions were found at the mouth of the left common iliac vein in 14 out of 100 unselected post-mortem dissections. Other series have shown an incidence of 21 to 30% (McMurrich 1908; Ehrich and Krumbhaar, 1943; May and Thurner, 1957). In none of our dissections was there evidence of thrombosis as well, though this was found and reported by others, but the site of the compression strictures suggests that compression and adhesion formation is of aetiological significance in iliac vein thrombosis, and in the subsequent failure of adequate recanalization.

Post-thrombotic iliac vein obstruction is followed by the development of collateral veins. These may occasionally be sufficient to compensate fully for the obstruction, and we have shown four such cases. More often they are insufficient, and

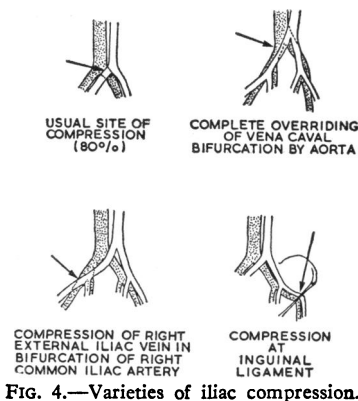


FIG. 4.—Varieties of iliac compression.

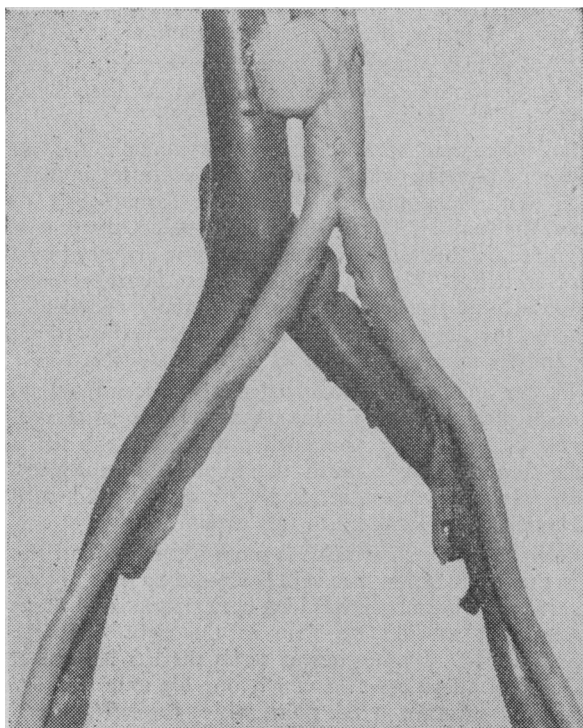


FIG. 5.—Corrosion cast (anterior view) of the iliac vessels of a 64-year-old woman, showing compression of the left common iliac vein by the right common iliac artery.

the consequent resistance to venous return results in chronic venous hypertension distal to the obstruction.

The calf pain which we have called "venous claudication" is associated particularly with this chronic iliac vein obstruction. It is relieved by successful surgical removal of the cause of the obstruction, though such surgery may not decrease the swelling of the limb greatly.

### Conclusion

The present study shows that patients suffering from the "postphlebotic syndrome" should be regarded as belonging to one of three groups.

*Group 1.*—Cases due to peripheral valve destruction. This follows calf and femoral venous thrombosis, which results in destruction of valves in the femoral and calf veins and in the ankle perforating veins. This group is characterized by ankle-swelling, induration, eczema, pigmentation, and ulceration. Treatment is supportive in the first instance, and surgery is directed to the ligation of incompetent perforating veins and the elimination of superficial incompetent veins of the long or short saphenous systems. Excellent results can be expected in this group from this type of surgery.

*Group 2.*—Cases due to iliac vein obstruction. This follows iliac vein thrombosis with inadequate recanalization and inadequate collateral formation. Swelling of the whole leg (ankle, calf, and thigh) is present in these patients. The chief distinguishing feature is the presence of "venous claudication." Surgery, if necessary, is directed to the relief of the obstruction.

*Group 3.*—Cases in which both iliac vein obstruction and peripheral valve destruction are present. These are the most distressing cases of all, and constitute the really intractable post-thrombotic ulcer cases which are to be found in all ulcer clinics.

