OLGU SUNUMU CASE REPORT

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Isolated Partial Third Nerve Palsy Following Coronary Angiography

Koroner Anjiyografi Sonrası Ortaya Çıkan İzole Parsiyel Üçüncü Sinir Felci

Zeynep KAYAARASI ÖZTÜRKER[a], Serpil AKAR[a], Birsen GÖKYİĞİT[a], Erkin ARIBAL[a]

[a]Başkent University İstanbul Hospital, Department of Ophthalmology, İstanbul, TURKEY

ABSTRACT We report a 64-year-old diabetic and hypertensive woman with left third nerve palsy presenting with acute diplopia and mild left upper eyelid ptosis following an uneventful coronary angiography. There were no other neurologic deficits. High-resolution magnetic resonance imaging (MRI) of the brain revealed focal ischemia on the left side of the mesencephalon at the level of the third nerve nucleus. Cranial MRI angiography showed no vascular occlusion due to emboli. Coronary angiography is a rare case of isolated third cranial nerve palsy. In this article, we aimed to draw attention to the possibility of unilateral third cranial nerve palsy as a rare complication of coronary angiography.

Keywords: Cranial nerve diseases; oculomotor nerve diseases; diplopia; coronary angiography

ÖZET Koroner anjiyografi sonrası akut diplopi ile başvuran, sol gözde üçüncü sinir felci ve üst göz kapağında hafif düzeyde pitozis olan 64 yaşında diyabetik ve hipertansif kadın hastayı sunuyoruz. Hastada başka nörolojik defisit yoktu. Yüksek çözünürlüklü beyin manyetik rezonans (MR) görüntülemesinde mezensefalonun sol tarafında, üçüncü sinir çekirdeği düzeyinde, fokal iskemik odak saptandı. Beyin MR anjiyografide emboliye bağlı gelişebilecek bir vasküler tıkanıklık tespit edilmedi. Koroner anjiyografi, izole üçüncü sinir felcinin nadir görülen sebeplerinden biridir. Bu çalışmada, koroner anjiyografi sonrası görülebilen, nadir bir komplikasyon olan tek taraflı üçüncü sinir felcine dikkat çekilmesi amaçlanmıştır.

Anahtar Kelimeler: Kraniyal sinir hastalıkları; okülomotor sinir hastalıkları; diplopi; koroner anjiyografi

Despite the widespread and long-lasting use of coronary angiography in clinical practice, visual symptoms after coronary angiographic procedures are uncommon. The neuro-ophthalmic complications after cardiac catheterization are rarely presented in the literature, although retinal vascular occlusion, ischemic optic neuropathy, and contrast-induced optic neurotoxicity have been described.[1,2]

In general, cranial mononeuropathies mostly occur from microvascular ischemia to the nerve in patients having risk factors such as older age, diabetes mellitus, hypertension, and hyperlipidemia.[3,4] The few reported cases in relation to invasive cardiac procedures are thought to occur due to thrombus formation or dislodgement of an atheromatous plaque during the manipulation which would increase the risk of embolic complications.[5-8] Neuro-ophthalmic symptoms secondary to embolic ischemia may be variable depending on the location and severity of the pathology. Lesions may locate anywhere from their nuclei to the termination of the nerves in the extraocular muscles within the orbit. In cases related to cardiac angiography, small embolic particles may reach up to the midbrain, and lodge in the tiny

Correspondence: Zeynep KAYAARASI ÖZTÜRKER
Başkent University İstanbul Hospital, Department of Ophthalmology, İstanbul, TURKEY/TÜRKİYE
E-mail: zeynepkayaa@yahoo.com

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vessels that supply the relevant areas including cranial nerves.

Here we report the case of a diabetic and hypertensive patient who had an isolated unilateral partial third nerve palsy after an uneventful coronary angiography. High-resolution magnetic resonance imaging (MRI) assessment of the brain revealed focal ischemia on the left side of the mesencephalon at the level of the third nerve nucleus.

CASE REPORT

A 64-year-old woman referred to our clinic with an acute presentation of binocular diplopia and unremarkable left upper eyelid ptosis following an uneventful coronary angiography. She had a history of diabetes mellitus and hypertension. The patient was taken to the angiography laboratory for suspicion of de novo coronary artery disease.

