Case Report

Community and Public Health Nursing
Vol. 2 No. 1, January - April 2017
DOI: http://dx.doi.org/10.21088/cphn.2455.8621.2117.12

Optic Nerve Glioma in Child: A Case Study

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Abstract

An optic nerve glioma is a type of brain tumor. There are multiple kinds of brain tumors and glioma's account for approximately one-third of brain tumors. They are typically named after the kinds of cells they affect. It is a rare kind of cancer, they are considered low-grade and do not grow as quickly as other types of brain tumors. They are found in the optic chiasm, where the optic nerves cross, or surround, the optic nerves. They are also referred to as optic glioma or juvenile pilocytic astrocytoma. It is rarely found in individuals over the age of 20. It has also been associated with the genetic disorder neurofibromatosis Type 1, or NF1. Evidence suggests that adult malignant gliomas (glioblastoma) are rare & almost always occur in adult males with a very poor prognosis & almost certain death within one year. Optic-nerve gliomas comprise about 1% of all intracranial tumors and Optic nerve glioma is a slow-growing tumour, which typically affects children. 30% of patients have associated neurofibromatosis type 1& those have better prognosis.However, optic nerve glioma of children is discussed in this article.

Keywords: Optic Nerve Glioma; Juvenile Pilocytic Astrocytoma; Brain Tumors; Malignant Gliomas (Glioblastoma) and Intracranial Tumors.

Introduction

A 7 ½ year old male child was admitted in the paediatric surgical ward on 12/02/2016 with the complaints of diminished vision from past 6 months and moderate to severehead ache on frontal area with one episode of vomiting. The child was apparently normal before 6 months, and his decreased in vision was reported by his school teacher that he is not able to see words in blackboard. He went for routine eye check-up and suggested for improving diet and no other treatment measures were used. The symptoms progress and the child vision worsen with which he started banging on walls and doors and thus continuous diminishing of vision for which he went for 2nd ophthalmologiccheck-up and he was referred to PGI Chandigarh and advised for MRI and the child was diagnosed for brain tumor. Therefore the clint came to AIIMS OPD for the same complaints and paediatric surgeon. The child underwent craniotomy and excision on 3rd march and the tumor was removed and culture was sent for histopathological examination. The incision from frontal area starting from right ear 13 sutures was made to close the incision. The conformation of diagnosis wasoptic nerve glioma. Postoperatively the child was complaining for diarrhoea and head ache.

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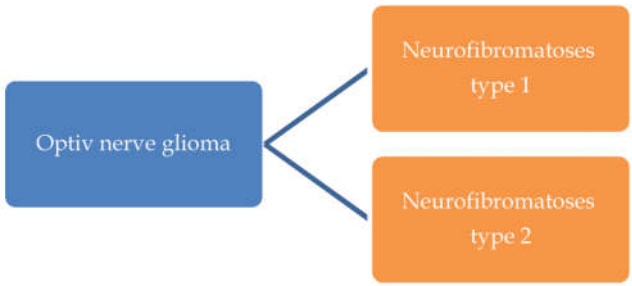
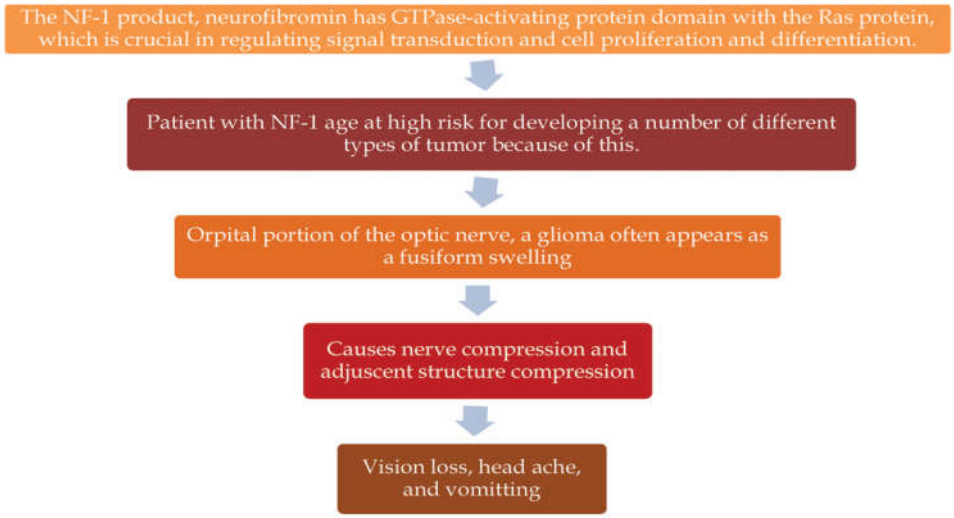
Recived on 19.09.2016, **Accepted on** 12.10.2016

