Nursing Management of Patient with Neurocysticercosis

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**Neurocysticercosis** is the most common parasitic diseases affecting the CNS. It is the lead cause of adult onset of seizure worldwide.

**Case Study**
Venkataramana, 39 years, was admitted to hospital with history of 2 episodes of seizures and complaints of headache and vomiting for one week. C.T. Scan showed hyper dense clarified lesion and MRI shows iso hypointense lesion with oedema. Diagnosis was Ventricular Neurocysticercosis.

Neurocysticercosis is systemic infection produced by the encysted larval form of the Taenia solium tapeworm and is the most common parasitic diseases affecting the CNS.

**Etiology**
The disease is caused by ingestion of water or food (vegetables, raw or uncooked pork) contaminated with the Taenia solium tapeworm. Food may be contaminated if washed with contaminated water or grown in areas that use human faeces as fertilizer.

**Pathophysiology**
Infection is caused by ingestion of food or water contaminated with tapeworm eggs. After ingestion the eggs hatch within the G.I. tract and the parasites penetrate the bowel wall and enter the bloodstream. The organism thus migrate into host tissue such as heart, skeletal muscle CNS structures. CNS infection includes invasion in to brain parenchyma, ventricle or subarachnoid space.

**Signs and Symptoms**
Clinical symptoms depend on the stage of the cyst and the location in the CNS.

**Objective data:**
2. Neurological signs -
   a. Seizures
   b. Cranial nerve abnormalities
   c. Focal neurological deficit
   d. Nuchal rigidity
   e. Altered mental status or increased ICP
   f. Radiculopathy or myelopathy
   g. If cyst is located in the spine.
3. Hydrocephalus:
   Due to obstruction of ventricles by a cyst or decreased absorption of CSF due to the dying cyst in ventricular system. It may become chronic after cyst calcifies.

**Physical Examination:** If the eyes are involved parasites may be seen directly in fundoscopic examination.

**Lab Studies:**
1. Culture - Stool specimen to identify tapeworm and sources of infection only.
2. C.S.F Studies: Increased protein level, decreased glucose level
3. Serology:
   a) Enzyme linked immuno electro transfer blot assay (E.I.T.B)
   b) ELISA Most widely used, is less expensive and more sensitive on C.S.F than E.I.T.B.

**Imaging Studies:**
1. C.T - Normal in early stages, Reveal contract enhancement as cyst dies. Calcification seen clearly.
2. MRI - may be normal in early stages, best for location cyst in ventricles which may float and change location.
3. Radiography - Demonstrates calcification

**Treatment**
A. Antiparasitic agent - These drugs are cisticidal and cause the cyst to begin dying within 2-5 days. Patients with hydrocephalus should undergo surgery for ventricular peritoneal shunt insertion prior to antiparasitic therapy.

1. Albendazole is the drug of choice and is reported to destroy 75% to 99% of parenchymal cysts. Albendazole is more effective than praziquantel against meningeal and ventricular cysticercosis. It does not interact with anticonvulsant.
2. **Praziquantel**: Serum levels are decreased by carbamazepine, phenytoin and dexamethasone, serum levels are increased by cimetidine. Antiparasitic agents should not be used in patients who present with cysticercotic encephalitis.

**B. Corticosteroids**: When a cyst begins to die, the immune system reacts, which causes an inflammatory response that leads to exacerbation of symptoms, steroids are usually given along with antiparasitics to reduce the inflammation.

**C. Anticonvulsants**: Seizures are the most common symptom and occur when the cyst invades the parenchyma.

**Surgical**
Removal or drainage of parenchymal lesion is not typically performed unless the cyst is very large causing increased ICP that is not responding to medication or the procedure is required for diagnostic purposes because laboratory tests are inconclusive.

A ventricular peritoneal shunt may be inserted for hydrocephalus. Endoscopic removal of the cyst can be done.

Venkataramana was treated with Rantac 150 mg, BD, Eptoin 100 mg, Tid, Wysolone 5 mg, Tid, Albendazole 400mg, Tid for 2 weeks, and then BD for 2 weeks. Then endoscopic removal of the cyst was done. After the surgery patient was treated with Ampicillin 500 mg, 6 hrly, Rantac 150, BD

**Potential Complications**
1. Shunt malfunction
2. Seizures

**Nursing care**

**I. Hyperthermia related to effect of inflammation and increased ICP in the hypothalamus secondary to CNS infection.**

**Nursing interventions**
- Administer antipyretic drugs
- Institute cooling measure such as tepid sponging
- Monitor vital sign and level of consciousness
- Monitor WBC count and electrolyte levels
- Administer I/V fluids as ordered. Monitor intake and output closely.

**II. Acute pain related to inflammation of meninges and increased ICP secondary to CNS inflammation**

**Nursing interventions**
- Assess the location, quality and severity of pain and have patient rate pain using 1 to 10 scale or visual analog chart.
- Assess the patient’s behaviour and physiological sign secondary to pain.
- Provide quiet darkened room with minimal disturbance
- Implement comfort measures to promote relaxation eg. Reposition, elevate the head of the bed apply a cool compress to head.
- Initiate non-pharmacological measures for pain control including transcutaneous electrical stimulation, acupuncture, heat, music, relaxation technique.
- Administer analgesics as prescribed.
- Assess patient’s pain, effectiveness of intervention as well as side effect.
- Administer pain medication prior to activities.

**III. Risk for injury related to seizure activity secondary to cerebral irritation.**

**Nursing interventions**
- Implement seizure precaution - plan bed in low position with side rails up and padded, keep suction and oral airway available at bed side.
- During a seizure
  - Protect patient from injury and place patient on his or her side
  - Maintain a patient airway, loosen clothing around neck
  - Do not put anything in patient’s mouth
- Document seizure activity, length of time, description of seizure and postictal characteristics.
- Monitor neurological status and vital signs after the seizure.
- Administer prophylactic AED.

**IV. Increased ICP related to CNS infection**

**Nursing interventions**
- Monitor neurological and vital sign closely.
- Elevate head of the bed 30 degrees with head in alignment to promote adequate venous drainage.
- Suction as needed, avoid aggressive suctioning and tight endotracheal tapes.
- Monitor ICP and EVD closely, records reading and drainage.
- Maintain Normal electrolytes
- Administer stool softeners to avoid Valsalva maneuver.

**V. Hydrocephalus related to cysticercosis**

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Nursing interventions

- Monitor neurological status and vital signs closely.
- Maintain E.V D and record drainage.
- Provide post-operative care for patient with a ventricular shunt.
- Monitor for signs of shunt malfunction.

Conclusion

Mr. Venkataramana was nursed in the Pre and Post Operative Neurosurgery Ward where he could be watched carefully. A cot with railing has been allotted to avoid injuries and was given treatment with aseptic precautions.

Nursing alertness in observation prevented secondary infection and complications. After the surgery symptoms reduced markedly. By eighth day after surgery he got discharged from the Hospital.

References:


SMT R.D. GORDI NURSES TRAINING CENTER

[based on 1990] Shree Indore Credai Market Hospital, M.O.G. Linga Dhar Road, Indore, M.P. 452002. Phone: 230845. 239013

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