

Research Article

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Prophylactic GSV surgery in elderly candidates for hip or knee arthroplasty

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Abstract: Aging is one of the major risk factors for varicose veins. The same is for Knee and Hip Osteoarthritis. Most of the patients undergoing to Hip (THA) or Knee (TKA) arthroplasty are over sixteen. Varicose veins, excluding thrombophilia, are the most significant risk factors for VTE after THA and TKA.

This study investigates on the usefulness of prophylactic treatment of GSV insufficiency in elderly patients undergoing to orthopedic surgery.

A retrospective study enrolling 44 over-sixty five patients, undergoing to TKA or THA. 24 patients underwent to traditional surgery and 20 to EVLA.

The presence of evident varicosities and/or a saphenic reflux lasting > 500 ms has been considered as operability criterion. Both in surgery and EVLA group has been performed the ablation of visible varicosities and only saphenic refluxing traits.

Results: 1 case of symptomatic DVT was recorded after arthroplasty. A statistically significant difference ($p = 0.006$) of recovery time between surgery and EVLA groups has been detected. There is not a statistically significant difference in long-term recurrence rate between surgery and EVLA.

Conclusions: It is useful to program GSV surgery, before treat hip or knee. This study showed a 50% decrease in the incidence of postoperative DVT.

Keywords: Hip Replacement Arthroplasties; Knee Replacement Arthroplasties; Deep Vein Thrombosis; Varicose Vein; Saphenous Vein; GSV; EVLA; Aging; Frail Elderly.

1 Introduction

Aging is considered one of the major risk factors for chronic venous insufficiency and varicose veins. In Criqui et al (2003) [1] is reported a significant increment of odds ratio (OR), up to 2.42 for varicose veins and up to 4.85 for Chronic Vein Insufficiency (CVI), in > 65 years old patients. In Rabe et al (2003) [2] OR, in the age 70-79, is significantly increased both for CVI (23.3) and varicose veins (15.9).

Female sex is itself a risk factor, as shown by a much larger prevalence in women compared with men. In women, in fact, height and number of pregnancies are positively associated with the presence of varicose veins, whilst, in men, lack of sufficient routine exercise and unskilled work are associated with higher risk [3].

Despite, as regards the difference of sex-related prevalence of varicose veins, Basle Study III and the Edinburgh Vein Study report a male preponderance [4].

A 3-fold higher prevalence of non-saphenous varicose veins has been found in women compared with men [3].

Aging is also considered the main risk factor for the development of knee (KOA) or hip osteoarthritis (HOA). The available data suggest a prevalence of symptomatic KOA of 20% in individuals >65 years old and an annual incidence rate approaching 1% in women aged 70–89 years [5].

Most of the patients undergoing Total Hip Arthroplasty (THA) or Total Knee Arthroplasty (TKA) were over age 60 (number of patients over 60: under 60 = 21:1) [6].

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Venous thromboembolism (VTE), which includes asymptomatic and symptomatic deep-vein thrombosis (DVT) and/or pulmonary thromboembolism (PE), has to be considered as a potentially serious complication after total hip arthroplasty (THA) and total knee arthroplasty (TKA). The vast majority of VTEs are asymptomatic, but they can also be associated with long-term morbidity when symptomatic events are considered [7].

Zhang *et al.* (2015, in a meta-analysis of 14 studies, showed that an history of VTE (RR = 10) and varicose veins (RR = 2) have to be considered as the most significant risk factors for postoperative VTE after THA and TKA [6].

Therefore it is clear that if arthroplastic surgery becomes necessary to restore the patient's mobility, or due to repeated episodes of acute joint inflammation, it must take into account the choice of a preventive saphenectomy or varicectomy.

2 Patients and methods

From April 2012 to December 2014, 44 patients aged > 65 years, undergoing to TKA or THA, were enrolled in this study. Of these, 24 (28 limbs) underwent to traditional surgery and 20 were treated with Endovascular Laser Ablation (EVLA) technique using a 810 nm -wavelength Laser Device (26 limbs). 31 patients were female and 13 were male.