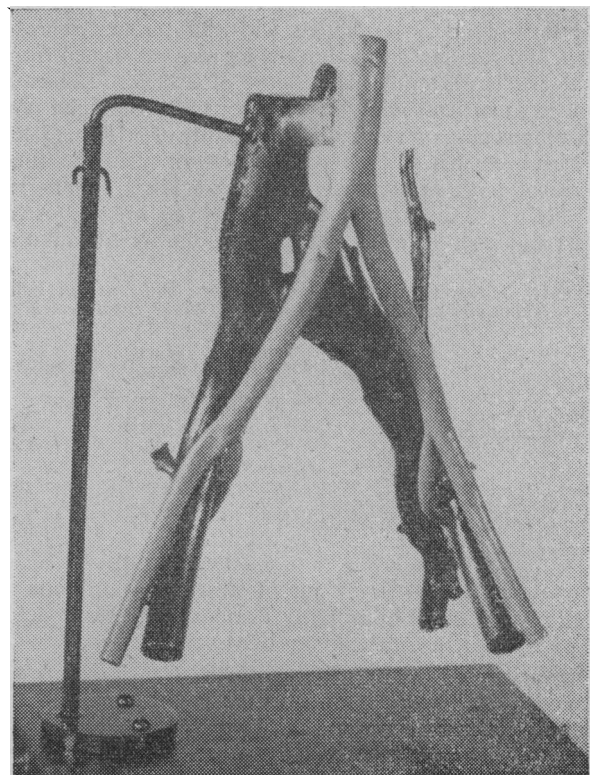


FIG. 6.—Corrosion cast (anterior view) of the iliac vessels of a 45-year-old woman. The photograph has been taken slightly obliquely to show the marked compression of the left iliac vein. The compression is so marked in this case that the anterior and posterior walls of the vein are adherent in the middle of the vein (leaving the round defect seen in the cast). The left common iliac vein enters the cava as two small channels above and below the defect.



### Summary

A detailed clinical analysis and investigation of 57 patients who had an iliofemoral thrombosis, or "white leg," is presented.

The main aetiological factor in these cases is shown to be a compression stenosis of the left common iliac vein by the overriding right common iliac artery.

This not only precipitates the thrombosis in the first place but prevents adequate recanalization at this point, thus accounting for the chronic iliac vein obstruction which develops in these cases.

Other less common varieties of iliac vein compression are described.

Evidence for this view is presented from phlebography of the iliac veins, from measurements of venous pressure in these cases, from anatomical studies, and from operative experience.

The symptom of venous claudication, which is highly typical of this group of cases, is described.

The name "iliac compression syndrome" is suggested, to embrace both the acute and the chronic phase of the disease.

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## Autoantibodies in Ulcerative Colitis

A. R. MCGIVEN,\* M.D.; T. GHOSE,\* M.B., D.PHIL., M.C.PATH.

R. C. NAIRN,† M.D., PH.D., F.C.PATH., M.C.P.A., F.R.S.ED.

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Autoantibodies which react with human colonic mucosa have been shown in patients with ulcerative colitis by haemagglutination (Broberger and Perlmann, 1959; Asherson and Broberger, 1961) and immunofluorescence (Broberger and Perlmann, 1962; Klavins, 1962; Koffler *et al.*, 1962; Harrison, 1965a; Wright and Truelove, 1966). Recently rat colon mucosa has been used for immunofluorescence studies and a phenol-water extract of faeces from germ-free rats as a haemagglutinating antigen (Hammarström *et al.*, 1965; McGiven *et al.*, 1967). Despite intensive study, the role of autoantibodies in the pathogenesis of ulcerative colitis and their diagnostic significance have remained unclear. In the following serological investigation of ulcerative colitis patients by haemagglutination, immunofluorescence, and tissue culture techniques about one-fifth showed intestinal-specific autoantibodies, but these were not directed exclusively against colon mucosa. The results do not indicate that any circulating gastrointestinal autoantibody is itself a pathogenic agent in ulcerative colitis.

### Methods

Sera were obtained from 54 patients with ulcerative colitis. In 42 the colon was removed and the diagnosis confirmed histo-

logically. There were 23 males and 31 females, aged from 10 to 82 years. The duration of colitis symptoms extended from 1 month to 30 years. We have graded the severity of the colitis according to the extent of mucosal ulceration in the colectomy patients and according to the bowel habits in the others.

As controls, sera were examined from 194 individuals, consisting of 17 with malabsorption of various types, 16 with carcinoma of the large bowel, 11 with amoebiasis, 30 with pernicious anaemia, 22 with autoimmune thyroiditis, 22 with systemic lupus erythematosus, 21 with rheumatoid arthritis, 35 with scleroderma, and 20 normal healthy subjects. Sera from those patients with the various autoimmune diseases contained the corresponding tissue-specific autoantibodies.

### Haemagglutination

Sera, after inactivation at 56° C. for 30 minutes, were absorbed with washed erythrocytes (twice with human group A<sub>1</sub> cells and once with sheep cells). Sheep erythrocytes sensitized

\* Senior Lecturers. Department of Pathology, Monash University, Melbourne.  
† Professor and Chairman, Department of Pathology, Monash University, Melbourne.