

Ocular proptosis as an initial presentation of neuroblastoma in infant: A rare case report

Marliyanti Nur Rahmah Akib, Faridah Amien, Halimah Pagarra, Suliati P. Amir, Ratih Natasha

ABSTRACT

Introduction: Neuroblastoma is a neoplasm arising from the primordial neural crest cells that form the sympathetic nervous system. Orbital neuroblastoma is typically a metastatic tumor. Accounting for 10–15% of childhood tumors, neuroblastoma is the second most common orbital tumor in children, after rhabdomyosarcoma. Neuroblastoma can also develop anywhere along the sympathetic nervous system chain from the neck to the pelvis. Neuroblastoma occurs primarily in the abdomen in 60% cases but in 8% cases the tumour arises in the orbit where it arises from ciliary ganglion. **To report a rare case of neuroblastoma with ocular proptosis as an initial presentation. Case Report:** A case of seven months old baby who presented with rapidly progressing proptosis within three months. A team of multidisciplinary specialists was conducted to manage the case. **Computerized Tomography Scanner (CT Scan)** showed visible heterogeneous lesions in retrobulbar region, extends from superior orbital fissure to optical chiasm with destruction of the surrounding bone. **Histopathologic diagnosis of neuroblastoma was made. Subsequent medical evaluation including laboratory, chest X-ray, and**

whole body computed tomography showed no evidence of systemic involvement or metastasis. The child was subjected to chemotherapy, but due to late presentation the patient deceased after the first cycle of chemotherapy. Conclusion: Neuroblastoma should be considered in the differential diagnosis of rapidly progressing proptosis in infant. Care must be taken to manage the case aggressively as delayed diagnosis and treatment in rapidly growing tumor would have led to death.

Keywords: Childhood orbital tumors, Neuroblastoma, Primary orbital neuroblastoma

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INTRODUCTION

Neuroblastoma is a pediatric neoplasm that is most common cancer diagnosed during infancy. Male to female ratio is 1,1:1 showing slight preponderance towards males [1–3]. It may originate in the adrenal gland or at any site along the sympathetic [4, 5]. Primary orbital neuroblastoma is rarely reported in adults [6, 7]. Abdominal, thoracic, cervical, and pelvic are frequent sites of primary neuroblastoma locations [2, 8]. Only 8% of neuroblastomas first present with orbital lesion [2, 9]. Ophthalmic involvement occurs in due course,

in more than 50% of cases [1, 5]. There are several ocular manifestations that include orbital mass causing proptosis, ecchymosis, Horner's syndrome, papilledema, nystagmus, extraocular muscle palsy, ptosis, retinal striae [1, 2, 5].

Primary orbital neuroblastoma is especially responsive to treatment unlike those arising from sympathetic chain and adrenal gland [10, 11]. We report a case of primary orbital neuroblastoma.

CASE REPORT

A seven months old boy was referred to the hospital with right eye proptosis since three months prior to admission. Initially, patient had visited a private clinic at the age of 4 months with ocular proptosis on the right eye without any other ocular abnormality (Figure 1). Orbital CT scan was advised to investigate any retrobulbar mass. The result revealed heterogenous (iso-hiperdens) retrobulbar mass impression of the optic nerve (2,9 cm x 3,1 cm x 2,9 cm), the mass urged the orbit to anterior (Figure 2). Based on CT scan findings, patient was suspected as a case of optic nerve glioma and needed consultation and referral to neurosurgery department. Neurosurgeon planned for a tumor extirpation followed by histopathological examination. However, the patient's mother declined the consent for her child to have any surgery due to financial problems. Patient did not have any health insurance at the time and therefore insurance application must be done immediately.

Three months after finishing the insurance administration, the patient came back to our hospital with profound proptosis on the right eye. Ophthalmology examination showed severe conjunctival chemosis and corneal melting (Figure 1). Topical antibiotic was given to reduce corneal infection. Within three months, the proptosis grew very rapidly accompanied by massive chemosis, suggesting a progressive growth from the posterior that have compressed the eyeball anteriorly and destroyed surrounding bones.

