



Special article

General surgeons and varicose vein surgery

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ABSTRACT

Chronic venous insufficiency is a highly prevalent condition, with significant health and economic repercussions. Although important therapeutic developments have been introduced in recent years, the majority are dealt with by general surgeons in national health hospitals. These surgeons do not have the required and continuous training, and continue to perform classic surgery techniques. Also, their presence at scientific, organisational meetings, and training is almost nil. We present an update on developments in phlebology, and tapping into the preliminary results of a national survey, we reflect on the current status of phlebology and beyond for those general surgeons who should have a role in this field.

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Los cirujanos generales frente a la cirugía de las varices

RESUMEN

La insuficiencia venosa crónica es una enfermedad muy prevalente, de una gran relevancia sanitaria y económica, y en la que en los últimos años se están produciendo importantes novedades terapéuticas. Aunque en la mayoría de los hospitales públicos su asistencia recae sobre los cirujanos generales, éstos no disponen de una formación continuada adecuada y continúan realizando habitualmente una cirugía clásica. Además, su presencia en el ámbito científico, organizativo y formativo es casi nula. Presentamos una actualización sobre las novedades en flebología y, aprovechando los resultados preliminares de una encuesta nacional, reflexionamos sobre la situación actual de la flebología y el futuro que los cirujanos generales tienen en este campo.

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Tratamiento

Introduction

In our hospital, where there is no angiology and vascular surgery (AVS) department, we usually take on the varicose vein surgeries, and we found it interesting the little importance that

general surgeons (GS) give to this disease. Although there are functional units (FU) of less prevalent diseases, we continued to give little importance to phlebology: we never questioned the classic technique, we did not audit results, and we had

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never published anything on the topic. Afterwards, we found that this situation was normal in other hospitals as well, and even on an institutional scale. Although there is an angiology and vascular surgery section in the AEC, the inclusion of this topic in our conferences, and in *Cirugía Española*, was testimonial.

For this reason, in 2007; we decided to start-up an FU for varicose veins. From that moment, we discovered that phlebology is a very current specialty, with important controversies on the management of patients, and that it would give us enormous possibilities to improve healthcare and science. Moreover, we have convinced ourselves that, given the reality of AVS in Spain, implanted only in certain hospitals and overflowed with arterial diseases, the GS should demand more attention regarding this problem. This study aims to argue about this issue and review the most controversial questions in phlebology. In addition, we present data from a postal survey sent to all of the public GS departments (Figure), and to which we have received 105 responses. We hope to publish the complete data when we finish recollecting.

The importance of chronic venous insufficiency

Chronic venous insufficiency (CVI) is one of the most prevalent diseases that is treated by a surgeon. A transversal study carried out in Scotland on the general population estimated that 40% of males and 32% of females present troncular varicose veins that are susceptible to surgery.² This high prevalence is greater in Spain, where another study carried out in 2001³ showed 57% of patients with CVI signs, and an update in 2006 raised it to 62%.⁴

The CVI also has important socioeconomic repercussions, especially concerning venous ulcers (VU), that affect up to 1% of the population.² In the United Kingdom, the average duration of an ulcer is 9 months, that persists for more than 2 years in 20% of patients.⁵ In the United States, the VU causes 2 millions of work leave days, with a cost of 3 billions of dollars/year.⁶ In Spain, 2.1% of patients have had at least 1 episode of work leave related with CVI, and 1.9% have needed to be hospitalized at least once.

NATIONAL SURVEY ON VARICOSE VEIN SURGERY IN GS

Do the following exist in your hospital? (circle the correct response):

Cardiovascular surgery department	Yes/No
Angiology and vascular surgery department	Yes/No
Functional unit for varicose veins within the GS department	Yes/No
A general surgeon with special interest and training	Yes/No
All colleagues work in this area equally	Yes/No

If there is a vascular department, what % of varicose veins does each department operate on?

-Vascular Surgery	%
-General Surgery	%

How many patients do they treat per year with each of the following techniques?