The most common comorbidities were: moderate chronic heart failure (NYHA Classes 1 and 2) (2), type II diabetes (7), Chronic Obstructive Pulmonary Disease (COPD) with moderate respiratory failure (3), high blood pressure (11). Patients with a history of DVT have been excluded.

All patients, by definition, suffered from osteoarthritis. In particular, 27 patients were in planning for TKA and 17 for THA.

All patients, before treatment, were subjected to a Doppler ultrasound control for the evaluation of lower limb superficial vein refluxes [8]. In particular, a reflux has been considered pathological, when, at the upstream and downstream compression maneuvers, with the patient standing, the reflux lasted more than 500 ms, regardless of the peak rate [9].

The presence of evident varicosities was in itself regarded as criterion of operability.

For all patients was provided for anti-thrombotic prophylaxis using sodium enoxaparin at a dose of 4000 I.U. (6000 I.U. for patients who, before treatment, were in

antiplatelet therapy). In all patients a postoperative stocking with a compression of 23 mmHg was prescribed [10].

In the group of patients who have undergone to ablative surgery, after a spinal anaesthesia, it has been performed a selective crosssectomy (with saving of the highest tributaries) [11,12] and a stripping of the only refluxing saphenous tract, as regards both the internal and external saphenous vein. Thereafter it is proceeded to a phlebectomy for superficial varicosities according to Muller technique.

In the EVLA group, under spinal anaesthesia, before procedure, has been practiced a tumescent infiltration, to permit a better contact between vein wall [13] and laser tip. Cannulation of the saphenous vein has been performed using a 16G needle as a guide for the laser fibre, under echographic view.

All patients were monitored at 7, 14, and 30 days from discharge, and followed from 8 to 24 months (mean 16.4). In the immediate follow up, all complications were noted and treated. In long-term follow-up, it was evaluated the presence of recurrence, evaluated as the appearance of new varicose veins and / or neocrosse, if surgical ablation performed, or the appearance of refluxing traits, in case of EVLA.

2.1 Statistics

All data were analyzed using the Statistical Package for the Social Sciences version 14.0 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics were used to summarize the demographic characteristics of patients. Fisher's exact test was used for categorical data. Student's T test was used to compare mean times of recovery between surgery and EVLA groups and $p < 0.05$ was considered statistically significant.

Ethical approval: The research related to human use has been complied with all the relevant national regulations, institutional policies and in accordance the tenets of the Helsinki Declaration

3 Results

In this retrospective study, 44 patients we were enrolled for a total of 54 treated limbs. The mean age of patients was 68.76 ± 1.20 years, with a minimum of 65 and a maximum of 73 years. Limbs treated with ablative surgery were 28, while 26 limbs were treated with EVLA technique.

Mean follow-up was 16.4 months with a range of 8-24 months. Stage of varicose disease between the two groups is similar. The CEAP class varies from C2 to C4.

Surgery group consisted of 24 patients (9 males and 15 females), with 28 limbs treated; mean age of patients was 67.92 ± 1.84 , with a minimum of 65 and a maximum 71 years.

EVLA group included 20 patients (4 males and 16 females) and 28 treated limbs; mean age was 69.61 ± 2.29 with a range of 66–73years.

3.1 Postoperative complications

Postoperative complications were considered any adverse effects that occurred and resolved in the context of the intensive follow-up conducted at 7, 14, and 30 days of discharge.

The most frequent complications were: haematomas (72.72%), wound infections (11.36%) and paresthesias (6.82%). Making a distinction in the incidence of complications according to the distribution between the two groups, we can say that, only with regard to hematomas, there is a statistically significant difference between the patients who underwent conventional surgery (47.72%) and those underwent to EVLA (25.00%).

Only 2 cases of superficial vein thrombosis occurred and the difference between the two groups was not statistically significant.

There were no cases of deep vein thrombosis (DVT). 1 case of symptomatic DVT (2.27%) was recorded in the postoperative period after programmed arthroplasty.