Disease Condition

Book picture	Patient picture
Definition: An optic nerve glioma (also called an optic pathway glioma) is a slow-growing brain tumor that arises in or around the optic nerve, which connects the eye to the brain. As the tumor progresses, it presses on the optic nerve, causing a child's vision to worsen. Blindness can occur, but only in about 5 percent of cases. the tumor sometimes produces additional symptoms as it grows. A low-grade form of this neoplasm, benign optic glioma, occurs most often in paediatric patients. While these are serious tumors, they have a high cure rate.	
Incidence: • Peak incidence occurs in individuals aged 6-7years. • Prevalence of 15% (range, 1.5–24%) • Benign optic glioma occur almost in children, better prognosis • Aggressive glioma occur almost in adult, poor prognosis. • Genetic disorder neurofibromatosis Type 1, or NF1is commonest type in children	Age 7 ½ years Sex: male Race: Asian
Types: 	• Neurofibromatosis type 1
Causes: Unknown chromosomal abnormalities/hereditary genetic disorder environmental or infectious causes can predispose	Unknown
Pathology: 	

Clinical manifestations • **Headache**: due to increased intracranial pressure or hydrocephalus. • **Nausea and Vomiting**: Classic projectile vomiting (frequently without nausea) • **Visionloss** ○ Children are frequently unaware of significant vision loss; nevertheless, this symptom reportedly occurs in 20-60% of paediatric patients with craniopharyngioma at presentation. ○ Anterior extension to the optic chiasm can result in a classic bitemporal hemianopsia, unilateral temporal hemianopsia, papilledema, or unilateral/bilateral decrease in visual acuity. Classically, vision loss starts with a superior temporal field cut. However, the eccentric growth of these tumors can result in varying patterns and severity of vision loss, including decreased acuity, diplopia, blurred vision, and subjective visual field deficits. Children are frequently inattentive to visual loss, and formal testing may be required. ○ **Balance problem** • **Seizures** due to Temporal lobe involvement • **Hyperactive** children with unusual eye movements and even blindness due to extrinsic compression of the hypothalamus. • **Endocrine deficiencies** leads to short stature, Weight gain, Lethargy, Fatigue, Cold intolerance, Dry skin, Dry brittle hair, Slow teething, Anorexia, Large tongue, Deep voice, Myxoedema, Delayed puberty, memory impairment, daytime sleepiness and growth delays	**Before surgery**: Head ache on frontal area Vomiting Partial Vision loss (bitemporal hemianopsia) Unusual eye movement **After surgery:** Head ache Diarrhoea
Diagnosis: • History • Physical examination with neurological exam. • Preoperative intellectual or psychological assessment. • Vision testing • Serum electrolytes levels • Hormonal studies • Skull radiography • Head CT scanning • Brain MRI • Cerebral angiography • Biopsies for Histological studies	• **History**: The child natal history was apparently normal. • **General appearance:** Oriented, conscious, moderate body built. • **GCS score:** Eye 4 verbal 5, and motor 6, • **Vital signs:** stable • **Anthropometr**y: height 154cm, weight 18kg, 1st degree malnutrition (according to Gomez classification). • **Growth and development** seems to be normal. And child was mild hyperactive and have hurried in speech. • **Head to foot:** after surgery suture line are present, partial visual acuity. Unusual eye movement, pupillary dilatation, partial optic atrophy. Extra ocular eye movement abnormalities. Slow teething and deep voice, weight loss. • No other abnormal physical findings. **Investigations:** • **Haematologicalinvestigation**: Hb: 11.3gm/dl, RBC 4.56mc/cum,TLC 7500cells/cumm,DLC-N 90%,E-01%, L-05%, m-04%, platelet – 3.11 lacks/c/cumm, Hematocrit 34.8%. • **Hormonal studies:**T3 level is elevated. • **MRI**: suggestive of possibilitiey of Craniopharyngiomas. • **Histopathologiclaexamination**: suggestive of optic nerve glioma

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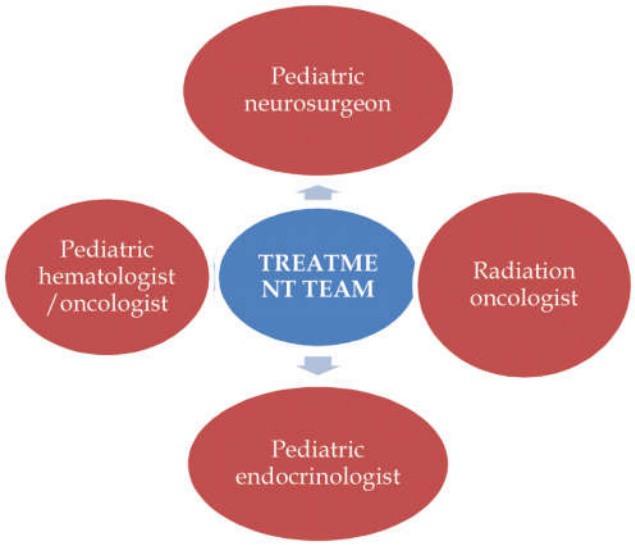
Treatment:

A treatment plan must be carefully individualized for each patient.This need consultation and team work.



