

# Thrombosis of the Abdominal Aorta of a Patient with Tubal Carcinoma Undergoing Cytoreductive Surgery under General Anesthesia

Genel Anestezi Altında Tuba Karsinomu Nedeniyle Sitoredüktif Cerrahi Yapılan Hastada Abdominal Aorta Trombozu

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A 74 year old patient, weighing 94 kg, with abdominal distention was admitted to hospital. Her upper and lower abdominal tomography was normal and ultrasonography could not be evaluated optimally because of massive ascites. She had undergone tumor debulking surgery (total abdominal hysterectomy, bilateral salpingo-oophorectomy, total omentectomy, appendectomy, pelvic and paraaortic lymph node dissection) under general anesthesia with prophylaxis for deep vein thrombosis. Pathologic examination revealed tubal carcinoma. At the end of the five hour long operation, the patient was admitted to the ICU for postoperative care. Within hours, progressive coldness and cyanosis bilaterally in the lower extremities were noted in her physical examination. Pulses distal to the femoral arteries were not palpable. Motor and sensory deficits were also present in both of the lower legs in her neurological examination. In her angiography, the aorta was atherosclerotic and a large thrombus, occluding the abdominal aorta, 3 cm distal to renal arteries, was revealed. The patient was taken for emergency embolectomy and treatment for hyperkalemia was also begun. After embolectomy, emergency hemodialysis was planned. However, the patient arrested in ICU and did not respond to cardiopulmonary resuscitation. Aortic thrombosis is a very rare and fatal complication after gynecologic surgery. Preoperative evaluation and assessment of risk factors should be done carefully and without losing time, since treatment options are very limited in such patients.

**Key Words:** Abdominal aorta, thrombosis, malignancy, gynecologic surgery

Yetmiş dört yaşında, 98 kg ağırlığında kadın hasta, karında şişlik şikayetiyle hastaneye başvurdu. Hastanın üst ve alt karın tomografisi normaldi. Ultrasonografi, yaygın asit nedeniyle değerlendirilemedi. Hastada tromboemboli profilaksisi başlandıktan sonra, genel anestezi altında ve tümör küçültücü operasyon (total abdominal histerektomi, bilateral salpingooferektomi, total omentektomi, apendektomi, pelvik ve periaortik lenf nodu diseksiyonu) yapıldı. Hastanın patoloji sonucu tuba karsinomu olarak geldi. Beş saat süren ameliyatın sonunda postoperatif takip için yoğun bakım ünitemize kabul edilen hastanın her iki alt ekstremitelerindeki soğukluk ve siyanoz saatler içinde artmaya başladı. Femoral arter ve distalinde nabız alınamıyordu. Nörolojik muayenesinde her iki alt ekstremitede de duyu ve motor kayıp mevcuttu. Anjiyografisinde, aortanın aterosklerotik olduğu, renal arterlerin 3 cm distalinde başlayan ve abdominal aortayı tıkayan trombüs izlendiği görüldü. Hasta acil embolektomi için operasyona alındı ve hiperkalemiye yönelik tedavi başlandı. Hastaya acil diyaliz girişi planlandı. Ancak hastada kardiyopulmoner arrest gelişti ve kardiyopulmoner restitasyona cevap vermedi. Jinekolojik cerrahi sonrası abdominal aortada trombüs gelişimi nadir görülen fatal bir komplikasyondur. Preoperatif değerlendirme ve risk faktörlerinin saptanması, bu tür hastalarda tedavi seçeneklerinin sınırlı olması nedeniyle, zaman kaybetmeden dikkatli bir şekilde yapılmalıdır.

**Anahtar Kelimeler:** Abdominal aorta, tromboz, malin, jinekolojik cerrahi

## Introduction

**A**cute thrombosis in the abdominal aorta is an extremely rare complication because of the large diameter and high blood flow (1). We report a case of an occlusion of abdominal aorta in an elderly patient with advanced fallopian tubal carcinoma undergoing debulking surgery under general anesthesia. Risk factors, diagnosis and the management of fatal thrombosis in the abdominal aorta are presented.

