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Abducens nerve palsy in patients with metastatic carcinoma

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ABSTRACT

Introduction: Abducens nerve palsy is a nerve disorder that occurs when the sixth cranial nerve is impaired. Signs and symptoms may include double vision, headache, and pain around the eyes. There are several conditions that can cause this problem; including compression by metastatic intracranial mass. Case Series: This article elucidates two cases of abducens nerve palsy in patients with metastatic carcinoma who were referred to ophthalmology department with double vision and marked limitation of abduction. Both patients had history of carcinoma, namely breast and cervix carcinoma. Ophthalmology examination showed normal results, except limitation of abduction in both patient and papilledema in one of the patients. Contrast head CT-Scan revealed intracranial mass, presumed as metastatic lesion from carcinoma which compressed the abducens nerve either directly or indirectly. Conclusion: The present of cranial nerve palsy including abducens nerve palsy might be an important sign of intracranial metastatic process in patient with carcinoma.

Keywords: Abducens nerve palsy, Carcinoma, Intracranial tumor

INTRODUCTION

Sixth (Abducens) nerve palsy is the most common ocular motor paralysis. The abducens (sixth) cranial nerve controls the lateral rectus muscle, which abducts the eye. Abducens nerve palsy causes an esotropia due to the unopposed action of the antagonistic medial rectus muscle. The affected eye turns in towards the nose and is unable to abduct properly. The deviation is constant and is usually greater at distance fixation than at near. The esotropia is also worse when the patient is looking towards the affected side [1, 2].

Sixth nerve palsy presents as horizontal diplopia that worsens on ipsilateral gaze, correlating with an abduction deficit and esodeviation that increases with gaze to the affected side [3]. Patients classically present with binocular horizontal diplopia, and clinical examination would reveal an abduction deficit in the affected eye [4]. Some causes for abducens nerve palsy in adults including vascular lesions are: diabetes mellitus, hypertension, Trauma, Neoplasm (Metastatic) and Infection [1]. Patel et al concluded that neoplasm was the least cause of abducens nerve palsy compared to other risk factors [5]. This article discusses two unusual cases of which neoplasm was the cause of abducens nerve palsy.
CASE SERIES

Case 1

A 49-year-old woman with breast carcinoma was referred from oncology with double vision on left gaze in the last two weeks. She was diagnosed with breast carcinoma since two years ago and was treated with chemo-radiation and hormonal therapy. She complained headache, fever and severe vomiting. No history of head trauma and decrease of visual acuity. Best corrected visual acuity were 20/25 OU and anterior segment was normal. There was restriction in abduction on left eye corresponding to abducens nerve palsy (Figure 1). Posterior segments (funduscopy) of both eyes were normal (Figure 2A). The patient was diagnosed with left abducens nerve palsy. Non-contrast head Computed Tomography (CT) scan on axial slice showed hyperdense lesion with irregular firm edges, sized 2x1cm in the right frontal lobe and 2x2.4 cm in the right parietal lobe. The lesion spreads and destructs the right frontal and parietal bones. CT-Scan result suggested intracranial and bone metastasis (Figure 2B).

Case 2

A 41-year-old woman with cervix carcinoma was referred from Gynaecology department with sudden decrease of vision and family noticed she had a squint from last three days. She complained a severe headache and vomiting. There was history of chemotherapy for two cycles and was discontinued about two years ago. Visual acuities were hand movement OU with marked limitation of abduction on the right eye (Figure 3). Anterior segments was normal. Funduscopy showed papilledema on both eyes (Figure 4). Head Multiple Slice Computed Tomography (MSCT) scan with contrast on axial slice showed heterogenous lesion and enhanced with contrast with irregular solid, firm edges, sized 4.2x5.8x4 cm, with focal edema around which pushed and narrowed the left lateral ventricle, which caused midline shift 0.5 cm to the right in parietooccipital lobe sinistra suggesting anaplastic astrocytoma (Figure 5).

