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High-risk acute pulmonary embolism as a complication of pelvic venous thrombosis in a student using oral contraception; a suspicion of May–Thurner syndrome – a case report

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SUMMARY

A 23-year-old student using oral contraceptives was admitted to hospital due to dyspnea at rest and tachypnea accompanied by tachycardia and hypotonia. Echocardiography revealed right ventricular overstrain with pulmonary hypertension. CT angiography of the pulmonary arteries showed massive pulmonary embolism. Due to a high-risk condition, alteplase thrombolytic treatment as well as continuous infusion with unfractionated heparin were started. A Doppler ultrasound examination of the lower limbs did not reveal signs of thrombosis. MRI showed the presence of a 7 cm thrombus closing the lumen of the right external iliac vein at the level of the groin and in the right internal iliac vein. CT of the abdominal and pelvic cavities was performed, and the results revealed no contrast of the inferior vena cava and iliac veins bilaterally. Clots were also found in the pelvic varicose venous plexus. A control MRI of the pelvic veins confirmed right external iliac vein occlusion resulting from thrombosis as well as impression of the common iliac vein due to the pressure exerted by the left iliac artery. The observed radiological image suggested the possibility of May–Thurner syndrome. However, this hypothesis was not confirmed as there were no significant hemodynamic disturbances caused by the compression, lesions were greater in the right veins, there was no collateral circulation and it was highly probable that previously used oral contraception was the factor contributing to thrombotic changes.
In order to exclude potential congenital reasons for the described clinical condition, genetic tests were carried out but did not confirm genetic prothrombotic risk. After heparin treatment, RF factor and serum lupus anticoagulant were established and no abnormalities were found. Neoplastic marker evaluation did not confirm a proliferative background of thrombotic tendencies of the patient. Also, there were no irregularities in anticardiolipin or â2 glycoprotein 1 antibodies. After oral anticoagulation was discontinued, control tests of C and S proteins as well as antithrombin III concentrations were performed for thrombophilia, but normal values were obtained. Due to the overall clinical condition, the patient was recommended not to use oral contraceptives in the future.
Key words: pulmonary embolism; venous thrombosis; oral contraceptives; May–Thurner syndrome

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INTRODUCTION

Pulmonary embolism (PE) is a clinical manifestation of venous thromboembolism (VTE). It is currently estimated that PE is a cause of approximately 15% of deaths in the first three months post-diagnosis [1]. The frequency of PE increases with age and is relatively rarely observed in young adults. VTE risk factors in young individuals include: thrombophilia, pregnancy and postpartum period, obesity, immobilization, family history of VTE, neoplasms, trauma and using oral contraceptives [2]. It has been proven that the use of oral contraception carries a risk of extensive thrombosis, which can cause PE, even in very young women [3–5].

CASE REPORT

A 23-year-old student of medicine with nonsignificant medical history, who had been using oral contraceptives (3 mg of drospirenone and 0.02 mg of ethinyloestradiol) for eighteen months, was admitted to the Cardiology Clinic due to dyspnea at rest 30/min, accompanied by tachycardia 115/min and hypotonia 70/40 mmHg. The patient claimed to have developed increasing exertional dyspnea several days before, and dry cough had been observed for several weeks.

At admission, laboratory tests showed considerably increased D-dimers (4,670.9 ng/ml – normal range to 490 ng/ml), leukocytosis (14.27 thousand) and elevated troponin I levels (0.46

