

Ovarian Cystectomy in Second Trimester of Pregnancy in a Patient with Diagnosed DVT



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Abstract

The surgical management of ovarian tumors in pregnancy is similar to that of the non-pregnant women. Most of these tumors are non-malignant and their treatment is often left until after the birth. However, if the tumour is larger than 6 cm in diameter, it is suggested that it is better to operate and remove them during pregnancy, as they may interfere with the birth of the baby.

This is a case report on a 34-year-old primigravida who was diagnosed with paraovarian cyst and deep venous thrombosis in the ninth week of gestation. The patient was initially treated with therapeutic values of the low molecular weight heparin. After the control ultrasonographic scan in the fifteenth week of gestation showed deep vein patency of the right leg with no signs of acute venous thrombosis, the patient was prepared for the surgery. Even though laparoscopic surgery during pregnancy has numerous advantages compared to open laparotomy, due to the dimensions of the tumor, it was safer to perform laparotomy. The patient had an uneventful operation and recovery, as well as the subsequent antenatal period.

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Introduction

The frequency of ovarian cysts in pregnancy is reported to be 1 in 1000 pregnancies. The surgical management of ovarian tumors in pregnancy is similar to that of non-pregnant women. Most of these tumors are not malignant, and if they are small then treatment can be left until after the birth. However, if the tumour is larger than 6 cm in diameter, it is suggested that it is better to operate and remove them during pregnancy, as they may interfere with the birth of the baby. Surgical procedures for these non-malignant tumors of the ovary in pregnancy can be performed by open surgery (laparotomy) or keyhole surgery (laparoscopy) techniques.

Case Presentation

After being treated in a general hospital, 34-year-old primigravida was sent as an in utero transfer to our clinic for further examination and treatment. An ultrasound scan at the 9th week of gestation confirmed a normal fetal anatomy and a large cyst arising from the pelvis which filled the entire right hemiabdomen, measuring 29x14x4 cm.

The mass appeared to be cystic with no solid component. That same day the patient underwent color Doppler of the leg veins that showed thrombosis of the right femoral vein and right external iliac vein, as well as thrombosis of popliteal and femoral vein on the left and the left external iliac vein. Treatment for acute deep vein thrombosis (DVT) with therapeutic values of low molecular weight heparin (LMWH) was immediately initiated. In the 15th week of gestation, after the control color Doppler of the deep veins of the leg showed patency of the deep veins of the right leg, with no signs of acute venous thrombosis, surgical treatment of the ovarian cyst was considered.



The cyst was not complex and was reported to be a simple cyst. Because the left ovary was not visualized at all, and because of the relationship of the cyst with the uterus and the cyst being so big, it was suggested to be of probable ovarian origin. The overall morphological features of the mass did not indicate malignancy. Tumor markers for malignancy also suggested the cyst being benign (Table 1). In the view of the large size of the cyst, the surgical option to remove the cyst by the laparotomy technique was discussed with the patient, which she agreed to. Surgery was performed in the 16th week of gestation. The patient was asymptomatic and the height of the uterine fundus corresponded to the 16th week of gestation.

Table 1

Tumor markers	Measured values	Normal Values
Alpha fetoprotein	19.1	< 7.0 mcg/L
CEA	0.6	< 3.8 mcg/L
CA-125	28.4	< 35 kIU/L
CA 15-3	14.7	< 25 kIU/L

The patient was premedicated with intravenous metoprolamide and ranitidine. After rapid sequence induction of general endotracheal anaesthesia with thiopental and succinylcholine, anaesthesia was maintained with fentanyl, rocuronium and sevoflurane. The patient was mechanically ventilated with IPPV mode with the use of PEEP of 10 cm H₂O. The patient woke up about twenty minutes after the surgery without reversal of muscle blocks. Nasogastric tube was passed to remove any gaseous distension of the stomach. Anaesthesia passed without complications and adverse events.

During laparotomy, a large paraovarian cystic formation sized 37x32 cm, with wall thickness of 0.2 -0.3 cm was found. The cyst occupied entire right hemiabdomen and compressed the surrounding structures. The surgeon performed puncture of the cyst and the obtained content was sent for urgent cytological analysis. Cytological finding suggested it was a serous cyst. Next procedure was aspiration of the cyst content and a total of 10 liters of serous fluid was evacuated from the cyst. Subsequently, cystectomy of paraovarian cyst was performed and the cyst was immediately sent on the pathological analysis. The histopathological findings also suggested the cyst benign. The wall of the cyst was described as being built from the connective tissue and the lumen of the cyst was described as being covered with normal epithelium. The right ovary was completely neat, as well as the uterus, size of which corresponded to the 16th week of pregnancy. Fallopian tubes were normal on both sides, as well as the left ovary. Surgical procedure was uneventful.