Ligature of arch and tributaries	Yes/No
Long saphenectomy ankle-groin	Yes/No
Partial saphenectomy knee-groin	Yes/No
Inverted saphenectomy	Yes/No
CHIVA	Yes/No
Ambulatory phlebectomy with Muller hooks	Yes/No
Liquid sclerosis	Yes/No
Foam sclerosis	Yes/No
Endovascular treatment with radiofrequency	Yes/No
Endovascular treatment with laser	Yes/No
SEPS (Subfascial Endoscopic Perforating Vein Surgery)	Yes/No

Is any type of sonography anal-rectal, breast, hepatic, intraoperative, etc used in your department by surgeons? Yes/No

Coloured doppler sonography preoperative studies of these patients are carried out by:

The x-ray department of the hospital	Yes/No
It is arranged with private clinics	Yes/No
By the general surgeons	Yes/No

Is pre/intraoperative sonography marking of perforating veins performed in your department? Yes/No

According to your experience, do you consider that training for GS regarding varicose veins during the residency period is: Poor/Normal/Good

Do you believe that the current continued training pre-conference courses, seminars, etc about this pathology is sufficient? Yes/No

Lastly, in your opinion, should we GS play a more important role in the treatment of this pathology? Yes/No

Hospital: _____ Number of surgery beds _____

Figure – Survey given to all of the general surgery departments of public hospitals.

Table 2 – Disease that causes the referral as a first visit from primary care

Anal-rectal, %	32
Chronic venous insufficiency, %	24
Dermatological problems, %	14
Abdominal wall (hernia-eversion), %	12
Breast, %	6
Sacrococcygeal pilonidal sinus, %	4
Cholelithiasis, %	4
Others, %	4

Prospective study that analyses the first 100 consecutive visits (January 2008).

In spite of the above, little attention is paid to it at the first healthcare level (primary healthcare and insurance companies) in Spain, as illustrated in studies recently carried out by primary care physicians and GS.^{7,8} This leads to the fact that the CVI is almost always referred to a surgeon and it becomes one of the most frequent diagnoses in the consultation. In concrete terms, in our hospital, we carried out a prospective study in January 2008, where we analysed the first 100 consecutive visits, and we confirmed that the CVI was the second most frequent cause of referral (24%) after anal diseases (30%) (Table 1).

This high frequency of patients in our consultations puts the diagnosis related group 119, "ligature and stripping of lower limbs veins" among the most frequent of a GS department in a hospital without vascular surgery.⁹

In addition, the demand for varicose vein surgery is growing in certain countries, such as the United Kingdom,¹⁰ as the benefits are shown in the 3 principal indications that patients demand: improved quality of life,¹¹ reduction of the risk of thromboembolic diseases (TED)¹² and aesthetic improvements.¹³

Who treats patients with varicose veins in Spain?

If we were realistic, we should respond "private medicine," as the public system has failed. But the environment of this study is public medicine and thus we refer to said system. It is difficult to recognise the varicose veins that we, the GS, operate and those that are operated on by vascular surgeons because of a lack of data. Let's get closer to reality by analysing data on the healthcare provision of each hospital and the activity carried out in each group of hospitals.

According to the provision of healthcare of the hospital, we can differentiate between hospitals that have or do not have vascular surgeons.

According to data provided by the AEC in March 2008, there are approximately 270 public hospitals in Spain, all of them with GS. By contrast, according to data published by the AVS, only 91 public hospitals have vascular surgeons.¹ As a result, in 179 public hospitals (66% of the total), there are no vascular surgeons. As varicose vein surgery enters in the menu of

Table 2 – Data from the Spanish Ministry of Health and Consumer Affairs on the number of discharges from DRG 114, according to the group of hospitals per number of beds¹⁴

Hospitals per No. of beds	Discharges, No. (%)	%
Group 1 (less than 250)	4284 (27.5)	
Group 2 (250-500)	5729 (36.9)	64.4
Group 3 (500-1000)	3244 (20.9)	35.6
Group 4 (>1000)	2294 (14.7)	

public health services, in 2/3 of the public hospitals, the GS are the ones that have to take on this specialty.