On ocular examination, best corrected visual acuity was 0.8 in the right eye and 0.9 in the left eye. There was 2 mm left upper eyelid ptosis. The adduction and supraduction of the left eye were restricted to -2 (30°) and -2 (30°), respectively. Infraduction was not limited (Figure 1). Left eye could adduct to pass the midline. The diplopia was binocular and resolved upon closing either eye. The left pupil was not mydriatic, and light reflex was present. There was no relative afferent pupillary defect. Alternate prism cover test revealed 18 prism diopters (PD) of hypotropia and 10 PD of exotropia in distance fixation and 16 PD of hypotropia and 8 PD of exotropia in near fixation in the left eye. She had a compensatory head posture with face turn to the right and chin-up position. Examination of the right eye was normal with a normal range of movements with normal size and reactivity of the pupil. Fundus examination of both eyes was unremarkable. She had pupil-sparing partial left third nerve palsy. She had no previous neurological history, and her neurological examination was otherwise normal.

Differential diagnoses included a transient ischaemic attack or a contrast-induced neurotoxicity. Contrast-induced neurotoxicity is a rare complication which would present with confusion due to encephalopathy. However, our patient showed no signs of confusion during the course of the symptoms. Cranial magnetic resonance imaging (MRI) at 3 Tesla with contrast media showed a hyperintense region on the left side of the mesencephalon at the level of the third nerve nucleus, suggesting focal ischemia at T1 and T2 weighted images (Figure 2A, B). Non-contrast 3D time-of-flight cranial MR angiography did not show embolization or any other pathology. Considering the timing of the event and radiological findings, it was concluded that paralysis was probably associated with coronary angiography.

DISCUSSION

Acquired third cranial nerve palsy can be associated with trauma, compression (e.g., aneurysm, tumor), in-

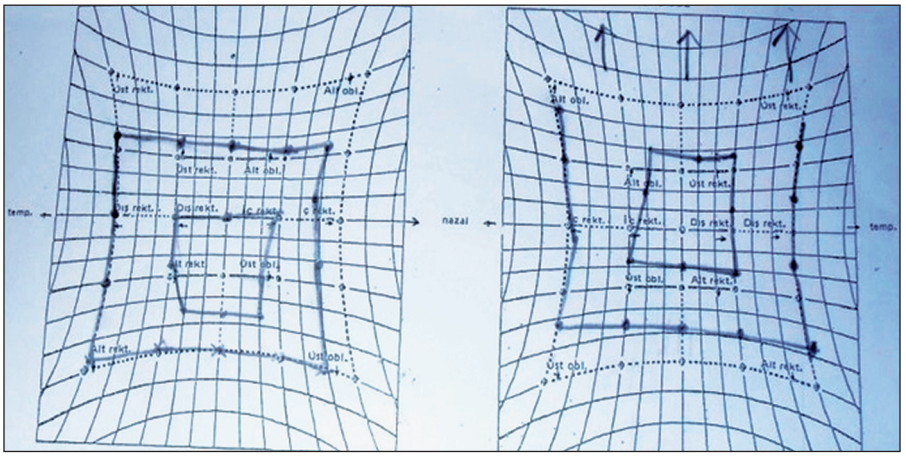

FIGURE 1: Lee's chart of a left third nerve palsy. Contraction of the left chart (left eye) shows underaction of superior rectus, inferior oblique, and medial rectus muscles. Expansion of right chart (right eye) shows overaction of superior rectus and inferior oblique muscles.

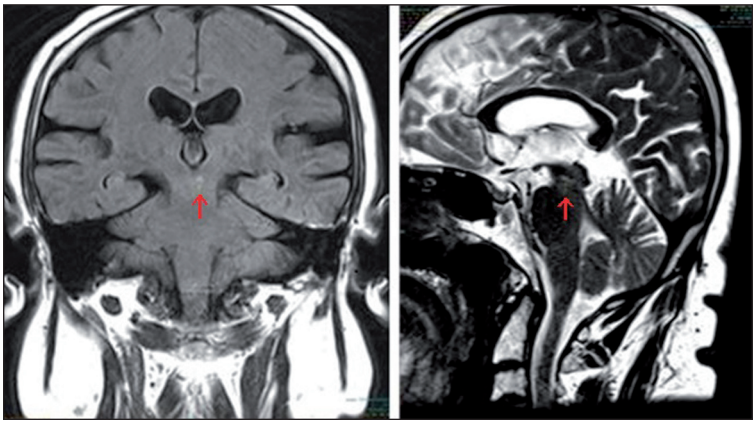

FIGURE 2: Contrast-enhanced brain MRI including coronal T1 weighted (A) and sagittal T2 weighted (B) sequences show focal hyperintense lesion at the level of the mesencephalon suggestive of ischemia (arrows).

filtrative diseases (e.g., leukemia), and demyelination as well as vascular processes such as brain stem strokes, and intracranial hemorrhages.[9-11]

The third nerve can be affected at every level from its nucleus in the midbrain to its entire course in the orbit. Nuclear lesions usually present as unilateral third nerve palsy with contralateral partial ptosis and elevation palsy. However, there may be variable presentations depending on the involvement of subnuclei clustered in the midbrain.