No tocolytics were used as there was no evidence for any role of tocolytics at this gestational age. Prophylactic antibiotics were administered. The fetal heart was auscultated before and after the procedure.

Postoperative recovery was uncomplicated and eight days after the procedure, the patient was moved to the department of obstetrics and gynecology at the general hospital, from which she initially came to our clinic. DVT prophylaxis was continued after recanalisation of the veins of the leg in the 15th week, as well as throughout the whole surgical procedure and throughout the rest of the pregnancy. The patient had an un-

eventful vaginal delivery in the 39th week of gestation. She gave a birth to a healthy male child. The weight of the child at birth was 3370 g, the length was 51 cm, and the child had 10/10 Apgar scores.

Discussion

Every move considering this case, in the terms of the treatment of the deep venous thrombosis, prevention of pulmonary embolism during surgery, successful laparotomy, and further monitoring of pregnancy, to be successful and without further complications and adverse events for both mother and fetus, led us to the various questions and dilemmas. Several problems and issues arose with respect of this case.

A primary question is when can we perform cystectomy in the state of deep venous thrombosis, considering the time of thrombosis occurrence, with the least risk of fatal pulmonary embolism and how long does it take for thrombotic complications to occur without placing temporary inferior vena cava (IVC) filter?

Is there some kind of other non-invasive solution for preventing fatal PE? What is the time required for thrombus resolution and vein wall remodeling? How many ultrasound controls do we need to perform during the treatment of DVT and after the resolution of the thrombus?

Given the size of the cyst, there was no doubt about the need for surgical treatment. Resection of the cyst was only a question of time due to the DVT and the pregnancy.

The frequency of ovarian tumours is about 1 in 1000 pregnancies^[1] and those which are malignant represent about 1 in 15,000 to 32,000 pregnancies^[2]. Management of the adnexal mass, whether it be conservative or surgery, remains controversial. Surgical removal is considered to reduce the risk of undiagnosed malignancy, torsion, infection, rupture, haemorrhage and obstruction of labour. Furthermore, the risk of obstruction of labour is calculated to be 17% to 21%^[3].

Most surgical options for adnexal masses in pregnancy are managed ideally in the second trimester after organogenesis is complete, thus decreasing the risk of fetal loss and eliminating 15% to 20% background risk of spontaneous miscarriage and allowing for spontaneous regression of the mass^[4]. There is evidence which suggest that laparoscopy and laparotomy do not differ with regard to the fetal outcome, that is, fetal weight, gestational age, growth restriction, infant survival and fetal malformations^[5]. However, the infusion of gas into the abdomen during the key-hole procedure may have adverse effects on the fetus. Additional gasless technique is also under study. Due to the dimensions of the tumor, it was safer, both for the patient and the baby, to perform open surgery (laparotomy).

Given the proven DVT we started a treatment of DVT before cystectomy.

According to the 2012 guidelines of American College of Chest Physicians (ACCP) guidelines on VTE and pregnancy, once it is determined that anticoagulation is indicated, it should be initiated using subcutaneous LMWH, intravenous unfractionated heparin (UFH), or subcutaneous unfractionated heparin (UFH)^[6].

Subcutaneous LMWH is preferred over intravenous UFH or subcutaneous UFH in most patients because it is easier

to use and it appears to be more efficacious with a better safety profile^[7].

IVC filters have been used during pregnancy^[8,9]. There are circumstances in the management of thromboembolic events during pregnancy when anticoagulant therapy is either contraindicated or not advisable, such as when pulmonary embolism (PE) or deep venous thrombosis is diagnosed close to the term, given the risk of bleeding during delivery. In these cases, the thromboembolic risk can be controlled using temporary inferior vena cava filters (T-IVCFs)^[10].