This data is similar to the data from the survey: of the 105 hospitals that have responded, in 59 (56.2%) there is no AVS department. The GS of the hospitals without vascular surgeons could refer these patients to hospitals with AVS. This only happens in 8 of the 59 hospitals (6 send them to AVS of the reference hospital, and 2 have contracts with private providers).

However, in the 46 hospitals where vascular and general surgeons coexist, both services take on this type of surgery. This happens in 9 hospitals in which the average percentage of varicose veins that are operated on by GS is 31%, which oscillated between 5%-90%.

Depending on the category of the hospital, the only general state data is found in the Web page of the Spanish Ministry of Health and Consumer Affairs, that classifies the number of hospital discharges per GS and hospital category.¹⁴ If we consider that the hospitals with AVS are located mostly in groups 3 and 4 (more than 500 hospital beds), whereas the hospitals of group 2 (250-500 beds) and, above all, those from group 1 (less than 200 beds) do not usually have vascular surgeons, the percentage of discharges by DRG 119 in each group serves as an approximate reference for us. In Table 2, we observe that 64.4% of the interventions are carried out in small hospitals, most likely, by a GS. As a result, we GS operate in, approximately, 2/3 of the cases of varicose veins that are operated on in the public healthcare system.

What's new in the treatment of varicose veins?

We will refer not only to diagnosis (CEAP classification, usefulness of ultrasounds) but also to therapeutic management (compressive treatment, extension, and the saphenectomy technique, less invasive techniques, etc).

CEAP classification (clinic, aetiology, anatomy, and physiopathology): as an evolving disease, the CVI shows a wide range of signs and symptoms which makes it difficult to stratify patients to compare results. The International Consensus Committee on Venous Disease recently proposed the CEAP Classification,^{15,16} which has been universally accepted.¹⁷ Given its exhaustive nature, Clinical Classification is more frequently used (C)¹⁸ (Table 3).

The importance of compressive treatment: compressive therapy not only improves clinic, but also reduces the diameter

Table 5 – Clinical classification (C) of chronic venous insufficiency (CVI) proposed by the International Consensus Committee on Venous Disease

Class	Definitions	Clarifications
C ₀	Without visible or palpable signs of CVI	
C ₁	Telangiectasia, reticular veins, inflamed maleolar	Telangiectasia: in tradermic venule with a diameter <1 mm. Reticular vein: subdermic vein dilated and not palpable with a diameter <3 mm
C ₂	Varicose veins	
C ₃	Oedema without skin alterations	
C ₄	Cutaneous alterations secondary to CVI	
C _{4A}		Pigmentation, venous eczema, or both
C _{4B}		Lipodermatosclerosis, white atrophy or both
C ₅	Scarred venous ulcer	
C ₆	Active venous ulcer	

Adapted from Porter et al¹⁶ and Eklof et al.¹⁷

of the veins, increases venous blood flow, and decreases the risk of thrombosis. Furthermore, it stimulates the fibrinolytic system, leading to an improved lymphatic flow and it reduces the extravascular filtrations, which minimizes the oedema and the cutaneous alterations.¹⁹ In addition, valvular incompetence from dilatation is corrected in an early manner if there are still no fibrous alterations.²⁰ Compressive therapy is useful, safe and inexpensive, and it should be recommended as the first line of treatment and as a complementary treatment to any other treatment.¹⁸ A recent randomized trial showed a greater benefit in more advanced stages; relapse of the ulcer is prevented after surgery.²¹ Together with compressive therapy, it has also showed improvement in the physical conditions (exercise, weight-loss, etc).²² As GS, we should dedicate a sufficient amount of time to our consultations to achieve their implantation.

Evolution of surgical treatment: CVI surgery has 3 basic objectives: a) eliminate dilated veins; b) aesthetic improvements; and c) low morbidity and relapse.²³ Given that there is no consensus on the ideal technique, various therapeutic techniques have been described, such as ligation, stripping, or occlusion by heat or sclerosis.¹⁸

Classic surgical treatment (ligature of the arch and saphenectomy): the first modern surgery was performed in 1905, and included the exhaustive removal of the arch and all of the greater saphenous vein with ligation of its tributaries.²⁴ The aggressiveness of this treatment was minimized with the introduction of the phleboextractor that removes the saphenous vein with less surgical damage.²⁵ Following this, although some authors defend the isolated ligation of the arch, basing their arguments on the fact that the most transcendent mechanism of the CVI is the gravitation backflow, the publication of better results when combining

the saphenectomy with a simple ligation,^{26,27} definitively consolidated this technique.

