Medicine

# POST SURGERY TROMBOFLEBITIS, MAJOR RISK OF PULMONARY EMBOLISM

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***ABSTRACT:*** *ONE OF THE UNDESIRED COMPLICATIONS FOLLOWING A SURGERY IS THE TROMBOFLEBITIS OF THE INFERIOR LIMBS, WHICH CAN LEAD TO PULMONARY EMBOLISM. MASSIVE PULMONARY EMBOLISM STARTING FROM THE DEEP VENOUS SYSTEM OF THE LOWER LEGS IS ONE OF THE POST SURGERY COMPLICATIONS THAT SETS IN VERY QUICKLY AND HAS A DEATH RATE ALMOST IMPOSSIBLE TO SAVE. I HAVE ANALYZED ORTHOPEDIC SURGERIES IN DEVA COUNTY HOSPITAL AND THE SURGERY CLINIC 1, TIMIS COUNTY HOSPITAL FOR FIVE YEARS. CONSEQUENTLY, WE HAVE OBSERVED THAT THE THROMBOEMBOLISM RISK DEPENDS BOTH ON THE SIZE OF THE SURGERY AND THE CO-MORBIDITY OF THE PATIENTS (VENOUS, MALIGNANT OR CARDIAC DISORDERS, SPLENECTOMIES, BLOOD DISORDERS, ETC). DEEP TROMBOFLEBITIS REQUIRES ENERGETIC MEASURES OF MEDICAL SURGICAL TREATMENT TO RENEW THE PERMEABILITY OF THE DEEP VENOUS SYSTEM AND TO PREVENT PULMONARY EMBOLISM. IN CONCLUSION, DEEP TROMBOFLEBITIS CANNOT BE PREVENTED IN ALL OF PATIENTS WHO HAVE UNDERGONE SURGERY. THIS COMPLICATION EXISTS IN ALL SURGICAL CASES REGARDLESS OF THE APPLIED PROPHYLACTIC MEASURES.*

***KEYWORDS****: TROMBOFLEBITIS, THROMBOEMBOLISM, PULMONARY EMBOLISM,*

## INTRODUCTION

One of the undesired complications following a surgery is the tromboflebitis of the inferior limbs, which can lead to pulmonary embolism. Massive pulmonary embolism starting from the deep venous system of the lower legs is one of the post surgical complications that sets in very quickly and has a death rate almost impossible to save. For this reason, deep venous thrombosis and pulmonary embolism are severe disorders with a major risk of death. Repeated pulmonary embolism can generate pulmonary hypertension, whereas massive pulmonary embolism is fatal most of the times. Mostly neglected, the post-

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thrombotic syndrome caused by the deep venous thrombosis of the lower limbs results in venous reflux and obstruction, with tegumentary and soft tissue changes, with the occurrence of ulceration, which affects the quality of patients' lives and requires high curing costs.

In North America and Europe the annual incidence of these disorders is approximately 160/100,000 for deep venous thrombosis, 20/100,000 for non-fatal symptomatic pulmonary embolism and 5/100,000 for fatal pulmonary embolism, diagnosed after autopsy.

Following the lack of preventive measures, the incidence of deep venous thrombosis is high and depends on the patients' age, the presence and the number of thrombogenic risk factors, the type and the duration of the surgery. The main factors are patients' extended immobilization, injuries, surgeries, malignant disorders and previous thromboembolic problems. Other factors include age, obesity, infection, postpartum period, varicose disease, dehydration, hormonal therapy. Thrombophilia represents the triggering etiological factor. The patients hospitalized for medical or surgical treatment who present a thromboembolic risk require specific therapeutic measures. Moreover, this risk still exists after the patients are discharged from the hospital.

Gonarthrosis is a degenerative disease, especially met among the elderly. The total arthroplasty of the knee is one of the most modern and efficient methods used to improve pain and reestablish articular mobility. One of the post ATG complications is the thromboembolic disesease represented through two clinical entities: deep venous thrombosis at the level of the operated limb and pulmonary embolism, sometimes with a fatal prognosis. This complication appears among the patients with a thromboembolic risk, being the result of the lack of appropriate prophylactic measures.

The purpose of this study is to assess the efficiency of the preventive measures in the case of deep venous thrombosis during two surgical services which involve a major occurrence risk of this undesired post surgical incident.

## MATERIAL AND METHOD

I have analyzed the orthopedic surgeries at Deva County Hospital and general surgery interventions at Surgical Clinic 1(Timişoara Emergency County Hospital, University of Medicine and Pharmacy Victor Babes Timişoara) for five years.

Within the orthopedy-traumatology department at Deva County Hospital, during 2009 and 2014, there were 110 patients with unilateral or bilateral gonarthrosis who did not react very well to the traditional medical treatment; therefore they were considered candidates for ATG. Among these, 35 (28, 18%) were clinically diagnosed with troncular varicosity of the affected lower limb and were assessed with a view to having the venous disease operated. The total knee arthroplasty was carried out after a variable 8-12-week period using a standard technique. The thromboembolism prophylactic measures were applied to all the patients and consisted of: administering heparin with a low molecular weight in prophylactic doses, starting 2 hours before the surgery and continuing then for 2 weeks; the right hydroelectrolytic equilibrium to prevent the rise of blood viscosity; early rising from bed after surgery – passive starting from the first day, associated with isometric contractions, and active from the fourth day; compressive bandage before gaining mobility; administering dicumarinics (Trombostop or Sintrom) starting from the eleventh day and continuing for 6 weeks under periodic control, so that the Quick time should be maintained between 30-40% and INR between 1,8-2,5.

