

Terpiłowski Michał, Tkaczyk Jędrzej, Klatka Barbara, Orzeł Anna, Janeczko Dominika, Hołowczuk Magdalena, Kęsik Jan, Hżeczki Marek. Deep vein thrombosis in a 19-year-old patient with thrombophilia - description of the diagnosis and treatment. *Journal of Education, Health and Sport*. 2019;9(8):773-778. eISSN 2391-8306. DOI <http://dx.doi.org/10.5281/zenodo.3407931>
<http://ojs.ukw.edu.pl/index.php/johs/article/view/7244>

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part B item 1223 (26/01/2017).
1223 Journal of Education, Health and Sport eISSN 2391-8306 7

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The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 05.07.2019. Revised: 25.07.2019. Accepted: 12.08.2019.

Deep vein thrombosis in a 19-year-old patient with thrombophilia - description of the diagnosis and treatment

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Abstract

Introduction:

Deep vein thrombosis (DVT) is a condition in which a blood clot forms in one of the body's deep veins, most commonly of the leg or pelvis. Before the fourth decade of life risk of DVT is low (about 1 per 10000). After the age of 45, it rises and approaches about 5 per 1000 by the age of 80. Noteworthy is the fact, that patients with a positive family history have a higher risk of DVT at a young age. Essential risk factors for developing DVT are genetic conditions or acquired thrombophilia and positive family history, but the lack of family predisposition cannot rule out the occurrence of DVT. Standard treatment method of DVT involves intravenous anticoagulation with the use of low molecular weight heparin and compression therapy. Apart from the above-mentioned methods, we can distinguish intermittent pneumatic compression, surgical embolectomy, pharmacomechanical thrombectomy, and venous stenting.

Case Report:

We present a case report of 19 - year old patient who was first admitted to hospital in April 2017 urgently with symptoms of pulmonary embolism which was confirmed in angio-CT. Moreover, in the Doppler ultrasound, left common iliac vein (LCIV), left external iliac vein (LEIV) and left femoral vein (LFV) thrombosis was diagnosed. During the hospitalization, genetic tests, antibody levels, and antithrombin levels were performed for thrombophilia and systemic diseases conducive to thrombosis. In October 2017 the angio-MR of the pelvis confirmed visible pressure on the LCIV, caused by the common iliac artery, which corresponds to the May-Turner syndrome. In March 2018 he was admitted to the clinic with DVT symptoms of the left lower limb such as swelling, pain, and redness. The patient underwent venous angioplasty and stent implantation for LCIV. The patient was discharged from hospital with recommendations such as compression therapy, Doppler ultrasonography and monitoring of INR.

Discussion:

Venous thrombosis is a multicausal disease: more than one risk factor needs to be present before thrombosis occurs. Choice of DVT treatment method is aimed at improving the quality of life of patients depending on clinical symptoms. venous stenting for an iliofemoral occlusive disease is a safe and effective method of treatment. It can be done with excellent patency rates expected in cases of idiopathic occlusion and May-Thurner syndrome. On this basis, the legitimacy of using venous stent implantation as an effective method of treatment of recurrent DVT episodes can be confirmed, which has been used in the described case

Key words: deep vein thrombosis; pharmacomechanical thrombectomy; thrombophilia

Introduction:

Venous thrombosis is a condition in which a blood clot forms within veins. Predominantly it is located in the deep veins of lower limbs. The incidence of deep venous thrombosis (DVT) is approximately 48 per 100,000 persons per year in large community-based studies [1]. Before the fourth decade of life risk of DVT is low (about 1 per 10000). After the age of 45, it rises and approaches about 5 per 1000 by the age of 80. Noteworthy is the fact, that patients with a positive family history have a higher risk of DVT at a young age [2]. In 1856, Rudolf Virchow published a triad of factors influencing the formation of a clot. He postulated that abnormalities in blood flow, hypercoagulability of the blood and injury to the vessel wall determine the formation of thrombus [3]. According to the 2017 Polish Consensus Statement through the indications of a DVT, we can distinguish immobilization, trauma, surgery, infection, pregnancy, and the postpartum period. Other predisposing factors include age above 40 years, malignancy, previous venous thrombosis or pulmonary embolism, dehydration, hormonal therapy, varicose veins, obesity, and congenital or acquired coagulation disorders [4]. A rarely diagnosed risk factor in which patients develop a DVT is May-Thurner syndrome [5]. It is a clinical condition that occurs as a result of compression of the left common iliac vein (LCIV) by the overlying right common iliac artery. This syndrome most often affects young to middle-aged women [6]. Through the most common signs and symptoms of acute deep venous thrombosis, we can distinguish leg pain and tenderness, swelling, redness, dilation of the superficial veins, venous claudication [7]. DVT diagnosis should be based on an assessment of clinical probability (it is recommended to use Wells' scale – **Table 1.**) [4], on the measurement of D-dimer level and performing a diagnostic test. Nowadays a deep veins ultrasonography (with color doppler option) is called the gold standard of diagnosis of DVT. According to the 2017 Polish Consensus Statement Computed tomography (CT), venography and magnetic resonance venography are currently of lesser

importance as diagnostic tools. For patients, at a young age, it is important to conduct a broad diagnostic evaluation for congenital and acquired coagulation disorders such as thrombophilia or antiphospholipid syndrome [8]. For this reason, immunological and genetic tests are performed, such as ANA3 antinuclear antibodies, anticardiolipin antibodies, lupus anticoagulant, anti B2 glycoprotein in the diagnosis of antiphospholipid syndrome and mutation of factor V Leiden, prothrombin 20210A gene, MTHFR gene, levels of Protein C, Protein S in the diagnosis of thrombophilia. Standard treatment method of DVT involves anticoagulation therapy with the use of low molecular weight heparin and compression therapy. Apart from the above-mentioned methods, we can distinguish surgical embolectomy, pharmacomechanical thrombectomy, and venous stenting.

