THROMBOSIS

The formation of a blood clot inside a blood vessel that could occur during pregnancy or after the childbirth.

⚠️ Risk factor ♂ Male & Female

About Thrombosis

Thrombosis is the formation of a blood clot inside a blood vessel, obstructing the flow of blood (Pic. 1) through the circulatory system. When a blood vessel (a vein or an artery) is injured, the body uses platelets (thrombocytes) and fibrin (insoluble protein) to form a blood clot to prevent blood loss. Even when a blood vessel is not injured, blood clots may form in the body under certain conditions. A clot, or a piece of the clot, that breaks free and begins to travel around the body is known as an embolus (Pic. 2).

Thrombosis may occur in veins (venous thrombosis) or in arteries (arterial thrombosis). Arterial thrombosis occur less frequently but has been described especially in cerebral, retinal and limbs arteries. A common type of venous thrombosis is a deep vein thrombosis (DVT), which is a blood clot in the deep veins of the leg. Rarely, vein thrombosis may occur within the ovary, most commonly in postpartum (after delivery) patients.

Postpartum ovarian thrombosis

Ovarian vein thrombosis is a well known complication of the postpartum period (postpartum ovarian vein thrombosis, POVT). When associated with parturition, ovarian vein thrombosis usually becomes apparent within the first week after delivery, with significant clinical symptoms often mimicking appendicitis (inflammation of appendix). The morbidity of ovarian vein thrombosis arises from complications such as sepsis, extension of the thrombus to the inferior vena cava and renal veins, and pulmonary embolism (blockage of an artery in the lungs).

Postpartum ovarian vein trombrosis is the result of bacterial infections, hypercoagulability (abnormality of blood coagulation that increases the risk of thrombosis) and reduced blood flow in dilated ovarian veins. Eighty to 90% occur in the right side due to the pressure by enlarging uterus with compression of right ovarian vein.

This condition is classically a puerperal process (immediately after the childbirth), but it may also arise in non puerperal (not after the childbirth) settings such as endometritis (abnormal growth of endometrial cells outside the uterus), pelvic inflammatory disease (occurs when an infection spreads from the vagina to the cervix and fallopian tubes), malignancy (cancerous), thrombophilia, inflammatory bowel disease, and pelvic and gynecologic surgeries. Postpartum ovarian vein thrombosis is an uncommon complication that may threaten mothers' lives.

The diagnosis of ovarian vein thrombosis can be established by ultrasound, magnetic resonance imaging (MRI) or computed tomography (CT), respectively. The limitations of ultrasound include obscuring of the gonadic vein by overlying bowel gas. Magnetic resonance has the best combined sensitivity and specificity. Since MRI is capable of imaging in multiple planes, does not require intravenous contrast material and is sensitive to alterations in blood flow, it is of potential value in the diagnosis and follow-up of ovarian vein thrombosis. If abdominal pain is present ultrasounds should be routinely performed during pregnancy to exclude ovarian thrombosis.

Management approach of POVT may be medical or surgical treatment, with both recording similar success rate. The main approach to medical treatment involves the use of anticoagulant (reduces blood coaguation). The inclusion of broad spectrum antibiotics for 7 to 10 days has also been recommended.
While the place of surgery in the initial management of POVT is controversial, some clinicians prefer surgery for complicated cases associated with free floating thrombosis, recurrent pulmonary emboli in spite of medical treatment, and contraindication to anticoagulant use.

**Symptoms**

**Thrombosis**

Thrombosis is generally defined by the type of blood vessel affected (arterial or venous thrombosis) and the precise location of the blood vessel or the organ supplied by it.

**Ovarian vein thrombosis**

Presentation classically, ovarian vein thrombosis arises in the first 7 days postpartum. In the postpartum period, up to 80% of patients will present with fever, but only half will experience right lower quadrant abdominal pain. Importantly, many patients will have nonspecific symptoms, including malaise, vague diffuse abdominal pain, or shortness of breath. In rare cases, a mass may be palpable, but this is an unusual finding.

**Associated diseases**

**Thrombophilia**

Thrombophilia (sometimes hypercoagulability or a prothrombotic state) is an abnormality of blood coagulation that increases the risk of thrombosis (blood clots in blood vessels). Although thrombophilia does not cause infertility and women can have normal pregnancies, thrombophilia is considered a significant risk factor for recurrent pregnancy loss.

