



**ANAESTHETIC MANAGEMENT OF CASE OF NORMAL PRESSURE
HYDROCEPHALOUS FOR FRACTURE FEMUR SURGERY**
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ABSTRACT

Normal pressure hydrocephalus is a neurological condition in which there is dilatation of cerebral ventricles with pressure effects on nearby brain tissue. It is chronic disorder often misdiagnosed as Alzheimer's disease or dementia. This patient of 72 yrs age was admitted with medical complaints of altered orientation, instability in gait and electrolyte imbalance with urinary incontinence he also had h/o HT/IHD with 2D ECHO showing hypokinesia, EF% of 30 %. Patient had uncontrolled diabetes, respiratory tract infection patient had fall in ward and developed fracture neck femur which required surgery immediately. After thorough investigation with MRI and neurological opinion patient was diagnosed to have normal pressure hydrocephalus. As treatment for NPH is to remove large quantities of CSF and it was necessary to maintain ICP it was decided to give spinal anaesthesia after removal of CSF of equal volume in order to maintain CSF pressure. Noninvasive method of monitoring as EEG, BIS, CVP, and arterial pressure was done. Patient was successfully managed throughout perioperative period.

Key words: NPH, Spinal Anaesthesia.

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INTRODUCTION

Normal pressure hydrocephalus also termed as Symptomatic hydrocephalus ¹ is a medical disorder caused by expansion of lateral cerebral ventricles and distortion of fibers in corona radiata. It is called normal pressure because despite excess fluid, CSF pressure as measured during spinal tap is usually normal. As brain ventricles enlarge with excess CSF they can disrupt and damage nearby brain tissue causing sign and symptoms of difficulty in walking, incontinence of urine with lack of concern for micturition and problems with thinking and reasoning.

Anaesthetic management of patients with neurological symptoms has dilemma whether general anaesthesia or regional anaesthesia should be used. Regional anaesthesia is preferred because of presence of co morbidities. Through study of literature and careful monitoring of vital parameters even patients with rare and complicated disease can be managed successfully.

CASE REPORT

Here we report a case of 72 year old patient who was admitted with medical complaints of instability in walking, urinary incontinence, and electrolyte imbalance. He was also a case of hypertension, ischemic heart disease with 2D echo showing Regional wall Abnormalities with hypokinesia and dysfunction and ejection fraction of 30%. Patient had uncontrolled Diabetes Mellitus and

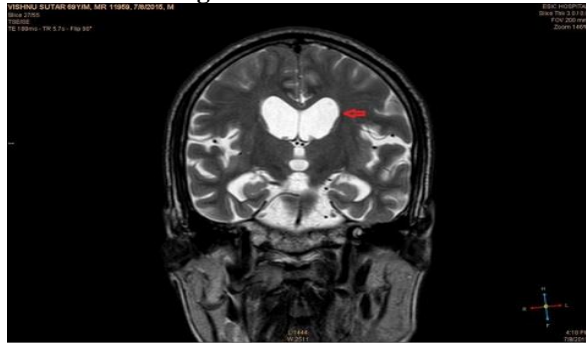
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respiratory tract infection. After admission patient had a fall due to giddiness and develop Right sided fracture Neck Femur which required immediate surgery. Patient was then investigated thoroughly to rule out cause of giddiness. CT-brain was done and showed dilated ventricles. MRI brain showed Normal Pressure Hydrocephalus with age related atrophy [2].

Figure 1. Observation



The third ventricle (arrowhead) is very wide and the hypointensity here signifies turbulent flow of Cerebrospinal fluid. Volume of brain Parenchyma is maintained.

Neurophysician opinion was taken and who advised for repeated lumbar puncture with removal of CSF to see for improvement in symptoms and signs of Normal pressure Hydrocephalus [3]. Cardiologist opinion was taken to stratify risk involved in Surgery. Patient was optimised for control of diabetes and treatment of respiratory tract infection with nebulisation and injectable Bronchodilators and correction of hyponatremia. Human Actrapide Insulin was given for blood sugar level control. Fundoscopy was done and there were no signs of raised intracranial pressure.

Anaesthetic Management

With adequate optimization, patient was taken for surgery with High risk informed consent under ASA grade IV risk. All monitors were attached including BIS monitor to know depth of sedation and function of CNS.

Goal was to avoid increase in intracranial pressure, hypoxia, and hypercarbia and volatile anaesthetic induced increases in cerebral blood flow. As treatment for normal pressure hydrocephalus is removal of CSF fluid it was decided to induce the patient with subarachnoid block with maintenance of CSF pressure with removal of equal volume of CSF.

Under all aseptic precautions subarachnoid block was given with prior removal of 3ml of CSF under guarded approach and drug -0.5% hyperbaric Bupivacaine 3ml supplemented with 25 mcg of Fentanyl was given.

Epidural was avoided as volume required will be high and may cause increase intracranial tension which would be detrimental.

Intraoperative sedation was avoided because of h/o dementia and disorientation.

Patient was maintained with adequate oxygenation and vitals were monitored. Hypotension was avoided and was maintained with fluids according to central venous pressure.

Duration of surgery was around 2 hours. Patient maintained vital parameters throughout perioperative period.

Surgery was uneventful. Patient was shifted to ICU for further observation and medical management and was watched for signs of raised intracranial tension.

Choice of Anaesthetic Technique

According to Literature repeated lumbar puncture was used for diagnosis as well as treatment for most of cases with Normal Pressure Hydrocephalus with improvement in signs and symptoms [4]. So subarachnoid block was given with removal of CSF equal to amount of drug volume injected.

DISCUSSION

Normal pressure hydrocephalus (NPH) is a clinical symptom complex caused by the build-up of cerebrospinal fluid. This condition is characterized by abnormal gait, urinary incontinence, and (potentially reversible) dementia. It is rare and chronic disorder and it is often misdiagnosed as Alzheimer or Parkinson's there are two types of NPH mainly primary or idiopathic and secondary to trauma, tumour, or post neurological surgery [5].

The diagnosis of Normal Pressure Hydrocephalus depend on signs and symptoms and expert neurological examination is required MRI is necessary for diagnosis which shows dilated ventricles with normal brain tissue as compared to Alzheimer's which shows shrinkage of brain tissue. High volume spinal tap with repeated lumbar puncture – showing improve in signs and symptoms is performed.

This patient was admitted with disorientation, irritable behaviour, incontinence of urine and was getting treatment for hyponatremia developed Fracture neck femur because of instability of gait

Patient was optimised for Hypertension, deranged blood sugar levels, electrolyte imbalance and Lower respiratory tract infection.

Most important goal for management was to maintain normal CSF pressure

Factors affecting intracranial pressure are

- 1) Cerebral blood flow
- 2) Cerebral metabolic rate
- 3) Blood pressure

4) To prevent hypoxia, hypercarbia

Geriatric patient are at high risk for anaesthesia and surgery because of co morbidities. This patient requires careful clinical and biochemical examination. Patient had altered sensorium hence regional Anesthesia was preferred

Patient was then referred for ventriculo-peritoneal shunting and further Neurosurgical opinion as researches have not found effective non-surgical treatment [6].

CONCLUSION

Thus it was a rare case of Normal Pressure Hydrocephalus with Hypertension, Diabetes mellitus, Ischemic Heart Disease and Electrolyte imbalance and Lower Respiratory tract infection posted for Fracture neck femur was managed successfully with subarachnoid block with maintenance of CSF pressure. With study of literature and careful

monitoring of vitals parameters even patients with rare and complicated diseases can be managed successfully.

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CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

STATEMENT OF HUMAN AND ANIMAL RIGHTS

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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