Modifications of classic treatment: although there is no discussion about the indication to ligate an insufficient arch together with its tributaries, and remove the insufficient saphenous to minimize the risk of relapse, there is controversy regarding the extension of the saphenectomy.¹³ The fact that the grade of insufficiency of the saphenous is not uniform and usually limits itself to the most proximal portion is accepted; generally, the distal portion is competent.²⁹⁻³¹ Therefore, numerous authors criticise the systematic removal of the entire saphenous vein that makes its posterior use for myocardial revascularisation impossible.³²⁻³⁴ In addition, the distal saphenous vein surgery entails paraesthesias from the damage done to the internal saphenous nerve,³⁵⁻³⁸ that are 6 times more frequent when the saphenectomy is extended to the ankle.²⁹ The following 2 technical modifications are thus recommended:

- The partial saphenectomy, limiting stripping to the point where the saphenous vein usually penetrates into the upper third of the leg, approximately 20 cm below the knee, although the best is to locate the exact point using a Coloured Doppler Sonography (CDS).³⁹⁻⁴¹
- The inverted saphenectomy using the phleboextractor with a hole to which the vein is sutured, the latter being inverted as it is tracted,⁴² instead of being stripped with the classical method. Although there is controversy when quantifying its benefits,⁴³⁻⁴⁵ its simplicity and economy make it recommendable for GS.

Introduction of minimally invasive procedures

The CHIVA method (haemodynamic cure of ambulatory chronic venous insufficiency): aims to restore the venous haemodynamics before removing the saphenous vein.⁴⁶⁻⁴⁸ A detailed study of the CDS should be carried out before performing said method. Although for those that defend it, it has more advantages than classic surgery,^{47,49} other studies do not find better results concerning relapses and aesthetics.⁵⁰

Endovascular procedures: the fact that one of the principal causes of relapse after classic surgery is neovascularisation at the level of the inguinal injury,⁵¹ as well as the intention to minimize work leave, has led to the recent introduction of endovascular techniques. Basically, there are 2 procedures: radiofrequency (RF) and endolaser that aim to produce, using heat, an irreversible occlusion of the vein.

In both procedures, an electrode is introduced distally (below the knee) in the saphenous vein, until it is located under the control of the CDS in the junction. Later, the electrode is removed and a sequential treatment of the trajectory is carried out. Both can be carried out with local-regional or local numbing anaesthesia.⁵²

Both the endolaser, with different wave lengths, and the RF are safe and effective in the short to mid term, with a greater level of satisfaction from patients than with traditional surgery.^{53,54} Although morbidity is low, surgeons should be very careful with this technique as to avoid burning skin. RF presents less complications as it requires lower

temperatures.^{55,56} At present, long term satisfactory results are being published, with curing rates of the saphenous vein backflow of 86% after 4 years with RF.^{57,58} Although these procedures are more expensive than surgery, recent studies demonstrate their cost-effectiveness as they require a shorter leave from work.⁵⁹

Ultrasound-guided foam sclerosis (UGFS): although liquid sclerosis has been used for many years to treat small varicose veins, its use in large veins gave poor results.⁶⁰ Cabrera, based on studies that demonstrated that the foam from mixing a sclerosant liquid with a gas was 4.5 times more effective than using the sclerosant agent alone,⁶¹ and that the effect of the sclerosant agent was greater when applied on a previously emptied vein,⁶² gave popularity to the UGFS in 1997.⁶³ This type of sclerosis is different than the liquid sclerosis because the foam is not diluted in the vein blood, but it moves it, which permits a precise control of the exact location and the time that it acts thanks to the CDS.⁶⁴