**Antiphospholipid syndrome**

The antiphospholipid syndrome is a relatively common acquired cause of venous thrombosis. Up to 20% of cases of deep vein thrombosis, with and without pulmonary embolism, may be associated with antiphospholipid antibodies. Antiphospholipid antibodies usually present as pregnancy loss.

**Cancer**

The large proportion of terminal events in neoplastic diseases are thrombotic, leading to the hypothesis that cancer is a prothrombotic disease. An additional aspect of thrombosis and cancer is the inevitably adverse effect of chemotherapy in promoting thrombosis.

Fertility in cancer patients could be affected by cancer treatment that can harm the reproductive organs and it could make it hard to have a children.

**Complications**

Complications of ovarian vein thrombosis most frequently occur in the postpartum period, the most serious being systemic sepsis and pulmonary embolism. The risk for developing complications of ovarian vein thrombosis correlates with the clinical setting in which the condition arises.

**Systemic sepsis**

There is strong evidence that sepsis produces a dysfunctional activation of the hemostatic system that maintains the liquid flow of blood. The resulting development of thrombosis is tightly related to associated organ failure and death. Inflammation-driven activation of platelets plays a key role in this complex process.

Thrombosis may be fatal if the clot dislodges and moves into the lungs (pulmonary embolism).

**Pulmonary embolism**

Pulmonary embolism is a blood clot in the lung, which causes signs and symptoms of chest pain, cough, and
shortness of breath. The incidence of pulmonary embolism after puerperal ovarian vein thrombosis varies widely, ranging from 0.15 to 0.33% in the highest reports, with a resultant mortality rate up to 4%. Up to one second of postpartum cases may result in pulmonary embolism, and mortality estimates approach 5%.

**Thrombosis in pregnancy**

During pregnancy, the diameter of the ovarian vessels increases due to increased blood flow and hormonal changes, resulting in substantially increased pressure on both the vessel walls and the valves within the veins. This increased pressure at the valves results in venous incompetence, compounding venous stasis in the pelvis. In addition, the gravid uterus may potentially compress the already engorged right ovarian vein.

Thrombosis during pregnancy does not affect the baby unless there are serious complications, such as permanent swelling of the veins and fluid retention.

**Postpartal ovarian vein thrombosis (POVT)**

POVT can occur after delivery causing severe complications. In pregnancy there is a progressive alteration in the balance between prothrombotic and anticoagulant factors. In ninety percent of the cases, the right ovarian vein is involved due to the incompetence of the valves. The size of the uterus during pregnancy may result in compression of the ovarian vein. Enlarged pregnant uterus may cause obstruction of large veins leading to vein stasis and its complications.

**Assisted reproductive technology**

Thromboembolic phenomena are uncommon but serious consequence of assisted reproductive technology ART). Deep vein thrombosis (DVT) is more common following ovarian hyperstimulation syndrome (OHSS). Ovarian hyperstimulation is responsible for the presence of haemoconcentration, elevated estrogen levels along with reduced venous return caused by enlarged ovaries that may in part explain the development of deep vein thrombosis.

**Risk factors**

The most important risk factors for the development of thrombosis are multiparity, puerperium, gynaecological surgery for malignant disease, infections, neoplasm, systemic lupus erythematosus, caesarean section delivery and hypercoagulability states.

Many observational studies have shown that combined oral contraceptives are associated with a twofold to sixfold increased risk of venous thrombosis. Despite the low incidence of venous thrombosis - about three per 10 000 woman years - among women of reproductive age, the effect of combined oral contraceptives on venous thrombosis is large, owing to the fact that many women use oral contraceptives.

**Prevention**

There are medication-based interventions and non-medication-based interventions. The risk of developing blood clots can be modified by lifestyle modifications, the discontinuation of oral contraceptives, and weight loss. The treatments to prevent the formation of blood clots is balanced against the risk of bleeding.

All women should be assessed for the risk factors in early pregnancy and that the assessment should be repeated if the woman is admitted to hospital or develops intercurrent problems. The assessment should be repeated anyway intrapartum or immediately postpartum.

