Perioperative blindness after debulking surgery for ovarian cancer

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The incidence rate of sudden onset perioperative visual loss after nonophthalmologic surgeries is around 0.002%, but it can be as high as 0.2% after spine or cardiac surgeries [1]. Although any portion of the visual pathways can be involved, the most common site to be subjected to injury is the optic nerve and is mostly related to ischemia [1]. This condition is called nonarteritic anterior ischemic optic neuropathy (NAION), which corresponds to a sudden onset of optic nerve stroke [1]. To the best of our knowledge, there has not been any English written literature on NAION after surgery for gynecological malignancy. We described a case of NAION with the presentation of blindness noted immediately after debulking surgery for ovarian cancer.

A 56-year-old Taiwanese female, gravida 2, para 2, had anorexia, abdominal distension, weight loss of 12 kg within 4 months, and pitting edema over the left leg for 2 months. Physical examination showed a distended abdomen with shifting dullness, and pelvic examination revealed a tense pelvic tumor. Laboratory examination showed anemia (hemoglobin 9.6 g/dL; normal (N): 12–16 g/dL), thrombocytopenia (platelets 121 × 10⁹/μL; N: 150–400 × 10⁹/μL), and hypoalbuminemia (albumin 3.3 g/mL; N: 3.5–5.5 g/mL). Elevated D-dimer (7203 μg/mL; N < 50 μg/mL) and fibrin degrada-
duction product (>80 μg/mL; N < 10 μg/mL) were also noted. The plasma fibrinogen level was within normal range. Her serum tumor markers, CA-125 (502.80 U/mL; N < 35 U/mL) and CA19-9 (640.02 U/mL; N < 37 U/mL), were markedly elevated. She denied past history or family history of deep vein thrombosis (DVT) or stroke. Computed tomography showed a 12 cm complex left pelvic tumor, which contained amorphous material. There were massive ascites and no enlarged lymph nodes. The left external iliac vein and left femoral vein were dilated, which contained a long segment of thrombus (Fig. 1). This finding suggests pelvic DVT formation. Ovarian cancer associated with Trousseau sign of malignancy, presented as disseminated intravascular coagulopathy (DIC) and DVT, was underlined [2].

The patient underwent a staging surgery after correction of anemia. At the opening of the pelvic cavity, there were 2000 mL of yellowish ascites in the abdomen, and a multilobulated tumor arose from the left ovary, which tightly adhered to the sigmoid colon. Left salpingo-oophorectomy was undertaken and the specimen was sent for frozen section. After observing the malignant nature of the left ovarian tumor, abdominal total hysterectomy, right salpingo-oophorectomy, omentectomy, and pelvic lymph node dissection were undertaken thereafter. Bleeding tendency was observed which impeded the procedure during surgery. One hour at the recovery room after surgery, the patient was observed to have hypotension and a distended abdomen. Immediate reopening of the abdominal cavity was performed. There was dark blood gushing out from the abdominal cavity at the reopened site/position and a pulsatile bleeder from an arteriole on the edge of the incised peritoneum between the left infundibulopelvic ligament and the sigmoid colon was discovered and ligated. The left paracervical tissue and the rough dissecting surface over the lower sigmoid colon, which adhered to the ovarian tumor, bled slowly. The slow bleeding ceased after transfusion of fresh frozen plasma. Total blood loss of the two openings was 2700 mL.

She complained of left-eye blindness 1 day after surgery. Neurological examination showed loss of left-eye visual acuity with only light perception. Fundoscopic examination (Fig. 2) showed an edematous disc with blurred margin and peripapillary splinter hemorrhage. Besides the disc infarction, a sectoral retinal infarction in the upper temporal region was also observed. These findings were consistent with NAION. Her leg edema subsided soon after surgery.
Final histopathological diagnosis showed a poorly differentiated serous papillary cystadenocarcinoma with clear cell component. There were no metastases in the surgical specimens. A FIGO stage Ic ovarian cancer was established. The patient received six cycles of chemotherapy with cyclophosphamide and cisplatin. Her serum CA-125 level returned to normal range after treatment. She resumed regular daily activities but the left-eye blindness persisted. Warfarin was prescribed at a maintenance dose.

One month after the completion of treatment, sudden onset of left-sided hemiparesis followed by conscious loss occurred. Image studies revealed infarction in the middle cerebral artery (MCA) territory with total occlusion of the right MCA at the M1 segment. There were multiple metastatic lesions in the liver and carcinomatosis in the abdomen and pelvis. Despite aggressive management, she died 1 month after the stroke.

NAION is the most frequent cause of perioperative blindness and is characterized by sudden painless visual loss [3]. Most cases of perioperative ION affect both eyes simultaneously, and in 54% of cases the affected eyes had no light perception [1]. The risk factors of NAION include prone position surgery, conditions associated with hypotension and hypovolemia, and diseases associated with hypercoagulable state and artherosclerosis [4].

Although the precise mechanism remains unclear, the pathogenesis of NAION is believed to result from hypoperfusion of the
posterior ciliary arteries and, occasionally, is associated with thrombophilic status [5]. In 1978, Lieberman et al [6] reported the only case of histologically proven thromboembolic occlusion of the short posterior ciliary artery leading to NAION of unilateral eye in a 68-year-old male by postmortem enucleation of both eyes.

Spine surgeries contribute to 70% of cases of postoperative visual loss. On the contrary, laparotomy accounts for less than 10% of cases [7]. We searched PubMed and discovered seven case reports on visual loss after laparotomy. Patients who almost suffered from bilateral blindness have a large volume of blood loss suspected to be one of the major causes (Table 1) [8–14]. However, malignancy and hypercoagulability were not cited in these cases. In a case—control analysis of 126,666 surgical procedures, Holy et al [15] concluded that the occurrence of perioperative ION cannot be predicted solely on the basis of fluctuations in hemodynamic variables.

Clear cell carcinoma, one of the histological components in this case, is frequently associated with coagulopathy, and also shows a high incidence rate of thrombus within a deep vein and the lung [16]. DIC is a clinical diagnosis identified by laboratory tests and is divided into acute and chronic categories [17]. Acute DIC typically induces hemorrhagic manifestation, whereas chronic DIC is predisposed to thrombotic events. Bleeding tendency and thrombosis could be simultaneously characteristic in DIC [17]. In our case, DIC is associated with both hemorrhagic and thrombotic events, evidenced by easy bleeding during operation as well as DVT formation, which might contribute to postoperative blindness.

No proven effective treatment for perioperative ION has been established [1]. Treatment options include correction of hemodynamic derangements, anticoagulation therapy, and systemic corticosteroids [1]. Ideally, prevention of perioperative ION would be the goal. Transesophageal echocardiography is useful in the perioperative period for identifying variable sources of cardiovascular emboli [18]. Administration of heparin is recommended prior to gynecological surgery to decrease thromboembolic events in high-risk patients, but the side effects of bleeding have to be a concern for the surgeon [19].

In conclusion, we report the first case of NAION after surgery for gynecological cancer. Transient fluctuations of blood pressure in the perioperative period and malignancy-related coagulopathy induced embolus formation in the short posterior ciliary artery, which resulted in optic nerve ischemia with the consequence of blindness.

### References