- **Observation** only in presumed optic nerve glioma, particularly with good vision on the involved side; with careful follow up if the radiographic evidence**.**
- **Long-term hormone replacement** is the primary medical treatment: intranasal vasopressin (desmopressin acetate [DDAVP]), corticosteroids, thyroid hormones, growth hormones, and sex hormones.
- **Combination chemotherapy** using actinomycin D, vincristine, etoposide, bevacizumab and other agents has also been reported to be effective in patients with progressive chiasmal/hypothalamic gliomas To shrink the tumor and stabilize vision.
- **Radiation therapy** as the sole treatment is considered if the tumor cannot be resected (usually chiasmal or optic tract lesions) and if symptoms (particularly neurological) progress or if the tumor is resistant to chemotherapy
- **Alternative medicine**(acupuncture/acupressure, therapeutic touch, herbal medicine, etc.) to control pain and treatment side effect.
- **Surgical Care**-Surgery is usually not preferred for this type of tumor, but can sometimes relieve symptoms and/or improve vision. Surgical excision in case of rapid intraorbital tumor growth to isolate the tumor from the optic chiasm and thus prevent chiasmal invasion. The surgeon should use an intracranial approach to obtain tumor-free surgical margins.
- Radical surgery
- Conservative surgery alone
- Conservative surgery with postoperative radiotherapy

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- **Medical management**

Tab Valporate 200mg OD (morning)

Tab Veona CR 300 mg OD (evening)

Tab Pantop -20mg OD

Tab Sporlac 120mg TDS

- **Surgical management**

Craniotomy and excision was done

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Complications:

- Hormonal deficiency
- Cognitive difficulties,
- learning disabilities, and
- impairments in growth

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- TSH deficiency
- Diencephalic syndrome (hyperactive with unusual eye movements)

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Prognosisand recurrence	
• Variable • Optic nerve glioma recurrence may take place many years after initial treatment. • It usually recurs in the same place as the original tumor, but can also occur in other parts of the brain or spinal cord. • Local radiation therapy is the usual treatment if the patient has not previously been treated with this modality. • Chemotherapy and radiation therapy are options for patients who have only been treated surgically. • Child with NF-I tend to fare better with respect to growth and visual prognosis. • Most tumor grows slowly or having self limited growth. • Some tumors are more aggressive, resulting in a rapid increase in ispilateral proptosis and visual loss.	• Not evident till date

Nursing Assessment

- Identification of risk factors for exposure to radiation or chemicals that is carcinogenic.
- Identify the signs and symptoms are: headache, vomiting, and decreased vision or double vision.
- Identify any changes in client behaviour.
- Observation of hemiparesis or hemiplegia.
- Changes in sensation: hyperesthesia, parasthesia.
- Observation of sensory changes: asteregnosis (not able to feel the sharp edges), agnosia (not able to recognize objects in general), apraxia (not being able to use the tool properly), agraphia (can't write).
- Observation of vital signs and level of consciousness.
- Observation circumstances fluid and electrolyte balance.
- Psychosocial: personality and behavioural changes, difficulty making decisions, anxiety and fear of hospitalization, diagnostic tests and surgical procedures, a change in the role.

Possible Nursing Diagnosis

1. Ineffective tissue perfusion related to circulatory damage caused by a tumor suppression.
2. Impaired sensory perception decrease visual acuity related to optic nerve compression
3. Pain (Acute / Chronic) related to increased intracranial pressure.

Altered comfort irritability related to increased intracranial pressure

4. Fluid and electrolyte imbalance related to vomiting
5. Impaired family coping related to poor prognosis of the disease
6. Risk for injury related to poor visual acuity.
7. Risk for recurrence related to metastatic nature of the disease
8. Potential for complications vision loss related to poor prognosis of disease
9. Potential for neurological deficit related to poor prognoses and non availability of the chemotherapy and radiation therapy.
10. Knowledge Deficit: the condition and treatment needs related to the inability to know the information.

Conclusion

Having cancer as a child can be socially and emotionally stressful. You or your child may benefit from counselling or a support group. Being around peers his or her own age can be a big support.The survival rate for optic pathway gliomas is near 90 percent.

Older children and those with neurofibromatosis 1 have better outcomes. In fact, two-thirds of children with NF1 experience spontaneous remission of their optic pathway gliomas. Children may suffer a smaller field of vision, which means they do not have peripheral vision.

The odds of complete blindness from these tumors, however, are less than 5 percent. As there is chance of recurrence after treatment, follow-up visits with doctor are necessary to check for any side effects and ensure the cancer has not returned.

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