

THE USE OF INFERIOR VENA CAVA FILTERS BEFORE SURGERY IN WOMEN WITH OVARIAN CANCER WITH THE INITIAL SYMPTOM OF DEEP VENOUS THROMBOSIS: CASE REPORT AND REVIEW OF LITERATURE

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SUMMARY – Venous thromboembolism is a frequent complication of gynecologic cancer, and may be the first symptom of occult malignant disease. Although anticoagulation therapy remains the standard of care in patients presenting with acute venous thromboembolism, inferior vena cava filters are an important alternative when anticoagulants are contraindicated or ineffective. We report a case of a 69-year-old woman who presented with left leg swelling secondary to deep venous thrombosis before the diagnosis of ovarian cancer. The aim of this study is to review the respective literature and report our experience with inferior vena cava filter placement to prevent pulmonary embolism in gynecologic cancer patients.

Key words: *Venous thromboembolism; Vena cava filters; Anticoagulants – therapeutic use; Edema; Venous thrombosis; Ovarian neoplasms – complications; Pulmonary embolism; Case reports*

Introduction

The relationship between occult cancer and venous thromboembolism (VTE) has been recognized for many years. Almost 20% of patients with cancer will develop thromboembolic events¹, and up to 20% of patients with thromboembolism have an underlying diagnosis of malignancy². Ovarian cancer has a higher incidence of VTE than other cancers. Because of the high incidence of perioperative VTE in women with gynecologic cancer, surgical and anesthesiologic management of these patients presents a unique clinical challenge. Although anticoagulant therapy minimizes the

risk of recurrence and further VTE, it increases the risk of intraoperative bleeding. Also, delaying surgery by 4-6 weeks due to acute thromboembolism is not advisable because delay of cancer treatment may result in its progression to incurable disease. In order to prevent pulmonary embolism and avoid bleeding from systemic anticoagulation in high-risk situations, placement of inferior vena cava filters (IVCF) may provide a very attractive alternative and optimize the prophylaxis strategy.

We report a case of a 69-year-old patient with ovarian cancer presenting preoperatively with femoral deep venous thrombosis (DVT) and our experience with IVCF placement.

Case Report

A 69-year-old woman presented to our hospital with complaints of left leg swelling and feeling tension

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and discomfort in this leg. She had no significant past medical history except for smoking history of 45 cigarettes/day, and she was not taking any medications. There was no family history of malignancy.

She also complained of developing a mass in the abdomen, which was growing in size for the last two months. Physical examination showed a cachectic, fatigued female with pale-gray skin color. Abdominal examination revealed a large mass in the lower abdomen. The left leg was markedly swollen, with edema extending from the groin to the foot. The skin was firm and warm to touch, with difference in circumference of 11 cm from the right thigh. The patient was admitted to the Department of Hematology for diagnostic testing. Doppler evaluation was performed, and she was found to have acute DVT of the left leg that extended from the left iliofemoral level to the lower leg level with extension to the proximal portion of the great saphenous vein. Also, color Doppler ultrasonography revealed a large tumor mass occupying the whole pelvis and abdomen. The adjacent inferior vena cava and pelvic veins were compressed. Colonoscopy revealed extrinsic compression approximately 30 cm from the anocutaneous line.

Pelvic computed tomography scan also revealed a large expansive mass. Magnetic resonance imaging (MRI) showed a tumor mass of 51x45 mm in size occupying the ventral part of uterine corpus, and a formation of 38x28 mm with heterogeneous change in topography of the left adnexal region. MRI also showed an encapsulated cystic mass lesion measuring approximately 16x19x11cm seen in the pelvis and extending cranially up to the lower pole of the right kidney, suggesting a possible ovarian origin.

The CEA, CA 125 and CA 19-9 tumor markers were measured and found to be significantly elevated.

The patient initially received anticoagulant treatment with intravenous heparin, a 5000-unit bolus, followed by heparin infusion. Based on the above clinical and radiological findings, surgical treatment was indicated, and with due consent, the patient was transferred to the Clinical Department of Obstetrics and Gynecology.

Since heparin therapy has to be stopped at least 6 hours prior to surgery, and the patient had large tumor that occupied the whole pelvis and abdomen, and DVT of the left iliofemoral vein, she was considered to be at a high risk of developing fatal pulmonary embolism during the perioperative period.



Fig. 1. Inferior vena cavogram performed prior to inferior vena cava filter placement.