## RESULTS

The 35 patients, aged between 32 and 72, with an average age of 58, 7, were mostly women (66, 67%).

A number of 12 patients (40%) had co morbidity: chronic ischemic cardiomyopathy – 6 (20%), II/III-degree obesity – 4 (13,3%); atrial fibrillation – 2 (6,66).

Following the data during the clinical examination, the 35 cases were classified into several stages of chronic venous insufficiency (CEAP):

- 18 cases in stage II: troncular varicosity - in 8 cases only one inferior limb was affected; in 3 cases the disorder was bilateral;
- 5 cases in stage III: troncular varicosity, perimalleolar edema, cramps, paresthesia, the syndrome of nocturnal restlessness of calves;
- 4 cases in stage IV: troncular varicosity, stasis dermatitis, perimalleolar edema, dermo-hypodermitis phlebopathy;
- 3 cases in stage V: troncular varicosity, cicatrized ulceration.

All the patients operated for varicosity had no problems and no post operative complications; whereas after the total knee arthroplasty there were 4 cases of post operatory thromboembolic disease (12, 9%). Thus:

- 2 cases of deep venous thrombosis (6, 67%) which occurred on the $7^{th}/10^{th}$ day after the surgery. It was the case of patients with chronic venous insufficiency in stage IV CEAP, surgically treated before the knee arthroplasty. They also showed signs of popliteal-femoral thrombosis with edema at the level of the knee. Its treatment was conventional and consisted of: heparin 5000ui, i.v. every 4 hours for 7 days, associated in the last 3 days with dicumarinics (Sintrom® or Trombostop®), checking the Quick time until the value of 25-30% was reached; then the treatment with Sintrom® continued for 3 months; rest in bed with the affected inferior limb in proclive position; anti inflammatory and analgesic pills.
- 1 case of symptomatic pulmonary embolism (3,3%), which occurred 8 days after the surgery of a patient with chronic venous insufficiency, class 5 CEAP, previously treated medically and surgically; the patient also had paroxistic atrial fibrillation and followed a treatment prescribed by the cardiologist. The clinical symptoms and the EKG suggested symptomatic pulmonary embolism accompanied by dyspnea, atrial fibrillation at a fast pace, thoracic pain, cough with sanguinolent saliva. Specific treatment: heparin 5000 ui, i.v. every four hours for ten days + Trombostop® per bone from the $7^{th}$ day for 6 months + papaverine 50 mg i.v. + oxygen therapy + Miofilin® i.v. + Digoxin® i.v. slowly. The evolution was favourable, the symptoms disappeared and there were no complications.

The patient with class 2 CEAP chronic venous insufficiency who refused its treatment before the knee arthroplasty developed from the $7^{th}$ day after the surgery deep ilio-femoral venous thrombosis, resistant to the specific treatment presented above, despite the preventive measures taken. The patient also developed chronic edema at the level of the calf and the thigh, which persisted even after 6 months of treatment with dicumarinics.

In the case of the patients without associated venous pathology there were no clinic manifestations suggestive for thromboembolism.

Thrombosis prevention with small doses of heparin diminished significantly the frequency of post surgical deep venous thrombosis. Calcic or sodium heparin 5,000 u is administered hypodermically two hours before the surgery and then every 8-12 hours. Heparin with low molecular weight and strong antithrombotic action are mostly used today (anti Xa). Mostly used are Fragmin (0,2-0,4 ml s.c.); Clexane (20 mg/day s.c.); Fraxiparine (0,3 ml/day) and Clivarine (0,25 ml s.c) before the surgery, then in daily single dosage similar s.c for 7010 days after the surgery. Anti-aggregation therapy, which includes Dextran 40, Aspirin, is associated.

**DISCUSSIONS**

When we decided to approach the problem of gonarthrosis with an indication to the total knee arthroplasty in the case of patients with varicose diseases we were motivated by the high number of patients who presented the two associated diseases. The primary varicose disease of the inferior limbs is a disorder often met, 30-50% in the case of adults (60% women), and its incidence increases with the ageing process. It is one of the general and local risk factors in the case of thromboembolic disease. Due to the thromboembolic risk, a number of patients can be excluded from ATG, despite the obvious indication and the lack of other risk factors of TVP. The varicose disease benefits today from efficient medical and surgical treatment so as to prevent evolutional complications such as shallow and deep tromboflebitis or chronic venous insufficiency. Thus, from a theoretical point of view, their pre-ATG treatment should eliminate the risk of post surgical TVP. As there is no precise information regarding this hypothesis, we wanted to create a prospective study to assess the risk of TVP after ATG for patients with varicose disease of inferior limbs, who were already operated on.