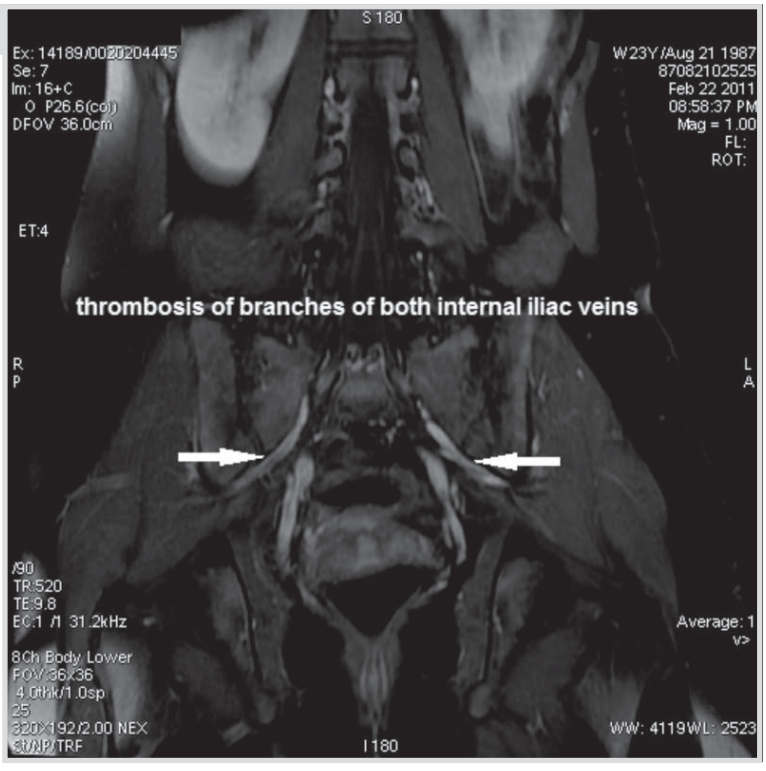
ng/ml – normal range to 0.1 ng/ml). Blood gasses tested at admission to the Cardiac Intensive Care Unit revealed hypocapnia (29 mmHg) with oxygen pressure in arterial blood of 134 mmHg (the patient had passive oxygen therapy 10 l/min in the Emergency Department). Chest X-ray revealed no changes. ECG showed regular sinus rhythm of 115/min, S wave in lead 1 and slight Q wave in lead 3.

Urgent echocardiography revealed right ventricular overstrain with pulmonary hypertension of 47 mmHg. It was decided to refer the patient for urgent CT angiography of the pulmonary arteries, which showed massive pulmonary embolism. Large clots were located in the bifurcation of the right pulmonary artery (1.3 cm), in the right middle, inferior and superior lobar arteries. A straddling clot was observed in the left pulmonary artery. Its major part entered the left inferior lobar branch. Smaller clots were seen peripherally. Due to high-risk pulmonary embolism, alteplase thrombolytic treatment (intravenous infusion of 100 ml for 2 hours) as well as continuous infusion with unfractionated heparin were started; APTT stabilized within the range of 1.5–2.5. On the second day of inpatient treatment, the patient underwent follow-up echocardiography: pulmonary pressure declined and the signs of right ventricular stain subsided. A Doppler examination of the lower limbs revealed no thrombosis, but pelvic MRI (SE and FSE as well as 2D-TOF sequences) was ordered due to disturbed flow in the right femoral vein (Fig. 1).

MRI showed the presence of a 7 cm thrombus closing the lumen of the right external iliac vein at the level of the groin as well as in the right internal iliac vein (a clot with the diameter of 0.7 cm, with partially retained patency). A 50% occlusion was found in the left external iliac vein. Moreover, MRI showed normal pelvic organs, and no proliferative process or any pathological structures within the pelvis minor that could cause venous compression were found. The patient was consulted by a gynecologist due to a slight uterine polyp (1.3 x 0.6 cm).

In order to rule out lesions in the abdominal cavity, pelvic and abdominal CT was conducted before and after administration of an intravenous contrast agent (in the arterial, venous and delayed phases). The results revealed no contrast in the inferior vena cava and iliac veins bilaterally. The presence of a hypodense thrombus occluding the lumen of the external iliac vein was confirmed. Clots were also found in the pelvic varicose venous plexus (Fig. 2). Abdominal organs were normal. A suspicion of chronic thrombosis of the right external iliac vein and the pelvic venous plexus was made.

Fig. 1. Pelvic MRI



The condition of the patient gradually improved. On the eighth day of inpatient treatment, unfractionated heparin was replaced with subcutaneous injections of low-molecular-weight-heparin (enoxaparin 0.6 ml twice daily) and oral anticoagulant agent (warfarin). A follow-up MRI of the pelvic veins, conducted on the tenth day of hospitalization, confirmed persisting right external iliac vein occlusion resulting from thrombosis as well as impression of the left common iliac vein due to the pressure exerted by the left iliac artery. The observed radiological image suggested the possibility of May–Thurner syndrome which is a rare form of proximal venous thrombosis involving mainly the left iliac vein and is associated with the anatomic course of this vessel. However, this hypothesis was not confirmed as there were no significant hemodynamic disturbances caused by the compression, lesions were greater in the right veins, there was no collateral circulation and it was highly probable that previously used oral contraception was the factor contributing to thrombotic changes [6–8].