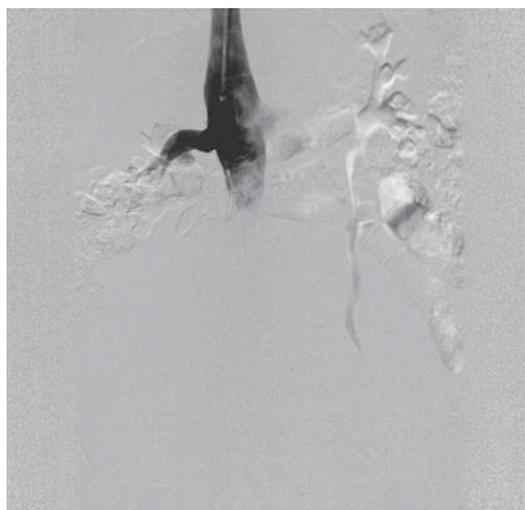


Fig. 2. Inferior vena cavogram obtained by digital subtraction angiography after inferior vena cava filter placement confirms appropriate infrarenal position of the filter.

Considering the tendency of perioperative complications, a multidisciplinary approach that involved gynecologists, anesthesiologist, hematologists and radiologist resulted in a decision to place IVCF. Temporary vena cava filter (Celect IVC filter, Cook Medical, Bloomington, Indiana, USA) was inserted at Clinical Department of Diagnostic and Interventional Radiology, Merkur University Hospital, Zagreb (Figs. 1-3). The IVCF was



Fig. 3. Native image confirming infrarenal placement of the inferior vena cava filter.

inserted *via* the right internal jugular vein. The jugular approach is preferable if an iliofemoral thrombus is present. The procedure was uneventful. The next day, the patient underwent total abdominal hysterectomy, bilateral salpingo-oophorectomy with omentectomy, and appendectomy.

Low molecular weight heparin, dalteparin 5000 IU sc. was commenced on postoperative day two. The postoperative course proceeded without any significant complications. When the risk of bleeding was reduced, the patient was converted to oral warfarin. Postoperative histologic examination revealed a clear cell carcinoma of the ovary with metastases to the omentum. She was discharged home and referred to oncology service. She was discharged with recommendations for retrieval of IVCF within the next few weeks based on clinical condition and with outpatient follow-up at hematology outpatient clinic.

Discussion

Venous thromboembolism such as DVT and pulmonary thromboembolism is the leading cause of death and disability in cancer patients. The relationship between cancer and VTE has been recognized

for many years and was first described by Trousseau in 1865³. The incidence rate of VTE in patients with cancer is not well established, but is assumed to range from 0.5% to 20%, depending on the cancer type, background risk, stage of disease, and treatment modality. Among all malignancies, ovarian cancer is associated with the highest incidence rates of venous thrombosis. The diagnosis of VTE, however, may also be the first symptom of occult malignant disease and has been shown to significantly affect overall survival in cancer patients^{4,5}. The occult tumor types most commonly presenting with VTE are cancers of the ovary, pancreas and liver^{6,7}.

Ovarian cancer patients most commonly present with a pelvic or abdominal mass that may be associated with ascites, and in 75% of patients with advanced stage of disease. Regarding the possible cause of VTE in ovarian cancer patients, it is well-known that large tumors and/or massive ascites may compress the intrapelvic veins, causing a hypercoagulable state and increasing the risk of DVT even before surgery. Massive ascites may also increase blood viscosity in blood vessels due to dehydration and inhibition of venous perfusion by compressing the inferior vena cava. The necessity of perioperative prevention of VTE is well established and anticoagulation therapy is still the mainstay of medical therapy for the treatment and prevention of DVT and pulmonary embolism after surgery. However, if DVT exists before surgery, anticoagulation therapy might be ineffective or contraindicated, and the primary therapeutic strategy for the treatment of this condition is placement of IVCF.

Regarding the indications for IVCF placement, there is certain controversy but in general, based on recent consensus guidelines, literature review, and current practice, widely accepted and validated indications for IVCF are patients with proven VTE and absolute contraindication for anticoagulation therapy⁸⁻¹⁰. This includes patients with active bleeding or coagulation disorder, failure of anticoagulation, and recurrent VTE despite conventional treatment, or those who had pelvic surgery in the presence of DVT or planned major surgery in the near future and had to discontinue anticoagulation therapy before surgery.