**How it can affect fertility**

The risk of thrombosis is increased by an abnormality of blood coagulation called thrombophilia. Several reports identify inherited predisposition to thrombophilia as one of the main causes of recurrent pregnancy loss (RPL) in particular if several diseases potentially responsible of RPL have been already excluded such as endocrine diseases (such as ovarian dysfunction, anovulation, hypopituitarism and diabetes), uterine malformation, genetic alterations (for example, chromosomal aberrations), inflammatory diseases (in particular systemic lupus erythematosus) and infectious diseases. Recurrent pregnancy loss represents a major health
problem with two to three or more losses in up to 5% of women of reproductive age and is actually one of the most common causes of female sterility.

From a pathological point of view, women affected by thrombophilia show during their pregnancy a hypercoagulable state that is already increased during pregnancy, which may impair placental flow and then its function and fetal growth and may predispose to develop venous thrombosis.

During pregnancy, in fact, many changes in the haemostatic (process which causes bleeding to stop) balance are observer with a trend toward thrombophilia in order to be prompt for the haemostatic challenge of delivery. Thus, pregnancy is a condition associated to thrombophilia per se.

Moreover, women carrying further thrombotic risk factors such as inherited thrombophilia show an additionally increased risk of thrombotic events during pregnancy such as venous thromboembolism and/or abortion.

Venous thromboembolism (VTE) and pulmonary embolism (PE), in fact, continue to be a leading cause of maternal death during pregnancy or postpartum and may cause significant morbidity of pregnant women.

Prognosis

Postpartum ovarian vein thrombosis is a rare puerperal complication, with an incidence of 1/600 and 1/2000 deliveries. It occurs in 0.05% of all pregnancies that results in live births.

Mortality rate of 52% was recorded among untreated cases. However, with the use of anticoagulant, the mortality among treated cases reduced from 25% to 5%. The four patients managed had anticoagulant therapy. Recurrence of POVT is low in subsequent pregnancy. But for patients with underlying hypercoagulable state, anticoagulant prophylaxis is recommended in future pregnancies.

Gallery

Pic
A blockage-causing piece of material, inside a blood vessel.

Pic
Deep vein thrombosis is a blood clot that forms in a vein deep in the body. Most deep vein clots occur in the lower leg or thigh.
Sources

"Thrombosis in inflammatory bowel diseases: what's the link?" [https://thrombosisjournal.biomedcentral.com/articles/10.1186/s12959-015-0044-2] by Giannotta et al., licensed under CC BY 4.0

"Postpartum deep vein thrombosis and pulmonary embolism in twin pregnancy: undertaking of clinical symptoms leading to massive complications" [https://thrombosisjournal.biomedcentral.com/articles/10.1186/1477-9560-11-4] by Fiengo et al., licensed under CC BY 2.0

"Arterial and Venous Thrombosis in Cancer Patients" [https://www.hindawi.com/journals/crp/2011/394740/] by Blann et al., licensed under CC BY 3.0

"Different combined oral contraceptives and the risk of venous thrombosis: systematic review and network meta-analysis" [http://www.bmj.com/content/347/bmj.15298] by Stegeman et al., licensed under CC BY-NC 3.0


"Deep venous thrombosis in the antenatal period in a large cohort of pregnancies from western India" [https://thrombosisjournal.biomedcentral.com/articles/10.1186/1477-9560-5-9] by Vora et al., licensed under CC BY 2.0

"Thrombosis" [https://en.wikipedia.org/wiki/Thrombosis] —sourced from Wikipedia licensed under CC BY-SA 3.0

"Ovarian vein thrombosis" [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4607796/] by Jenayah et al., licensed under CC BY-SA 3.0

"Outcomes of Severe Sepsis and Septic Shock Patients on Chronic Antiplatelet Treatment: A Historical Cohort Study" [https://www.hindawi.com/journals/crcp/2013/782573/] by Valerio-Rojas et al., licensed under CC BY 3.0


"Blausen 0089 BloodClot Motion" [https://commons.wikimedia.org/wiki/File:Blausen_0089_BloodClot_Motion.png] by BruceBlaus licensed under CC BY 3.0

"Blausen 0290 DeepVeinThrombosis" [https://commons.wikimedia.org/wiki/File:Blausen_0290_DeepVeinThrombosis.png] by BruceBlaus licensed under CC BY 3.0