On general examination, the child had good nourishment, no palpable abdominal mass, the chest was clear and the cardiovascular system was normal. Complete blood count on this patient declared normal result except platelets (804×10^3 u/L) and leucocyte (11.6×10^3 /uL).

A team of multidisciplinary specialists was conducted to manage this case, including pediatric ophthalmologist, ocular oncologist, pediatric hematologist, neurologist, pediatric surgeon, neurosurgeon and radiologist. A number of differential diagnosis for rapid progression of the proptosis was made including rhabdomyosarcoma, optic nerve glioma, lymphoma and neuroblastoma.

Systemic evaluation for primary site was done. Contrast head CT Scan was performed at the age of 7 months old and disclosed a heterogeneous retrobulbar mass (3.98x5.07x4.35 cm) with relative firm and irregular

edge, the mass compress the orbit to anteriorly extended from superior orbital fissure to optical chiasm in right side and destroyed the surrounding bone Figure 3 (A and B). Abdominal MSCT and chest X-ray examination confirmed normal findings with no sign of metastasis Figure 4(A and B).

Incisional biopsy and histopathology examination were performed and showed tissue sediments from the temporal superior indicate tumor nests among the connective tissue stroma, tumors composed of primitive round nuclear tumor cells, with considerable mitosis, the cells are generally solidly arranged like sheets, some forming structures like rosette, which confirmed a malignant tumor consistent to neuroblastoma (Figure 5).

The diagnosis of primary orbital neuroblastoma was then enforced followed by chemotherapy, as advised from the pediatric oncologist. The child was subjected to six cycles of chemotherapy comprising vincristine 1.5 mg/m^2 , cisplatin 80 mg/m^2 , carboplatin 500 mg/m^2 , etoposide 200 mg/m^2 , and cyclophosphamide 600 mg/m^2 regimens. Unfortunately, because of the late presentation of intracranial metastasis proven by CT scan, the patient deceased after the first cycle of chemotherapy.

DISCUSSION

Based on clinical presentation on first visit, this child was initially suspected as a case of optic nerve glioma. Neuroblastoma was not considered initially as there was no abdominal mass.

Orbital neuroblastoma in children commonly

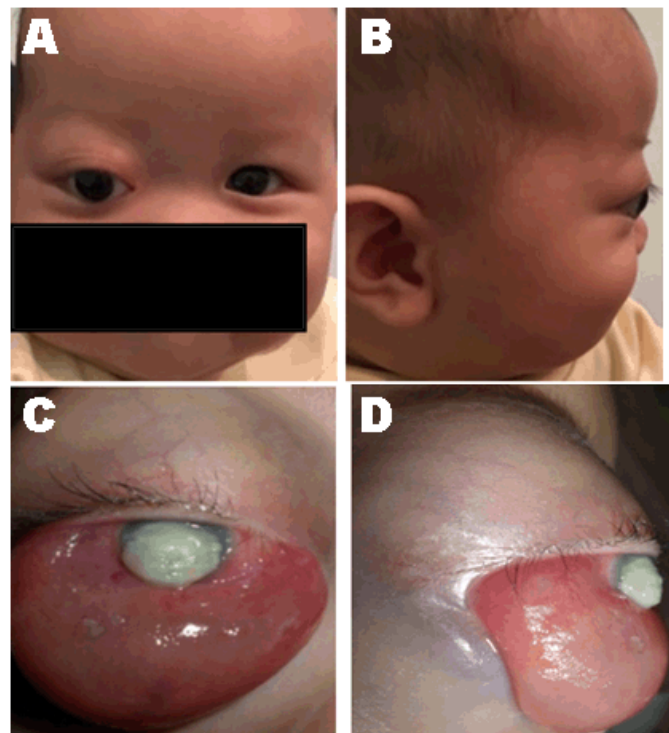


Figure 1(A-D): Clinical presentation at the age of four months (A and B), after three months preoperative view (C and D).