## Case Report

A 74 year-old, 98 kg weight woman was admitted to hospital with the complaint of distension of the abdomen. The patient had an history of hypertension regulated with verapamil+trendolapril once a day. Ultrasonography showed massive ascites in the abdomen, other structures could not be evaluated. Her upper and lower abdominal CT was normal. Cytology of preoperative paracentesis was malignant in nature. The patient was given prophylaxis for deep vein thrombosis with low molecular weight heparin.

The patient was premedicated with 0.02 mg/kg i.v midazolam. Heart rate, peripheral O<sub>2</sub> saturation and non-invasive blood pressure were monitored. The induction of anesthesia was provided with 5 mg/kg i.v thiopental and 1 mcg/kg i.v fentanyl. Endotracheal intubation was facilitated with 0.5 mg/kg i.v rocuronium bromide. Invasive arterial blood pressure was monitored with a catheter placed in the right radial artery. Central venous catheterization was performed through the right internal jugular vein with a 7F catheter. Anesthesia was maintained with 1 MAC sevoflurane in 50% O<sub>2</sub>-N<sub>2</sub>O. At the beginning of laparotomy, 7.5 L ascites were withdrawn from the midline

incision below the umbilicus. Total abdominal hysterectomy, bilateral salpingoophorectomy, total omentectomy, appendectomy, tumoral debulking, excision of paraaortic lymph nodes up to the left renal vein and pelvic lymph nodes were completed uneventfully. Histopathological examination revealed tubal carcinoma. Fluid resuscitation of the patient was achieved by infusion of 1000 mL colloid, 7000 mL crystalloid and 4 units of red blood cells throughout the operation. Her central venous pressure (CVP) remained between -2 to -3 cm H<sub>2</sub>O during surgery. Urine output was zero in the first 3 hours of operation. Her mean arterial blood pressure was under 60 mmHg. Arterial blood gas analysis was carried out throughout the operation; electrolytes were replaced accordingly. Dopamine infusion (3-10 mcg kg/min) was started and titrated to keep the mean arterial blood pressure above 65 mmHg until the end of the operation. Dopamine infusion was stopped when fascia closure was begun. The operation lasted 5 hours. She was transferred to the post anesthetic care unit (PACU). She was conscious and awake on admission to ICU. Arterial blood pressure was within normal limits. Heart rate was 112 beats min<sup>-1</sup>. Her SpO<sub>2</sub> was 93% with 2-3 L/min O<sub>2</sub>. Urine output was above 0.5 mL kg/hr. Her postoperative blood count (CBC), biochemistry values, activated partial thromboplastin time, international normalized ratio were unremarkable. Three hours after admission to ICU, both of her lower extremities became abnormally cold and were ecchymotic. Circulation of the bilateral lower extremities worsened within following hours, bilateral sensory and motor deficits were observed in both lower extremities in her neurological examination (Figure 1). Her motor and sensory function deteriorated with time. Femoral, popliteal, posterior tibial and dorsalis pedis arteries were not palpable. Consultations with gynecology, cardiology, cardiovascular surgery and neurology were carried out. Low molecular weight heparin 0.6 mL was applied subcutaneously. The abdominal aorta was atherosclerotic and



Figure 1. Circulation of blood flow is limited below pelvic region

a thrombus in the lumen 3 cm distal to the renal arteries was detected in digital subtraction angiography. A stenotic segment was visualized at the first portion of right renal artery. Iliac and femoral arteries were not visualized at all (Figure 2). The patient was taken for emergency embolectomy under general anesthesia, 12 hours after the first operation. The same anesthesia induction was performed as in the first operation. Maintenance of anesthesia was provided with 1 MAC desflurane in 50% O<sub>2</sub>-N<sub>2</sub>O. Invasive arterial blood pressure was monitored. The thrombus in the abdominal aorta was removed by a 4 Fr Fogarty catheter. Arterial blood gas analysis was obtained during the operation. Metabolic acidosis and hyperkalemia was noted. Anti-hyperkalemic treatment (insulin-glucose therapy and calcium infusion) was started and NaHCO<sub>3</sub> replacement was done intraoperatively. After surgery, the patient was transferred to ICU. Emergency dialysis was planned for hyperkalemia. The patient had values of: ALT: 65 U/L, Ca: 7.4 mmol/L, glucose: 215 mg/dL, Cl: 117 mmol/L, AST: 123 U/L, K<sup>+</sup>: 7.4 mmol/L, Na: 143 mmol/L, blood urea nitrogen: 76 mmol/L and arrested in ICU. Cardiopulmonary resuscitation (CPR) was performed. Adrenaline was given and repeated when necessary. Chest compressions were performed. Replacement of Ca<sup>++</sup> and NaHCO<sub>3</sub> was done. Circulation was not ensured and she did not respond to CPR. Pathologic examination of the thrombus showed that it was not tumoral in origin.

