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TRANSIENT LOSS OF VISION POST PERCUTANEOUS NEPHROLITHOTOMY, A CASE REPORT

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Background: To the best of our knowledge, we report a case of temporary visual loss following percutaneous nephrolithotomy (PCNL).

Presentation of a case: To treat nephrolithiasis, a 39-year-old male who had a history of right femoro-popliteal by-pass surgery and was taking antiplatelet medication prior to surgery had a left percutaneous nephrolithotomy. Two hours following the procedure, there was painless sight loss in both eyes with intraoperative ECG abnormalities that suggested inferior myocardial infarction. One hand movement per bilateral visual acuity. On the other hand, neuroimaging was normal and ophthalmologic exams were unremarkable. Visual fields and acuity both significantly improved in a month.

In conclusion, this is one of the few cases of posterior ischemic optic neuropathy (PION) 1 after PCNL that has been documented. Severe visual loss following surgery is infrequently caused by posterior ischemic optic neuropathy. The most significant risk factors are vascular disorders, excessive bleeding, hypotension, anemia, and surgical site placement. This instance should be known to ophthalmologists, urologists, and anesthesiologists, and before surgery, this uncommon probability should be taken into account.

Keywords: PCNL, PION, loss of vision.

BACKGROUND

Postoperative vision loss (POVL) is an uncommon event that might occur. Its prevalence is 0.1% in cases of cardiopulmonary by-pass and 0.02% to 0.2% in cases of spinal surgery.[1] Based on the kind of operation, ischemic optic neuropathy (ION) has been found to be the most common cause of POVL patients, with a reported incidence ranging from 0.01% to 1% 2.[2] 0.028% to 0.2% of spinal surgical cases and 0.113% of cardiac cases including cardiopulmonary by-pass are reported to have ischemic optic neuropathy.[1]

The hallmark of ischemic optic neuropathy is a reduction in blood supply to the optic nerve. Thus, there is a consequent decrease in the perfusion pressure of the eye, potentially leading to ischemia, in conditions of increased intraocular pressure (IOP), decreased systemic mean arterial pressure (MAP), or a combination of both.[3] Based on the location of the damaged optic nerve and the accompanying blood flow, ION can be divided into two categories: anterior and posterior ischemic optic neuropathy. The most frequent cause of vision loss in two spinal surgery cases that has been described is posterior ischemic optic neuropathy (PION), which is frequently linked to hemorrhage, anemia, and hypotension.[1]

The lack of edema evidence surrounding the optic disk on the fundoscopic exam makes the diagnosis of PION challenging. This uncommon condition can arise from various non-ocular procedures such radical neck dissection and spine surgery, as a side effect of giant cell arteritis, or in the context of non-arteritic systemic vasculopathy without inflammation.[4,5]

Hemodialysis, laparoscopic nephrectomy, endoscopic sinus surgery, posterior draining dural cavernous sinus fistula with an arterial steal, and other diseases are also linked to PION.[5-7]

We provide a case of bilateral PION following percutaneous nephrolithotomy (PCNL), which has, as far as we are aware, not been documented frequently previously.

CASE PRESENTATION

A 39-years-old man complained of bilateral visual loss following left PCNL. He had a history of vasculitis but not a smoker. He had undergone right femoro-popliteal by-pass surgery since six years. The patient was on treatment with antiplatelet drugs. On examination ,the patient was generally well and no abnormalities detected .The patient had undergone PCNL for nephrolithiasis on the left side under general anesthesia. Suddenly, half

an hour after prone positioning for starting left PCNL, ECG changes occurred, suggesting inferior myocardial infarction. (Fig. 1)

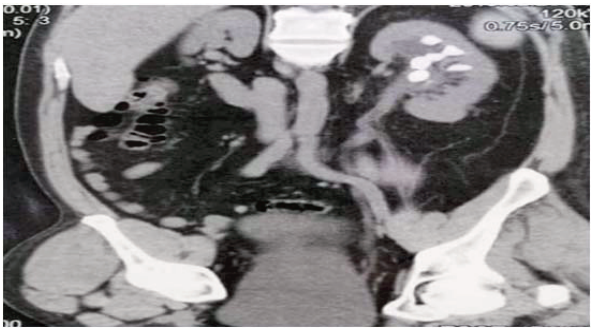

Fig. 1: Non-contrast CT abdomen and pelvis showing preoperative left renal stone.