In order to exclude potential congenital reasons for the described clinical condition, genetic tests were carried out (Factor V Leiden G1691A, Factor II G20210A, MTHFR C677T) but did not confirm genetic prothrombotic risk. After heparin treatment, RF factor and serum lupus anticoagulant were established and no abnormalities were found. Tumor marker evaluation (CEA, CA 19-9, CA 125II, CA 15-3, AFP) did not confirm a proliferative background of thrombotic tendencies. Also, there were no irregularities in anticardiolipin or â2 glycoprotein 1 antibodies.

The patient was discharged in a good condition on the twelfth day of hospitalization during oral warfarin treatment. Follow-up CT angiography performed three months after the embolic event showed no signs of embolism within the pulmonary arteries. A follow-up US scan of the lower limbs only showed mural thrombotic material in the right common iliac vein. Echocardiography performed four and nine months after the event, revealed no signs of right ventricular strain or pulmonary hypertension.

After oral anticoagulation was discontinued (7 months after the event), control tests of C and S proteins as well as antithrombin III concentrations were performed for thrombophilia, but normal values were obtained.

DISCUSSION

Considering the entire clinical picture, it was agreed that the cause of venous thrombosis complicated by high-risk pulmonary embolism

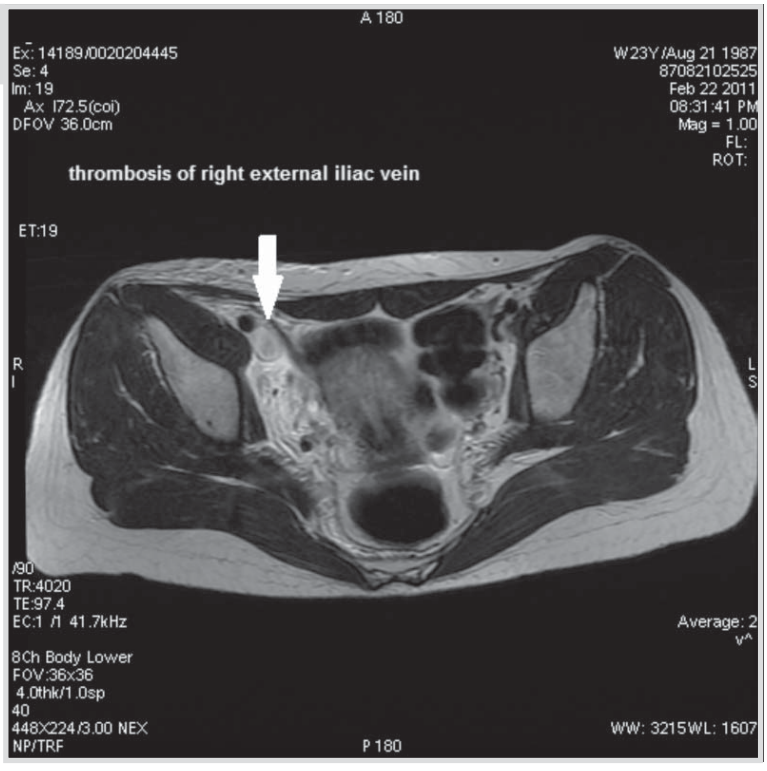


Fig. 2. A hypodense clot occluding the lumen of the external iliac vein

in the patient presented above was the use of oral contraceptives. In the light of current studies, it is known that the use of hormonal contraception significantly increases the thromboembolic risk in young women, particularly those with a familial prothrombotic tendency [9]. The literature contains reports suggesting the necessity of screening for thrombophilia before initiating oral contraception, but these recommendations seem to be difficult to implement due to high costs [10]. Alternatively, combined oral contraceptive pill based on NOMAC/E2 (nomegestrol acetate and E2 structurally identical to 17ß-estradiol) is proposed since it exerts only minimal effects on hemostasis (without modifying the activity of serum coagulation parameters, fibrinolysis or platelet functions). In the opinion of the Polish Gynecologic Society, NOMAC/E2 can be considered as referential contraceptive therapy in terms of prothrombotic risk [11].

Due to the overall clinical condition, the patient was recommended not to use oral contraceptives in the future.

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