Figure 1: Clinical photographs showing 9-gaze position, there is a limitation of abduction on left, corresponding to a left abducens nerve palsy.

Figure 2: (A) Funduscopy photographs of the patient showed normal posterior segments on both eyes. (B) Hyperdense lesion with irregular firm edges, sized 2x1cm in the right frontal lobe and 2x2.4 cm in the right parietal lobe (arrow).

Figure 3: Clinical photographs showing 9-gaze position, limitation of abduction on right eye corresponding to a right abducens nerve palsy.

Figure 4: Head MSCT scan with contrast on axial slice showed heterogenous lesion and enhanced with contrast with irregular solid, firm edges, sized 4.2x5.8x4 cm, with focal edema around which pushed and narrowed the left lateral ventricle, which caused midline shift 0.5 cm to the right in parietooccipital lobe sinistra suggesting anaplastic astrocytoma.
DISCUSSION

The abducens nerve is the longest cranial nerve. It controls the ipsilateral eye abduction/horizontal gaze. The abducens nerve dysfunction can occur at any point of from the pons to the lateral rectus muscle, resulting in sixth nerve palsy. The abducens nerve begins in the pons before leaving the brainstem. At this point, it travels into the subarachnoid space, goes along the skull at the clivus, and then moves to the basal skull at the petrous apex of the temporal bone where it enters the cavernous sinus. In the cavernous sinus, the internal carotid was located medially as to the abducens nerve. Then the abducens nerve enters the orbit through the superior orbital fissure and innervates the lateral rectus muscle, resulting in eye abduction [6].

Causes of abducens nerve palsy including Neoplasm: benign, malignant, and metastatic. The incidence of brain metastasis is relatively frequent in the presence of systemic malignancy, ranging 8%–15% [7, 8]. However, the occurrence of a brainstem metastasis is relatively rare. Only about 5%–7% of brain metastasis would present in the brainstem [7–9].

Abducens nerve palsy patients usually present with horizontal diplopia, worse in the distance, and esotropia in primary gaze. Patients may also present with a head-turn to minimize diplopia. Examination for an abducens nerve palsy includes documenting any papilledema, examining the ocular motility, evaluating the eyelids and pupils, and excluding involvement of other cranial nerves (V, VII, VIII) [10].

In our cases, patients had pre-existing malignancy; breast carcinoma and cervix carcinoma, who complained of misalignment of their eyes due to restriction of abduction corresponding to abducens nerve palsy. Both patients have intracranial masses that detected for neuroimaging examination. Metastatic causes must be consider in every ocular palsy in patient with history of malignancy.

Due to the known aggressive nature of a metastatic lesion, imaging studies were immediately undertaken, which revealed a lesion that was either a metastasis or an astrocytoma. Stereotactic biopsy was done to determine whether this was a primary brain tumour or a metastatic lesion, as this would greatly influence the choice of subsequent treatment [11, 12].

In this case we found that first patients with breast carcinoma had better visual acuity compared to the second patient. This can occur due to the size of the intracranial lesions. Neuroimaging results support this finding, smaller lesion and superficial location for intracranial mass in the first patient may have not increase the intracranial pressure while in the second patient with cervix carcinoma, the intracranial lesion is larger with a focal edema and constrict the ventricle results a midline shift. All of which would increase the intracranial pressure thus papilledema occurs.

The possibility of a primary tumor could not be completely ruled out. However, 30% of patients with breast cancer strongly supported the possibility of a metastatic lesion. Metastatic brain tumors have been reported to be at least four times as common as primary brain tumors, and breast cancer is known to be the second most common cause of brain metastasis the incidence of brainstem involvement in patients with breast cancer metastasis to the brain was as high as 12.4%, higher than that in patients with any other type of cancer [13].

CONCLUSION

The present of cranial nerve palsy including abducens nerve palsy might be an important sign of intracranial metastatic process in patient with carcinoma.

REFERENCES


Author Contributions
Yunita Mansyur – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
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Authors declare no conflict of interest.

Data Availability
All relevant data are within the paper and its Supporting Information files.

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