SMOKING AS ASSOCIATED RISK FACTOR FOR DEEP VEIN THROMBOSIS

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1. INTRODUCTION

Smoking was more frequently associated with atherosclerotic plaque pathogenesis, but it has an important role in vein thrombosis formation also. Deep vein thrombosis is a medical condition in which clots are formed inside of veins, especially in lower limb veins.

2. METHODOLOGY

We investigated 120 patients referred for vascular ultrasound examination with suspicion of deep vein thrombosis based on symptomatology (unilateral edema, pain or tenderness in calf or groin) or patients with pulmonary embolism. In all patients demographic data and risk factors were noted. Then venous ultrasound was performed using compression technique and also color and spectral Doppler (duplex or triplex ultrasound). Vein thrombus was diagnosed when were noticed direct or indirect signs. Direct signs were represented by visualization of an heterogeneous image in the vein lumen, lack of vein compressibility, absence of color or spectral Doppler signal, absence of respiratory modulation. Indirect signs were venous distension, fixed venous valves, lack of venous dilatation during proximal compression or Valsalva maneuver, increased spontaneous echogenicity of the blood flow, increasing of flow in superficial veins and collaterals, opening of perforator veins [1].

3. RESULTS AND DISCUSSIONS

The mean age of group was 58.91±16.58 years. From the initial group, after the ultrasound examination, were excluded 22 patients in which the cause of unilateral edema was other than vein thrombosis (compressive tumor masses, muscular hematoma, posttraumatic or post surgery hematoma, Backer’s cyst). We analyzed risk factors for vein thrombosis in the group of 98 patients left: bed immobilization more than 4 days in 12 (12%) patients, recent surgery in 10 (10%) cases, orthopedic surgery in 14 (14%) patients, cancer in 9 (9%), pregnancy in 5 women (5%), oral contraceptives in 7 women (7%), obesity in 31 (30%), heart failure in 22 (22%), clot disorders (antiphosphoipidic syndrome, thrombocitosis, genetic disorders) in 8 (8%) cases. Smoking was present in 46 (46%) of cases and was the most prevalent risk factors. 20 (20%) patients presented post thrombotic syndrome, 25 (25%) – varicosis in superficial veins and 33 (33%) had pathological reflux on Valsalva maneuver, having venous insufficiency. Regarding the localization of thrombosis we noted the presence of thrombus more distal than proximal: 20 (20%) in common femoral vein, 25 (25%) in femoral vein, 35 (35%) in popliteal vein, 50(50%) in calf veins and 10 (10%) in muscular veins.
Proximal vein thrombosis was noticed in patients with malignancies of pelvis. We divided the lot by smoking status into two groups: 46 smokers (47%) and 52 (53%) non-smokers and we noted vein segments affected by thrombus. In group of smokers we found 11 (24%) cases with common femoral vein thrombosis, 11 (24%) with femoral thrombosis, 20 (43%) with popliteal thrombosis, 38 (83%) with calf thrombosis and 8 (17%) with muscular vein thrombosis.

In a group of non-smokers there were 9 (17%) cases with common femoral vein thrombosis, 14 (27%) with femoral thrombosis, 15 (29%) with popliteal thrombosis, 12 (23%) with calf thrombosis and 3 (6%) with muscular vein thrombosis. In smokers calf thrombosis was more frequent ($p < 0.0001$) than in non-smokers; for the rest of the vein segments we did not find a statistical significance.

In 10 cases (10%) we found deep vein thrombosis in bilateral lower limb (of which 8 (80%) were smokers) and in 11 cases (11%), of which 7 (64%) smokers, coexisted iliac vein thrombosis. We noted also association between smoking and oral contraceptives in 4 (80%) of women.

**Discussion.** The main pathogenic conditions for thrombus formation are represented the classical triad of Virchow: hypercoagulability, blood stasis and endothelial injury.

The most frequent predisposing factors for deep vein thrombosis are prolonged immobilization, surgery, cancer, pregnancy, oral contraceptives, obesity, heart failure, smoking, age over 60, coagulation disorders. Smoking increase the risk of the deep vein thrombosis by multiple mechanisms: increase the level of fibrinogen, the clotting factor levels including factors II (thrombin), V, VIII, X, and XIII, increased tissue factor and homocysteine level, increase platelet activation and aggregation.[2]. Smoking is implicated in alteration of fibrinolysis, which is the process of clot destruction. The consequence is increasing the clot formation. The most serious complication of DVT is PE, which occurs in 40% of patients with DVT, and is associated with a 3-month mortality rate of 17%. [3].

In patients with vein thrombosis risk factors are clustered. Smoking, as a single risk factor, was found only in 5 (5%) of the entire studied lot. In women, association of smoking with oral contraceptives increases the risk of thrombosis for nine times.[4]. In the same time smoking is a life style pattern associated combined with sedentary, obesity, poor social status and stress disorders, factors that can amplify the risk of thrombosis. Regarding the localization of vein thrombosis we noticed that in smoking person which spent a lot of time sitting on chair at work (like computer workers) or having long travels by plain had more frequent calf thrombosis. Groin thrombosis is more frequent in patients with associated malignancies, especially with pelvic localization and in pregnant women, the starting point being presented by pelvic (ovarian and uterine) veins. Varicose disease is complicated sometimes by superficial thrombosis but seldom is associated with deep vein thrombosis; more often sapheno-femoral junction is followed by femoral thrombosis and pulmonary embolism.

### 4. CONCLUSIONS

Smoking alone or associated to other specific factors increases the risk of vein thrombosis. Venous ultrasound is a non-invasive, without risk for patient and repeatable diagnostic method in deep vein thrombosis.

### REFERENCES