3.2 Recovery time

The patients enrolled in this study are, by definition, limited in their mobility. For this reason, recovery time was evaluated, not as the time necessary to resume full mobility, but to return to the pre-operative status in terms of both motility and daily carried out activities. The average recovery time was of 5.71 ± 1.20 days, with a statistically significant difference ($p = 0.006$) between the mean time to recovery of patients undergoing conventional surgery (6.56 ± 2.36 days) and that of patients undergoing EVLA (4.85 ± 1.56 days).

3.3 Recurrence

Within the follow-up, some relapses (15.90% of the patients) had been observed, with no statistically significant difference between the surgery group (6.81%) and EVLA (9.09%) ($p = 0.683$).

4 Discussion

Aging is an independent risk factor for chronic venous insufficiency and the appearance of saphenous and extra-saphenous varices [14].

Even hip and knee osteoarthritis sees the main risk factor in aging together with osteoporosis [15].

Despite the prevalence of both diseases interests the older segments of the population, we see a quite different therapeutic approach between the two conditions.

In those over 65, treatment tendency for varicose pathology is conservative. However, for hip and knee osteoarthritis, being diseases with potentially more disabling characteristics in terms of reduced mobility, interventional approach is often the only way to prevent total patient immobilization [16,17]. It becomes even reliable in case of non-reducible/unstable intertrochanteric fractures [18].

This difference in approach takes into account the risk / benefit ratio related to surgical stress in over sixty-five patients, especially considering the potential comorbidities.

For this reason we tend to subject the elderly patients to an ablative intervention only in case of need. Prevention of thromboembolic events subsequent to knee or hip surgery can, in effect, be regarded as an indication for ablative intervention, in consideration of the fact that, excluding history of DVT, the presence of varicose veins is a risk factor for DVT, increases the risk of 2 times [6].

Most of the studies [19,20] suggest that the adoption of an adequate anti-thrombotic strategy lowers the risk of DVT. However, despite prophylaxis, DVT after THA and TKA equally happens and varies depending on the series; the incidence is greater for knee arthroplasty [21,22]. In Fujita et al (2015) is reported an overall VTE incidence of 4.4%, and a DVT incidence of 3.7%; subsequent DVT occurs in THA in 2.4% of cases while in 5.5% of cases after TKA [23].

In our study, there was an incidence of post-procedural DVT of 2.27% and there have been no cases of VTE.

Our approach has been marked on the mini-invasiveness. It proceeded, in fact, on the basis of a rigorous preoperative hemodynamic mapping, to the ablation of the only refluxing and/or dilated saphenous traits. This resulted in saving apparently healthy saphenous traits, to be used as material for a possible procedure of aortic-coronary or peripheral bypass.

Recurrence rate is not low and this is explicable since, despite the intervention of THA or TKA was performed at not more than 60 days after the intervention of saphenec-

tomy, patient's mobility conditions are reduced, although improved after orthopaedic procedure.

Short-term complications were represented mainly by hematomas and paraesthesias. According to the distribution among the two groups, we can say that, only with regard to hematomas, there is a statistically significant difference between the patients who underwent conventional surgery and those underwent to EVLA. In the other cases, however, even if there exists an unfavourable trend, for the appearance of complications, in respect of traditional surgery, it is not possible to assert that there is a statistically significant difference.