Another solution is thrombolysis/thrombectomy. Teratogenicity due to the thrombolytic agents has not been reported, but the risk of maternal hemorrhage is high. As a result, thrombolytic therapy should be reserved for pregnant patients with life-threatening acute PE (ie, persistent and severe hypotension due to the PE)^[11]. Case reports of thrombectomy suggest that it can be used successfully as a life saving measure when other measures have failed^[12,13].

In our case, given the good response to the therapeutic dose of LMWH, there was no need for additional treatment of DVT, even though we know the most serious complication of deep vein thrombosis (DVT) or nonfatal pulmonary embolism (PE) is fatal PE. However, reliable estimates as to the risk of fatal PE in patients with treated DVT or PE are lacking^[14].

Therefore, it was only reasonable to think and to seek non-invasive possibility of reducing the risk of fatal PE. Although in animal models, the study examines the hemodynamic changes and physiologic shunting across the right and left lungs after fat embolism as influenced by unilateral PEEP, using the contralateral lung as well as the lungs in animals with no PEEP as controls. The role of positive end expiratory pressure (PEEP) was evaluated in preventing the deleterious mechanical respiratory effects of fatty acid pulmonary embolism, confirmed the value of PEEP in the therapy of the pulmonary manifestations of fat embolism which are the lethal factors in the fatty embolism syndrome. PEEP can not only significantly decrease the amount of shunting but also can aid in maintaining normal respiratory mechanics and normal systemic oxygen saturations^[15].

Also, Zasslow and et showed that PEEP up to 10 cm H₂O does not alter the pulmonary arterial wedge pressure (PAWP) - RAP difference, it can be safely applied without the concern of paradoxical arterial embolism^[16].

Due to the lack of reports about the possibility of using PEEP as prevention of pulmonary embolism in patients with proven DVT, further trials are needed.

The process of recanalization was shown to be confined mainly to the first 6 weeks after thrombosis and shows little progression afterward. The report by Bert van Ramshorst et al^[17], showed that the recanalization of the thrombus in lower-limb DVT is not a slow process as was suggested in the past.

The natural course of venous thrombosis is threefold^[18]. Initial loose thrombus becomes adherent to the vein wall by the end of the first week. The local inflammatory response of the vessel wall initiates the organization of thrombus with subsequent contraction, and spontaneous lysis of the area within the thrombus finally leads to recanalization. Thrombus regression reflects the overall outcome of these processes.

In our case, exactly six weeks after the diagnosis and treatment of the DVT, ultrasound confirmed deep vein patency of deep veins of the right leg, with no signs of acute venous

thrombosis. A series of ultrasounds may be done over several days to determine if a blood clot is growing or to be sure a new one hasn't developed^[19].

One of the issues in our case, was also the safety of vaginal birth in the patient receiving prophylactic doses of LMWH subcutaneously. There are several studies which suggest similar vaginal delivery rates between the patients receiving prophylactic LMWH and the general obstetric population^[20,21]. We decided to continue with subcutaneous LMWH throughout the rest of the pregnancy which also showed as the right choice because the patient had an uncomplicated vaginal birth at the 39th week of gestation.

Conclusion

This case demonstrates that, at the 16th week of gestation, an ovarian cystectomy is possible using the laparotomy approach and after the drug therapy for the DVT was applied.

In our case, pregnancy of a patient was doubly burdened, first by the DVT and then by the presence of a large ovarian cyst. Both diagnoses were endangering the patient and fetus. We decided to act according to the guidelines of American College of Chest Physicians (ACCP) on the VTE and pregnancy, after which the cystectomy was committed by surgical laparotomy.

We know that reliable estimates as to the risk of the fatal PE in patients with treated DVT or PE are lacking, and according to the guidelines, we did not have an indication for setting inferior vena cava filters (IVC), with an additional problem in our case and that is the presence of cyst which occupied the entire right hemiabdomen and worked pressure on surrounding structures.

Due to the lack of reports about the possibility of using PEEP as prevention of pulmonary embolism in patients with proven DVT, further trials are needed.

Our experience gained from this case suggests a good response to the treatment of DVT with LMWH in pregnancy, as well as the ultrasound confirmation that the process of recanalization is faster than previously thought. We can also confirm that the adnexal masses in pregnancy are managed ideally in the second trimester after organogenesis is complete, which decreases the risk of fetal loss.

After both types of treatment, the patient and the child are well. At the time of writing this case report a patient is without complications and adverse events and lives a life of a mother of a healthy five months child.

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