The risk of deep venous thrombosis after the total knee arthroplasty beyond any preventive measures (medicamentary or mechanical) is between 40 and 84%. The occurrence of thrombus at the level of the inferior limb can be popliteal (with a frequency between 9 and 20%) or with a frequency higher than 40-60% for the calf. The first has a higher risk of migration and of producing pulmonary embolism. The risk of asymptomatic pulmonary embolism can reach 10-20% whereas the risk of symptomatic pulmonary embolism can reach 0,5-3%; the death rate can reach 2%.

The reference method for diagnosing TVP was phlebography, but the development of Doppler echography offered a non-invasive and reliable exploration, lacking risks and complications and being repeatable with a sensitivity of 67-86% compared to phlebography. Its accuracy is though dependent on the surgery, fact demonstrated in a multicentre study in which the values of sensitivity varied between 20 and 90%. In our study we have used it in explorations before surgery and mostly in confirming the TVP diagnostic in an evocative clinical context. We have focused on the incidence of symptomatic TVP without insisting on the incidence of asymptomatic TVP as the latter was difficult to appreciate correctly, considering the risks arising from the phlebography being too invasive and the lack of complete accuracy of the echography.

Once the venous thrombosis installed, we must face the problem of treating it as quickly and correctly as possible with a view to preventing the post thrombophlebitis complications.

At Surgical Clinic 1 from Timisoara, which has an average of 2,500 surgeries/year, 60% of the cases have a moderate or high risk of thromboembolic disease, through the risk of the surgery or/and the risk of associated diseases. These patients benefited from preventive pharmacological treatment (fractioned heparin s.c, single dose) and mechanical treatment (external flexible contention of the inferior limbs).

We adapted the dose of fractioned heparin to particular cases (liver diseases, clotting disorders, over 70 years, body weight of less than 50 kg, in laparoscopic bariatric surgery). The evaluation before surgery consisted of:

- complete clinical examination
- local examination accompanied by the specific clinical screening to have an accurate ostial reflux at the level of the communicating vessels
- Doppler echography of the deep venous system so as to appreciate its permeability, the accuracy of the ostial reflux or at the level of the external saphenous vein

Tracking down the patients with a thromboembolic risk is marked:

**3 points**

-age >50

-major surgery in pelvis or abdomen

**2 points**

- extended surgery >3 hours, femur or hip fracture
- major post surgical complication (bleeding, peritonitis, occlusion)
- neoplastic disease

**1 point**

- more than 10-day immobilization
- the presence of varicosity
- thromboembolic previous problems
- sanguine discrasia or anemia
- associated cardiopathy
- shock during or after the surgery >30 minutes
- intra abdominal or retroperitoneal infection
- dehydration
- obesity
- abdominal distension
- pregnancy or estrogen therapy

The points are added and the factor of thromboembolic risk is established:

Minor risk: 0-2 points

Major risk: 3-6 points

Extreme risk: >7 points

The prophylaxis of venous thrombosis is addressed to patients with a high thrombosis risk: cardiovascular diseases, neoplastic diseases, traumatisms, obesity, abdominal and pelvic surgeries. The preventive measures of the thromboembolic disease consisted of:

- administering heparin with a low molecular weight in prophylactic doses, starting 2 hours before the surgery and continuing for 48 hours after the surgery, until the patient could rise
- flexible and compressive bandage applied at the end of the surgery on the entire pelvic member and, after 48 hours, compressive stocking for 7-10 days
- the slight proclivity position of the resting pelvic limb

The anticoagulant treatment for maintenance (Aspirin or dicumarinics) was replaced with fractioned heparin administered 12 hours before the surgery (for spinal anesthesia) or 1-2 hours before surgery (for general anesthesia). The mechanical prophylaxis was applied before surgery and continued until the patient could rise.

Deep thrombophlebitis requires energetic measures of medical and surgical treatment for the re-permeabilization of the deep venous system and the prevention of pulmonary embolism.

## RESULTS

By applying the preventive protocol of the thromboembolic disease in a combined variant, pharmacological and mechanical, we have observed the significant reduction of thromboembolic accidents in patients with a significant thromboembolic risk. The immediate post surgical incidents in the last 5 years decreased to 3% (mortality < 2%).

Applying this protocol reduced the number of hemorrhagic accidents significantly. All patients with high thromboembolic risk were conscripted early and were recommended to continue the anticoagulant treatment after leaving the hospital, receiving advice regarding the

signs and symptoms of thromboembolism, the importance of the treatment and the side effects.

**In conclusion,** using fractioned heparin, easy to administer, associated with external flexible contention, has greatly improved the post surgical results of elective interventions in general abdominal and vascular surgery for people with moderate and high thromboembolic risk.

This study has proved that the thromboembolic risk depends on the extension of the surgical intervention as well as on the co-morbidity of the patients (venous, malignant, cardiac diseases, splenectomies, blood disorders etc).

Deep thromboflebitis cannot be prevented in all cases of operated patients. This complication exists in all surgical services, regardless of the preventive measures we apply.

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