Table 1: Results of the study

Variables	Total (N=44) N (%)	Surgery (n = 24) n (%)	EVLA (n = 20) n (%)	Fisher's Exact Test (p)	Student's T-test (p)
Sex				0.320	
Male	13 (29.54)	9 (20.45)	4 (9.09)		
Female	31 (70.46)	15 (34.09)	16 (36.37)		
Age					0.015
Mean \pm sd	68.76 \pm 1.20	67.92 \pm 1.84	69.61 \pm 2.29		
Max	73	71	73		
Min	65	65	66		
Postoperative Complications					
Wound Infection				0.356	
Yes	5 (11.36)	4 (9.09)	1 (2.27)		
No	39 (88.64)	20 (45.45)	19 (43.19)		
Superficial Phlebitis				> 0.99	
Yes	4 (9.09)	2 (4.54)	2 (4.54)		
No	40 (90.91)	22 (50.00)	18 (40.91)		
Deep Vein Thrombosis				> 0.99	
Yes	0 (0)	0 (0)	0 (0)		
No	44 (100)	24 (54.54)	20 (45.46)		
Haematoma				0.021	
Yes	32 (72.72)	21 (47.72)	11 (25.00)		
No	12 (27.28)	3 (6.82)	9 (20.46)		
Paresthesia				> 0.99	
Yes	3 (6.82)	2 (4.54)	1 (2.28)		
No	41 (93.18)	22 (50.00)	19 (43.18)		
Recovery time (mean in days \pm sd)	5.71 \pm 1.20	6.56 \pm 2.36	4.85 \pm 1.56		0.006
Recurrence				0.683	
Yes	7(15.90)	3 (6.81)	4 (9.09)		
No	37 (84.10)	21 (47.73)	16 (36.37)		
Post THA/TKA DVT				> 0.99	
Yes	1 (2.27)	0 (0)	1 (2.27)		
No	43 (97.73)	24 (54.55)	19 (43.18)		

The long-term rate of recurrence comparison between surgical ablation and EVLA, in agreement with the literature has been not demonstrated statistically significant [24,25].

What undoubtedly was favourable towards the EVLA is the patient's recovery time, proving to be a technique far less invasive than traditional surgery, especially if an 808 nm-wavelength laser device is adopted, which allows to perform, in a single time, both the saphenous vein and its varicose tributaries laser ablation, the latter supported by the use of transillumination [26].

5 Conclusions

The average age extension has increased the incidence of diseases we see, where aging is the main risk factor. Chronic venous insufficiency and osteoarthritis are widespread diseases in the population over 65 years.

While therapeutic options for the treatment of chronic venous insufficiency offer the opportunity to move towards a conservative management, in order to avoid as long as possible the stress resulting from surgery, in patients with potential co-morbidities, hip and knee osteoarthritis very often need of the arthroplasty to restore the patient's mobility which, otherwise, would be sentenced to a worsening immobility.

Hip and knee surgery is burdened by a significant risk of thrombosis and varicose veins are one of the most important risk factors. In this case, if the health conditions of the patient permit, it is useful to program a prophylactic intervention of saphenectomy / varicectomy, before working on the hip or knee. This study showed a decrease in the incidence of symptomatic DVT of approximately 50% compared to the reference works. The choice between traditional surgery and EVLA has proved indifferent in terms of long-term relapse. However, EVLA is preferable when a minimally invasive procedure has to be considered, especially according reduction of hospitalization and recovery time.

It could be interesting, in this group of patients (elderly), to make a comparison among sclerotherapy (both liquid sclerotherapy and foam sclerotherapy), EVLA and surgery, evaluating the effects in elderly patients undergoing major orthopedic surgery. Although the international literature reports a higher incidence of recurrence in sclerotherapy compared to ablative surgery and endovascular techniques [27,28], this does not mean that, in the period immediately following a successful sclerotherapy treatment and before the onset of a relapse, sclerotherapy cannot give benefits in terms of reducing the risk of postoperative VTE.

rotherapy cannot give benefits in terms of reducing the risk of postoperative VTE.

Abbreviations:

KOA: Knee Osteoarthritis

HOA: Hip Osteoarthritis

THA: Total Hip Arthroplasty

TKA: Total Knee Arthroplasty

VTE: Venous Thromboembolism

EVLA: Endovascular Laser Ablation

DVT: Deep Vein Thrombosis

CVI: Chronic Vein Insufficiency

OR: Odds Ratio

RR: Relative Risk

CPD: Chronic Obstructive Pulmonary Disease

Conflict of Interest: The authors declare that they have no conflict of interest.

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