Because of its simplicity and low cost, the most used method to obtain foam is from Tessari,⁶⁵ using 2 disposable syringes and a 3 way connector. After filling the syringe with air and the other with 1 mL of sclerosant solution, both are connected to the 3 way connector, and 20 fast shakes are carried out with the content between the 2 syringes, which provides a stable foam that has a greater volume and is more effective than the sclerosant solution; it can be used with a CDS control in any vein up to 20 mm diameter. The fact that the foam can be used in large saphenous trunks or in reticular, primary or relapsed veins, independent of their size, pattern or anatomical location, in an ambulatory manner, in both legs at the same time, and can be repeated as many times as necessary, makes it, for many phlebologists, the treatment of the future.⁶⁶

The rate of relapses after 10 years is 40%, comparable to classical surgery,⁶⁷⁻⁶⁹ although with the exception that in these cases a repeated sclerosis is as effective and simple as the first treatment.¹⁸

However, it is not free of complications and needs, aside from sonographic control, an experienced phlebologist, as any excessive penetration of foam to the profound system can cause PVT⁷⁰; one case of death by a paradoxical embolism has been published of a patient with a permeable oval foramen.⁷¹

Ambulatory phlebectomy: consists of an avulsion by mini-incisions of non-axial varicose veins larger than 4 mm.⁷² Although it is a classic technique, it was reintroduced in 1951 by Muller,⁷³ with 4 principal advantages: ambulatory, radicalism, low cost, and aesthetics. It can be used alone or combined with other procedures (ligature of the arch,⁷⁴ RF,⁷⁵ endolaser,⁷⁶ etc). The mid to long term results are better than those obtained with the sclerosis.⁷⁷

Treatment of venous ulcers using Subfascial Endoscopic Perforator Surgery (SEPS)

In spite of the socioeconomic importance of the VU and the poor results from conservative treatment, surgery has made few advances in the treatment of this disease.⁷⁸ The pathogenesis of VU includes fundamentally the incompetence

of the perforating veins in the legs.^{79,80} Traditional treatment has included the ligature of said perforators using the Linton procedure,⁸¹ with acceptable scarring rates,⁸² but with high morbidity and prolonged hospitalisation. In 1985, Hauer⁸³ described an endoscopic procedure that later, coinciding with the development of laparoscopic material, experienced technical improvements.^{84,85} SEPS, as is the case with the Linton procedure, aims to disconnect the insufficient perforators, while accessing the subfascial space from an area far away from the damaged skin.⁸⁶ For the correct indication and realisation, a detailed study with CDS is required of not only the perforating veins, but also the superficial and deep venous systems.⁸⁷

The short term studies, some performed by GS, show scarring rates of 100%, with minimal morbidity. Recent studies,⁸⁸⁻⁹⁰ some of them randomized trials,^{91,92} confirm these good results (87%-90%) with minimal morbidity and little hospitalisation.

With these results it is hard to justify that GS, specialists with more experience in video-surgical techniques, remain distanced from the treatment of a problem that is so highly prevalent in our consultations.

The problem is not its high cost, as we GS have the majority of the material necessary available to us (that used for laparoscopies).⁸⁵ The explanation could be found in the lack of interest that we GS have for the phlebology and the lack of training in the management of the CDS, which is indispensable to locate the insufficient perforating veins and to evaluate their competency.⁸⁵⁻⁹²

CDS handling by GS-phlebologist

Although multiple explorations in CVI have classically been described, all of them have been replaced by the CDS. Its simplicity, fastness, comfort level, and absence of complications together with a sensitivity and specificity greater than 95%, convert it in an indispensable exploration when studying a phlebologic patient.⁹³ In the words of Pizano, a Colombian phlebologist, the CDS has transformed phlebology into a formal science, "converting the skill into science."²⁹ As we commented, the CDS is indispensable in endovascular techniques, and to be able to correctly cartograph the venous system of the patient and limit surgery to the affected territory.⁵² Just as it is not conceivable that an AVS department does not use CDS as a fundamental exploration in their vascular laboratory,⁹⁴ it is completely indispensable that a GS-phlebologist be properly trained to be able to carry out a CDS.

