

Assessment of risk factors for pulmonary embolism during pregnancy and puerperium - management and maternal and neonatal outcomes. A literature review

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Abstract

Pulmonary thrombembolism during pregnancy and puerperium is a major cause of maternal mortality. The physiological maternal hypercoagulable state during pregnancy is correlated with an increased risk of thrombotic accident. The risk of a venous thrombembolism during pregnancy is seven to ten times higher than the incidence in non pregnant woman, and in puerperium is estimated to be between 15 and 35 times higher. Prevention, diagnosis, and therapeutic approach of pulmonary embolism are challenging and it aims to reduce maternal mortality. Low-molecular-weight heparin represents the treatment of choice for pulmonary embolism in pregnancy and postpartum. Risk assessment assumes establishing the need for thromboprophylaxis in pregnancy and puerperium.

Keywords: risk factors, prophylaxis, thrombosis, pulmonary embolism

Introduction

Worldwide pulmonary thrombembolism still remains a major cause of maternal mortality. The starting point of this affection is represented by a deep vein. Associated to pregnancy, deep vein thrombosis increases the risk of thrombosis accidents. Congenital and acquired thrombophilias acts like complementary risk factors for thrombotic events in pregnancy and postpartum⁽¹⁾. Pregnancy is a condition that induces a physiological hypercoagulability state, venous stasis and impaired vascular endothelium. This is a triad which represents the Virchow's pathophysiological triad of venous thrombosis.

Pathophysiology

During pregnancy, the procoagulant factors are increased and the anticoagulant factors have reduced activity or quantity. The increase of the plasminogen activator inhibitors 1 and 2 produced by the placenta contribute to an impaired fibrinolysis⁽²⁾. All this changes represents physiological adaptations for postpartum enhancing hemostasis. Venous stasis occurs from the first trimester and reaches a peak at 36 weeks of gestation and could be probably caused by a venous dilatation

induced by the progesterone effect, or by the pelvic compression exerted by the pregnant uterus. At these adaptative changes adds the vascular endothelial damage that can occur both in vaginal delivery and post cesarean sections. In pregnancy almost 90% of deep vein thrombosis occurs on the left side members. Deep vein thrombosis affects more often the ileofemoral vein compared with the calf vein which can lead to pulmonary boembolism⁽³⁾.

The thrombophilias can underline many thrombotic accidents during pregnancy. At a pregnant women with an underline thrombophilia the risk for an thromboembolic event depends on additional risk factors like weight over 80 kg, family or personal history of thrombosis and the thrombotic defect due to its multi-causal pattern, an interaction between congenital and acquired risk factors^(1,2).

Clinical management

Pulmonary thrombembolism during pregnancy and puerperium it is still a major cause of maternal mortality even in developed countries. Some measures should be taken for reducing maternal morbidity. All clinical suspicions of deep vein thrombosis should be investigated

and properly treated. Prophylaxis should be applied to all cases with an increased risk of thrombotic event. There is a concern about performing isotope lung and spiral computed tomography scanning due to fetal exposure at radiation⁽³⁾. Rational administration of prophylaxis during pregnancy depends on identifying the cases with an increased risk of thrombotic accidents and quantifying this risk, because low molecular weight heparin (LMWH) are expensive, painful at administration, and can associate a risk of bleeding, osteoporosis and heparin induced thrombocytopenia⁽⁴⁾.

LMWH is the anticoagulant of choice during pregnancy⁽⁵⁾. Coumarin derivatives cross the fetoplacental barrier and can cause fetal bleeding and are showed to be teratogenic: nasal defects, midface hypoplasia, stippled chondral calcification, scoliosis, short proximal limbs, short phalanges and central nervous system malformations^(6,7).

The pregnancy per se is a risk factors for venous thrombembolism and pulmonary embolism, in addition an inherited thrombophilias, a previous history of thrombosis increases this risk. Additional risk factors are shown to be: black race, heart disease, sickle cell disease, diabetes, lupus, smoking, multiple pregnancy, age higher than 35 years, obesity, and cesarean delivery^(8,9,10).

For venous thrombembolism diagnosis the clinical suspicion is critical. Unfortunately many signs of this disorder are usually normal during pregnancy: tachycardia, tachypnea, dyspnea, leg swelling (i.e. can occur due to pelvic uterus compression). Although venous thromboembolism is confirmed in less than 10% of all suspected cases⁽¹¹⁾ all pregnant women with signs and symptoms suggestive of venous thromboembolism should be investigated and treatment with heparin-related compound is recommended until the diagnosis is ruled out by objective testing, unless a contraindication for the treatment exist⁽¹²⁾.

Paraclinical investigations

Compressive ultrasonography can be used for diagnosis of deep vein thrombosis, and has a sensitivity of 97% and a specificity of 94%⁽¹³⁾. Magnetic resonance also can be used for identifying thrombus images, because is a non-irradiating method of diagnosis, does not affect the fetus, and has a high sensitivity and specificity^(14,15). Computer tomography scanning is encumbered by the irradiating risk and d-dimer test should be integrated into a combined diagnose plan^(12,16). When a pulmonary embolism is suspected at a patient with normal findings at ultrasonography, a chest radiograph should be also obtained. Another paraclinical investigations that can be used at a patient with pulmonary thromembolism are ventilation-perfusion lung scanning or computed tomographic pulmonary angiography⁽¹²⁾. Ventilation-perfusion lung scanning is encumbered by a high fetal dose of radiation delivered and have a higher risk of fetal cancer, but lower risk for maternal breast cancer^(12,17,18).

In puerperium the risk of an thrombotic event is higher. All women who had an thrombotic event should wear graduated compression stockings ante partum and postpartum. The women with a thrombotic event should received thromboprophylaxis six weeks postpartum with⁽¹⁸⁾.

Conclusions

The incidence of thrombotic accidents in pregnancy or puerpelium exceeds the incidence among nonpregnant women. The puerpelium period has a high risk for venous thromboembolism and pulmonary thrombembolism. Pulmonary embolism is still a major cause of maternal mortality. The diagnosis and therapeutic management of pulmonary embolism during pregnancy is intricate due to the physiological adaptations in pregnancy. Adequate anticoagulant therapy and thromboprophylaxis should be used for reducing maternal morbidity. ■

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