Routine placement of IVCF is not indicated in patients with DVT or pulmonary embolism who can be anticoagulated⁹. The use of prophylactic IVCF was reviewed by Decousus *et al.*; they randomized 400 pa-

tients to receive an IVCF with anticoagulation or anticoagulation alone. Vena cava filters significantly reduced the incidence of pulmonary embolism within the first 12 days compared to patients without filter, but this protection was no longer significant after 2 years of follow-up. Also, the initial benefit seen in the group of patients with filters was overcome by a significant increase in the rate of recurrent DVT¹¹. Similar results have been reported from the PREPIC trial, a prospective, randomized, controlled study of 400 patients, which showed that at 8 years, IVCF reduced the risk of pulmonary embolism but increased DVT and had no effect on survival¹². Although the use of IVCF may be beneficial in patients at a high risk of pulmonary embolism, systematic use in the general population with VTE is not recommended.

Due to the high suspicion of advanced ovarian malignancy and known DVT, our patient was consequently considered to be at a high risk of developing fatal pulmonary embolism. In addition, she had contraindication for anticoagulation therapy due to the planned major pelvic surgery and risk of serious perioperative bleeding. Therefore, IVCF was preoperatively inserted according to recommendations of the American College of Chest Physicians⁹. The basic function of IVCF was to prevent the passage of larger emboli from the pelvic and lower limb through the inferior vena cava to pulmonary arteries, thus preventing pulmonary embolism.

However, despite the marked increase in the use of IVCF, it is important to point out that implantation of IVCF is not free of complications. Most complications and side effects may occur during implantation or retrieval, and while retained in the body.

During the 2005-2010 period, the Food and Drug Administration (FDA) received 921 reports of adverse events related to IVCF, of which 328 involved device migration, 146 embolizations, 70 perforation of the inferior vena cava, 56 involved filter fracture, and death in 4% of cases. Some of the adverse events may have also been related to retrievable filters not being removed and staying past the time when the risk of pulmonary embolism had subsided.

In 2014, the FDA decided that in patients with a documented DVT/pulmonary embolism, IVCF should be removed between 29 and 54 days after implantation in order to avoid these complications, and when thera-

peutic dose of anticoagulation has been reached and the patient has been found to tolerate it¹³.

The need of anticoagulation therapy after filter placement is not yet consensual either, but according to the consensus report of the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy, it is recommended that anticoagulation therapy be resumed as soon as possible after filter insertion because the filter alone is not an effective treatment of VTE¹⁴. Our patient was anticoagulated after filter placement, and anticoagulation was maintained after the procedure as an attempt to minimize VTE recurrence.

In this case report, we presented a patient with a large tumor mass occupying the whole pelvis and abdomen, and with DVT, in whom IVCF was inserted for perioperative prevention of pulmonary embolism. It can be concluded that IVCF is a very useful therapeutic device in selected patients at a high risk of fatal pulmonary embolism, especially those whose initial thromboembolic event is proven cancer-associated DVT.

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Sažetak

UGRADNJA FILTRA U DONJU ŠUPLJU VENU PRIJE OPERACIJSKOG ZAHVATA U ŽENE S TUMOROM JAJNIKA I SIMPTOMIMA DUBOKE VENSKE TROMBOZE: PRIKAZ SLUČAJA I PREGLED LITERATURE

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Venska tromboembolija je česta komplikacija ginekoloških malignih bolesti, a može se javiti i kao prvi simptom skrivene maligne bolesti. Unatoč tome što je antikoagulantna terapija zlatni standard u liječenju bolesnika s akutnom venskom tromboembolijom, postavljanje filtra šuplje vene predstavlja značajnu alternativu u bolesnika kod kojih je antikoagulantna terapija kontraindicirana ili neučinkovita. U radu je prikazan slučaj 69-godišnje bolesnice s edemom lijeve noge zbog duboke venske tromboze koja je nastala kao prvi simptom karcinoma jajnika. Analizirana je medicinska literatura i opisano naše iskustvo s postavljanjem filtra šuplje vene u svrhu sprječavanja moguće plućne embolije u bolesnice s karcinomom jajnika.

Ključne riječi: *Venska tromboembolija; Filtri šuplje vene; Antikoagulansi – terapijska primjena; Edem; Venska tromboza; Ovarijalni tumori – komplikacije; Plućna embolija; Prikazi slučaja*