After stopping the procedure and doing resuscitation, the patient was sent to Cardiac Care Unit to finish up with appropriate management. After two hours, the patient reported having no other ocular symptoms other than a painless loss of vision in both eyes. Upon first testing, both eyes' visual acuity was determined by hand movement. Both eyes' intraocular pressures were within normal limits. Fundus examination revealed no abnormalities. The results of the neuroimaging were normal. The anesthesiology report states that there was neither systemic hypotension or considerable blood loss during the procedure; the systolic blood pressure never fell below 120 mmHg. The preoperative laboratory tests included an INR of 1.2, a hematocrit of 45.4%, hemoglobin of 15 g/dl, prothrombin activity of 80%, and fasting blood sugar of 100 mg/dl.

After stabilizing the patient's general condition, the patient was on anti-ischemic measures in the cardiac care unit. The ophthalmologist prescribed an intravenous infusion of methylprednisolone over 24 hours for three days with blood pressure and glycaemic control. Visual fields were obtained 48 hours postoperatively when visual acuity improved to counting fingers at 3 meters in both eyes. Seventy-two hours later, visual acuity gradually improved in both eyes respectively. Anterior segment examinations, IOP, and funduscopy were the same as the initial examination. The cardiac state improved, and no ECG changes occurred again. After one week, the patient was discharged on anti-ischemic measures and oral steroids with follow-up in the outpatient clinic of cardiology, ophthalmology, vascular, and urology department. After one month, visual acuity and visual fields improved dramatically. After two months, elective diagnostic cardiac catheterization was done, and no abnormalities were detected.

After six months, the patient was prepared again for completing his left PCNL. A multidisciplinary team was consulted to assess the cardiac, vascular, and ophthalmological state of the patient. The anesthesiologist assessed the fitness for completing the procedure, and after a full assessment and full investigations, we proceeded for left PCNL. Inadvertently, five minutes after prone positioning, persistent bradycardia occurred, so repositioning to supine state again and resuscitation was done until normal sinus rhythm. Only annual double JJ fixation was done. The patient was discharged after three days with the good general condition. After one month, the patient was sent for Extracorporeal Shock Wave Lithotripsy (ESWL) and became stone-free after five sessions of ESWL.

DISCUSSION

This patient's history, clinical course, and paraclinical data are consistent with PION following PCNL, which has, to our knowledge, not been described very often. Axonal necrosis and ischemia inflict damage to the optic nerve in the course of ischemic optic neuropathy. AION and PION are two subtypes of ischemic optic neuropathies, which are distinguished by the segment of the optic nerve that is damaged. The pathophysiological mechanisms of both types differ due to differing vascular supplies in the anterior and posterior regions of the optic nerve, despite the fact that the underlying problem in both is insufficient blood supply.[8] Non-arteritic, arteritic, surgically caused (perioperative), shock-induced, and secondary to bleeding resulting from other causes are among the PION categories.[4]

In patients with non-arteritic PION, systemic vascular risk factors are typically present. Though it can sporadically coexist with other forms of vasculitis, the arteritic variety almost always arises in the context of giant cell arteritis. Perioperative PION typically develops after 50% of patients undergo lengthy spine procedures, during which they are typically younger and free of vascular disorders. However, additional risk factors such as hypertension, diabetes mellitus, smoking, hypercholesterolemia, congestive heart failure, coronary artery disease, and cerebrovascular accident are typically present in cases that follow orthopedic, abdominal, cardiac,

and ocular procedures, and these cases resemble non-arteritic PION.[4]

Our patient's initial visual acuity was as low as hand motion, but after a month, there was a noticeable improvement. Twice a week, the patient had an examination. By the end of the month, his visual acuity was 0.5, his color vision and contrast sensitivity had improved somewhat, and his optic nerve function had improved. This may be because of a few factors, including the relatively brief surgery (around 30 minutes), the absence of severe bleeding or systemic hypotension throughout the process, and the proper homodynamic rehabilitation following the initial surgery. As a result, many axons were able to restore their regular blood flow, and it's likely that very few of them experienced ischemia necrosis. Persistent pre- or intraoperative anemia, hypovolemia and hypotension during surgery, and facial swelling and edema are major risk factors for perioperative PION.[9,10]

CONCLUSION

Surgeons and anesthesiologists should be aware of PION, an uncommon but potentially blinding syndrome that can arise after heart and spine procedures, as well as any treatment involving significant blood loss. The example mentioned in this study is the second after PCNL. PION should be considered in patients with perioperative risk factors.

Preventive strategies, such as modifying systemic vascular risk factors and maintaining hemodynamic stability before, during, and after major procedures, are critical to lowering the risk of this illness.

LIST OF ABBREVIATIONS

PCNL: Percutaneous Nephrolithotomy
ECG: Electrocardiogram
ION: Ischemic optic neuropathy
PION: Posterior ischemic optic neuropathy
AION: Anterior ischemic optic neuropathy
POVL: Postoperative vision loss
MAP: Mean Arterial Pressure
IOP: Intraocular pressure
ESWL: Extracorporeal Shock Wave Lithotripsy

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