The GS, like other specialists (cardiologists, enterologists), have recognized the need to carry out our own sonographic studies. It is unthinkable that a proctologist or a hepatic surgeon does not perform sonographies. In concrete terms, a question about sonographic activity in general surgery was included in our survey. Of the 96 hospitals that have responded, 60% claimed to have used it at some time. Facing this reality, AEC sponsored a sonography course in 2007 for surgeons that was held in Zaragoza, and later the organisers published a complete manual,⁹⁵ and although neither the course nor the book included the phlebologic CDS, hopefully

it will be included in future editions, since according to the data from our survey, 11% of the general surgery departments are currently performing CDS.

In our hospital, where we already have a great amount of experience in anal-rectal sonographies, we introduced the CDS 1 year ago, and we have confirmed its great usefulness after a small learning curve. We have gone from operating varicose veins with a CDS performed by an external radiologist that only informed us about the arch, to being able to perform a preoperative cartograph of our patients.

What is the current situation of GS and varicose vein surgery?

In our opinion, the situation is bad, as in spite of being responsible for the treatment of the majority of the patients, we are not where we should be in the healthcare, scientific, organizational and training areas.

Regarding healthcare, and according to the data from the survey, we observe that:

- Only 7.6% of the general surgery departments have a phlebology unit, although 33% have a GS-phlebologist.
- In 1/3 of the departments that operate varicose veins, this surgery is carried out by all GS, while in the remaining 2/3, this surgery is carried out by only some of the surgeons of the department.
- The most used technique is the ligation of the arch with a long saphenectomy; only 5% of the departments systematically perform short saphenectomies, and 13.5% perform inverted saphenectomies.
- Only 22% of the departments that use to operate varicose veins have some kind of experience with SEPS, and 24% with CHIVA.

We are not at a good scientific level either. In the last 10 years we have only found 5 studies on phlebology in *Cirugía Española*.^{85,96-99}

Concerning organisation, we GS have left all attention in the hands of the vascular surgeons. At the heart of the AEC there is an angiology section, whose board is exclusively formed by AVS. The organization that represents Spain in all international phlebological forums is the Spanish Chapter of Phlebology that depends on the Spanish Society of Angiology and Vascular Surgery (SEACV). Although it admits GS, and our numbers are growing, they only do so as "added members" (with a voice but without a vote).

However, possibly, the principal problem may be reflected in the absence of continued education. While the SEACV organises courses for its residents, that are hard to access for general surgery residents, the AEC does not offer any phlebological training. If varicose veins are only operated in a few hospitals, and there is no continued training, how will future residents be trained? The same thing happens with teaching CDS. The SEACV organises its own courses to which we GS do not have access.

In our study, when we asked about training, we obtained the following results:

- Concerning training in phlebology during residency, 71% of the responses considered it as poor; 20% mediocre, and only 9% as good.
- Concerning if they consider the current continued training as sufficient for phlebology offered by the AEC or the industry, 88% of the responses are negative, and 83% believe that it should be improved.

As important as knowing what we do is to know what we want for the future. Regarding the question about if we GS should have a more important role: only 47% respond affirmatively, while 40% respond negatively and 13% do not respond. This duality is reflected in the comments attached to the survey. While some hospitals tell us "thanks to God that we have freed ourselves from having to operate more varicose veins," others lament their current situation and they encourage us to improve phlebological training. It is interesting that the favourable opinions for a greater prominence come mostly from small hospitals with no AVS department.

Reflections

Phlebology is a surgical area of great socio-sanitary relevance that is going through great changes as it introduces new procedures, on top of those that already have demonstrated clinical evidence and whose demand by patients is growing. GS, although having a great healthcare responsibility, we have a poor investigative, organisational and training role. Although we recognise that the situation could be improved, we do not quite clarify what our position should be concerning this disease.

In our opinion, the GS departments where this activity is being carried out should have phlebology units available, just as other FU have done (breast, bariatric surgery, abdominal wall, proctology, endocrine, etc). Regarding training, the AEC should make sure that our residents, that in many cases end up working in a hospital without an AVS department, receive correct training and education, regarding surgical techniques as well as the basic exploration of these patients, and the CDS.

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