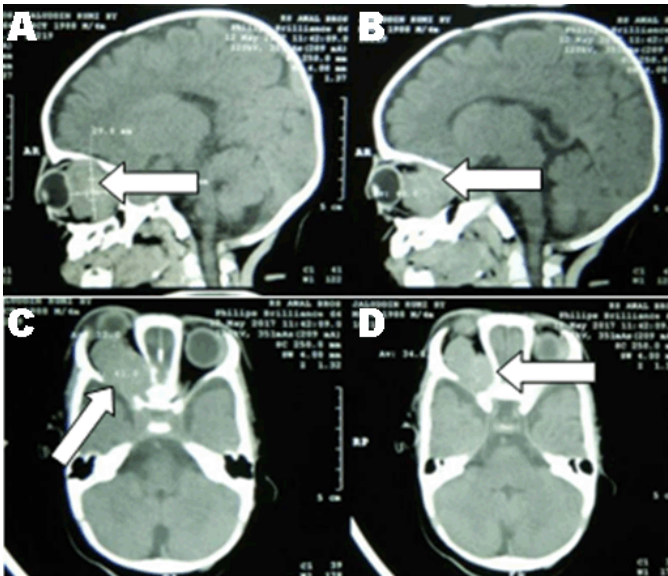


Figure 2(A–D): Computed tomography scan showing retrobulbar mass impression of the optic nerve 2,9cm x 3,1cm x 2,9cm (white arrow)

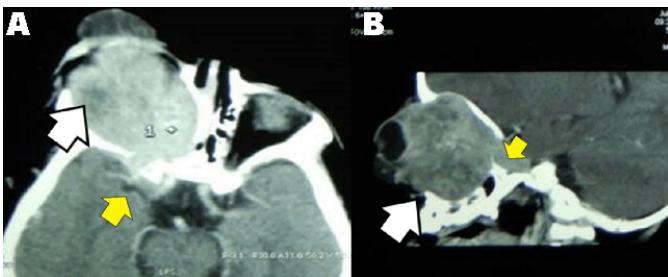


Figure 3(A and B): CT Scan taken 3 months later showing orbital mass with intraocular extension (white arrow) and destroying bone (yellow arrow).

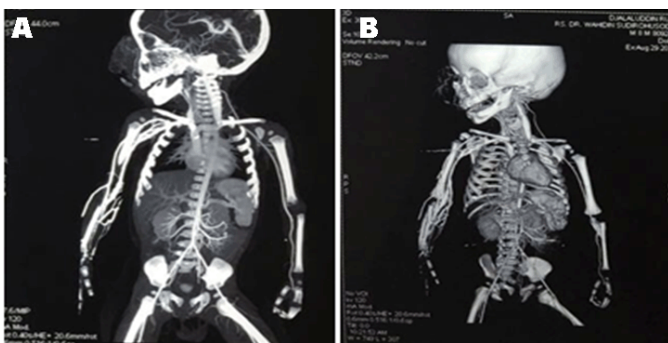


Figure 4(A and B): Abdominal MSCT examination confirmed normal findings.

occurred due to metastasis with primary in the abdomen. The diagnosis of neuroblastoma is often delayed due to its varying and nonspecific presenting symptoms.

It represents second most common orbital tumor in children after rhabdomyosarcoma. It arises from the sympathetic system and ganglia. Rarely neuroblastomas may represent primary lesions in the orbit where they may arise from ciliary ganglion[12].