Table 1. Well's scale

Criteria Description	Points
Active cancer (treatment within the last 6 months or palliative)	+1 point
Calf swelling \geq 3 cm compared to asymptomatic calf	+1 point
Swollen unilateral superficial veins	+1 point
Unilateral pitting edema (in the symptomatic leg)	+1 point
Previous documented DVT	+1 point
Swelling of the entire leg	+1 point
Localized tenderness along with the deep venous system	+1 point
Paralysis, paresis, or recent cast immobilization of lower extremities	+1 point
Recently bedridden \geq 3 days, or major surgery requiring a regional or general anesthetic in the past 12 weeks	+1 point
Alternative diagnosis at least as likely	-2 points
Interpretation	Score
High (probability 53%)	>2.0
Moderate (probability 17%)	1.0 to 2.0
Low (probability 5%)	<2.0

Case Report:

We present a case report of 19 - year old patient who has been urgently admitted to the hospital on April 2017 due to symptoms of pulmonary embolism. In the Doppler ultrasound, LCIV, left external iliac vein (LEIV) and left femoral vein (LFV) thrombosis was diagnosed. Angio-CT showed of central and peripheral pulmonary embolism as well as ischemia of lower lobe of the right lung. There were no signs of right ventricular overload in the ECHO. Conservative treatment with low molecular weight heparin in the therapeutic dose was carried out. Subsequently, the patient was treated with warfarin, under monitoring the INR level. Applied treatment resulted in improvement with visible partial recanalization of the femoral vein in the affected limb. At the discharge, the patient demonstrated significant swelling within the lower extremity. Moreover, during the hospitalization, genetic tests, antibody levels, and antithrombin levels were performed for thrombophilia and systemic diseases conducive to thrombosis. The suspicion of the antiphospholipid syndrome has been raised. The patient had an elevated level of ANA3 antinuclear antibodies, anti-cardiolipin antibodies,

LA1 and LA2 anticoagulant, and anti-B2 glycoprotein antibodies (**Table 2.**). In August 2017 he was referred to the immunological clinic to continue diagnosis towards the triple-positive antiphospholipid syndrome. where the antiphospholipid syndrome was not confirmed. Repeated tests allowed to diagnose the thrombophilia. In October 2017 in the vascular surgery clinic, the USG revealed the features of partial recanalization and wall-flow through the LCIV, LEIV, and LFV with visible well-developed collateral circulation in the pelvic vessels. Moreover, compression of the common iliac artery to LCIV was suspected. The angio-MR of the pelvis confirmed visible pressure on the LCIV, caused by the common iliac artery, which corresponds to the May-Turner syndrome. In March 2018 he was admitted to the clinic with DVT symptoms of the left lower limb such as swelling, pain, and redness. Angio-MR examination revealed obstruction of LCIV and LEIV with a well-developed collateral circulation (**Figure 1.**). The patient underwent venous angioplasty and stent implantation for clotted veins (**Figure 2.**). The procedure was considered technically successful. The patient was discharged from hospital with recommendations such as compression therapy (second degree up to 32 mmHg), Doppler ultrasonography - once a month for the first 6 months after the procedure, monitoring of INR once a week for the first month, then once a month.

Table 2. Patient's results

Name	Result	Unit	Reference value
Protein S	56	%	67 – 139
Homocysteine	15,4	($\mu\text{g/l}$)	3,0 – 15,0
LA 1 anticoagulant	1,23	ratio	<1,15
LA 2 anticoagulant	1,21	ratio	<1,15
anti-cardiolipin antibodies (IgM)	23,1	MPL	0,0 – 17,0
anti-cardiolipin antibodies (IgG)	3,9	GPL	0,0 – 15,0



Figure 1. Angio-MR examination. Visible obstruction of LCIV and LEIV with well-developed collateral circulation.



Figure 2. Angiography after the procedure. Visible venous stent implanted into the LCIV.

Discussion:

The incidence of DVT strongly depends on age. It is a very rare disorder in the young, and a common affliction in the elderly. Venous thrombosis is a multicausal disease: more than one risk factor needs to be present before thrombosis occurs [9]. Noteworthy is the fact, that patients with a positive family history have a higher risk of DVT at a young age. Antithrombin, Protein C, Protein S deficiency and mutation of factor V Leiden. Martinelli et al. claim that the above-mentioned risk factors have a significant impact on the prevalence of DVT [10]. Choice of DVT treatment method is aimed at improving the quality of life of patients depending on clinical symptoms. Venous stenting for an iliofemoral occlusive disease is a safe and effective method of treatment. It can be done with excellent patency rates expected in cases of idiopathic occlusion and May-Thurner syndrome [11]. Endovascular venous stenting use in patients with an obstructive lesion of the common iliac vein for the treatment of extensive iliofemoral DVT is an effective method of restoration of venous patency and relief of acute symptoms. Results of Kwak et al. analysis revealed that the rates of 1- and 2-year primary patency were 95% and the 1- and 2-year secondary patency rates were 100% [12]. On this basis, the legitimacy of using venous stent implantation as an effective method of treatment of recurrent DVT episodes can be confirmed, which has been used in the described case.

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