Early neuroimaging with MRI has an important role in the initial evaluation of patients presenting with acute symptoms of ocular motor mononeuropathies. In these cases, detection of ischemia or bleeding with neuroimaging is important in terms of initiating antiplatelet therapy or controlling blood pressure. Some patients with cerebral ischemia and isolated third cranial nerve palsies have demonstrated cardiac sources of emboli or large vessel thromboembolic disease. Emboli frequently lodge in the middle cerebral artery territory and often cause severe neurologic deficits. The majority of arterial emboli originate in the left ventricle where they form secondary to functional or structural abnormalities. Additionally, cardiac interventions such as catheterization, surgery, and transplantation may also cause an embolic stroke. Third nerve palsy is rare following coronary catheterization.[5-8] Drummond et al. reported right partial third cranial nerve palsy after percutaneous transluminal coronary angioplasty in a 61-year-old woman.[5] Kocabay et al. observed sudden partial third nerve palsy in a patient having a prolonged and technically difficult angiography procedure.[6] In the study of Muqit et al., third nerve palsy with Weber's syndrome was detected in a patient during the angiographic procedure.[7] In all these studies, computed cranial tomography and cranial MRI did not show any pathological finding, and microembolic infarct was presumed to be causative for paralysis.

In our case, we believe that the cause of neuro-ophthalmic complication following coronary angiography was ischemia due to microemboli. In MRI brain scans, a focal ischemic lesion at the level of the third nucleus suggested an embolic infarct. Hypertension and diabetes may also have contributed to the risk of embolism. Chou et al. found that over 50% of patients with ocular motor nerve palsies had vasculopathic risk factors.[12] Third nerve palsy with sparing of the pupil is mostly secondary to microvascular disease associated with diabetes, hypertension, and hyperlipidemia. Although the pupils are normal in our case, the sparing of the contralateral ocular movements were also spared given that many other fibers within the third nerve were not affected. These associated features help to localize the ischemic area in the subnuclei of the nerve. The partial involvement of the nerve with normal pupil reaction may also be related to compressive lesions which may later progress to involve the pupil. An aneurysm should be suspected if the patient is within 20-50 years of age that has high-risk for developing an aneurysm, and does not have any vascular risk factors. Our patient's age

and MR angiography results did not indicate the presence of an aneurysm.

At present, coronary angiography and percutaneous coronary intervention are considered to be safe procedures with a low-risk profile in general. However, periprocedural strokes may affect patients undergoing percutaneous coronary intervention worldwide every year.

In conclusion, coronary angiography is a potential cause of isolated third cranial nerve palsy. Small vessel embolization may result in brain stem infarct which leads to cranial nerve palsy. This case with unilateral ptosis due to the infarction of the midbrain and a marked limitation of upward gaze represents a rare oculomotor nerve involvement. A multidisciplinary approach using imaging modalities has an important role in the initial evaluation and differential diagnosis of patients presenting with acute isolated ocular motor palsies.

Informed Consent

The written informed consent was obtained from the patient.

Source of Finance

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Zeynep Kayaarası Öztürker;* ***Design:*** *Zeynep Kayaarası Öztürker, Serpil Akar;* ***Control/Supervision:*** *Serpil Akar, Birsen Gökyiğit;* ***Data Collection and/or Processing:*** *Zeynep Kayaarası Öztürker, Serpil Akar;* ***Analysis and/or Interpretation:*** *Serpil Akar, Birsen Gökyiğit, Erkin Arıbal;* ***Literature Review:*** *Zeynep Kayaarası Öztürker, Serpil Akar;* ***Writing the Article:*** *Zeynep Kayaarası Öztürker, Serpil Akar;* ***Critical Review:*** *Serpil Akar;* ***References and Fundings:*** *Serpil Akar****Materials:*** *Serpil Akar.*

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