The rapid progression of proptosis were not suitable

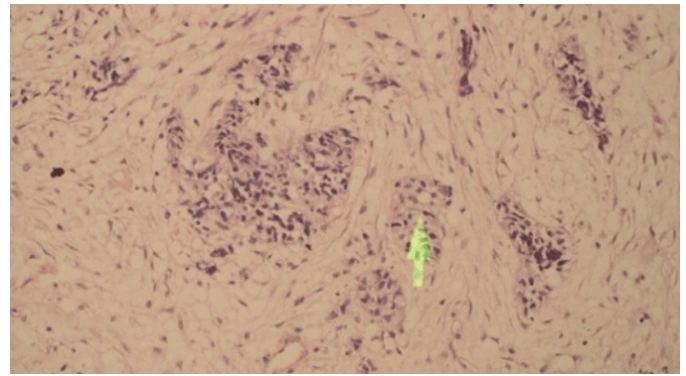


Figure 5: Histopathology examination result tumor cells form a Homer wright pseudorosette structure (yellow arrow).

for optic nerve glioma and lymphoma. Optic nerve glioma is a slow-growing tumor and lymphoma typically occur between 50 and 70 years of age, therefore both of these diagnosis were excluded [13, 14].

Working diagnosis of suspected metastatic neuroblastoma was made after exclusion of other differential diagnosis. Systemic examination also ruled out other primary lesions and any metastasis of primary orbital neuroblastoma. Incisional biopsy followed by pathological features that certainly pointed out neuroblastoma in our case. Primary orbital neuroblastoma in infants is definitely a rare case presentation.

Neuroblastoma is a cancer predominantly seen in pediatric patients. It is the most common extracranial malignancy of childhood and the most common solid tumor of infancy. It is a neoplasm arising from the primordial neural crest cells.

The neural crest is an embryonic structure formed at the beginning of the 4th week of human development. These cells migrate to the trunk to form the sympathetic ganglia and adrenal medulla, however little is known about the molecular events governing the formation and migration of these cells [15, 16].

Sohail et al. found infiltration in the bone marrow and classic rosette forms of whom were suggestive of neuroblastoma [17]. Immunohistochemistry plays an important role in differentiating neuroblastoma from other small round cell tumors such as retinoblastoma, rhabdomyosarcoma, and lymphoma. Tumors cells are stained for neuronal markers such as neuron specific enolase, chromogranin, and synaptophysin which could be helpful in diagnosing neuroblastoma [1, 2].

For treatment of neuroblastoma and its ocular complications, chemotherapy remains as primary approach. Other treatment such as radiation and steroids may have benefit but failed to show good effect. Belgaumi et al. suggests in infants and children with age under 2 years old treatment for prevention of blindness is the most relevant because they have the best chance for cure [18]. Muthukrishnan et al. also report a case of a rapidly progress primary orbital neuroblastoma a two year old patient with excellent response after completion of three

cycles of chemotherapy [1].

The survival rate in neuroblastoma has improved in the past two decades. Approximately 70% of the patients have widespread disease at the time of diagnosis and their responses to radiation and chemotherapeutic agents are variable and transient. The ophthalmologist play a major role in the early diagnosis of neuroblastoma since ocular involvement is seen in approximately 20% of patients with neuroblastoma [19].

The prognosis of neuroblastoma is correlated with age, stage and site of the tumor. Highests survival rate found in children under two years old. 75% children diagnosed before one year of age, and 12% after two years of age [20, 21]. Unfortunately, because of the late presentation of intracranial metastasis proven by CT scan, the patient deceased after the first cycle of chemotherapy.

CONCLUSION

Neuroblastoma can be one of the differential diagnosis in infant who present with progresive proptosis. Systemic and holistic work up should be made immediately, as delayed diagnosis and treatment in rapidly growing tumor would have led to death.

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Author Contributions

Marliyanti Nur Rahmah Akib – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
 Faridah Amien – 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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 Ratih Natasha – Substantial contributions to conception and design, Drafting the article and revising it critically for important intellectual content, Final approval of the version to be published

Guarantor of Submission

The corresponding author is the guarantor of submission.

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Consent Statement

Written informed consent was obtained from the patient for publication of this case report.

Conflict of Interest

Authors declare no conflict of interest.

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