## Discussion

Acute abdominal aortic thrombosis is a rare condition with an extremely high mortality rate. It is manifested by development of ischemia of the lower limbs and neurologic symptoms caused by spinal cord ischemia (2). In the literature, there was a few case reports documenting arterial thrombosis. Arterial thrombosis induced by chemotherapy was reported in a patient with ovarian carcinoma coexisting with endometrial carcinoma (3). Green et al. (4) reported a case of discontinuous arterial thrombosis in the upper extremity of a patient with fallopian tube cancer. Coldness of the lower limbs,



Figure 2. Blood flow below the level of renal arteries was nearly absent

mottling from the level of iliac crest, paraplegia and absence of femoral pulses are all manifestations of sudden and acute interruption of blood flow through the abdominal aorta as happened in our case.

Deep vein thrombosis is much more common than arterial thrombosis in cancer patients. Patients with gynecological cancer are at increased risk of developing thrombo-embolic complications due to a hypercoagulable state associated with malignancy (1, 5). Agnelli et al. (6) showed that age, previous venous thromboemboli, advanced disease, duration of surgery and bed rest are the risk factors for venous thromboembolism.

Malignancy may trigger a hypercoagulable state due to release of some procoagulants from tumor cells and excess thrombin production via over-expression of tissue factor (5, 7, 8). Cancer related surgery tends to be more extensive and involves venous trauma (9). Insertion of central venous catheters may damage the vascular endothelium. Chemotherapy reduces the circulating anticoagulant proteins, leading to a prothrombotic state (10). However, our patient did not receive chemotherapy before the operation. Stress response to surgery causes elevation of procoagulant factors and a shut-down of the fibrinolytic system (11). Hyperviscosity associated with perioperative fluid loss also induces a hypercoagulable state.

Congenital factors such as deficiency of protein C and S and antithrombin III, factor V Leiden mutation are the most common inherited hypercoagulable disorders, playing a significant role in venous thromboembolism (VTE). Obesity is an independent risk factor for VTE (12).

The most commonly used thromboprophylaxis regimens consist of a single preoperative dose of unfractionated heparin or low molecular weight heparin (LMWH), continuing with subcutaneous doses every 8-24 hours (13). Patients with arterial and venous thromboembolic complications are usually treated with low molecular weight heparin. In this case, the patient was operated on under prophylaxis with LMWH. Low molecular weight heparin was also initiated immediately after her neurologic examination but perfusion could not be restored. If evolution of this state of hypercoagulability could be detected, it might be possible to prevent the development of postoperative mortal thromboembolic complications (5). Thromboelastography, providing differentiation between the platelets, coagulation system, fibrinolysis and influence of anticoagulant drugs might be a suitable tool for predicting postoperative thromboembolic complications (14, 15). A careful preoperative evaluation is mandatory in order to diagnose such fatal complications earlier. We believe that life threatening hyperkalemia was associated with reperfusion injury in this patient with a sudden aortic thrombosis presenting with bilateral acute and massive lower limb ischemia (16).

## Conclusion

Aortic thrombosis is a very rare but potential complication of patients with gynecologic malignancy undergoing surgery. Risk factor

assessment, careful preoperative evaluation, early detection and immediate treatment or intervention may minimize the mortality of the case; otherwise the treatment options are very limited.

## Conflict of Interest

No conflicts of interest were declared by the authors.

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