Immediate Post-operative Outcome following Lumbo-Peritoneal Shunt Surgery in Idiopathic Intracranial Hypertension

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Abstract:

Background: *Idiopathic intracranial hypertension is a benign condition which is associated with headache and visual disturbance.*

Introduction: *Patients were diagnosed with IIH with Dandy's criteria and were treated with lumbo-peritoneal shunt system.*

Materials and methods: *This is an observational study. The study was done from September 2013 up to January 2015. Six patients were operated on. They were followed up to 15 days after surgery. They were evaluated with confrontation test, visual field analysis and fundal photograph, both preoperatively and post operatively.*

Results: *All patients had improvement of symptoms with decreased headache and in improvement in visual acuity.*

Key Words: *Headache, Idiopathic intracranial hypertension, Lumboperitoneal shunt, Optic nerve sheath fenestration, Papilledema, Venous sinus thrombosis, Ventriculoperitoneal shunt.*

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Introduction:

Idiopathic intracranial hypertension (IIH), is a heterogeneous group of conditions characterized by increased intracranial pressure with no evidence of intracranial mass, hydrocephalus, infection (e.g. chronic fungal meningitis),or hypertensive encephalopathy. IIH is thus a diagnosis of exclusion. There is a juvenile and an adult form. It is also known as pseudotumor cerebri and benign intracranial hypertension.

Idiopathic intracranial hypertension (IIH), or pseudotumor cerebri, was originally described as *meningitis serosa* by Quincke in 1893. He reported several cases of increased intracranial pressure (ICP) without a brain tumor.[1] It is a common problem in neurological practice is that of the patient with papilloedema who, on investigation, is found to have neither a brain tumour nor other space-occupying lesion, nor indeed any very well defined cause to explain it.[2]

Idiopathic intracranial hypertension (IIH) is a challenging disorder with a rapid increasing incidence due to a close relation to obesity. The onset of symptoms is often insidious and patients may see many different specialists before the IIH diagnosis is settled[3].

IIH occurs most commonly among women. The prevalence is approximately 1 case/100,000 women but increases to 13 cases/100,000 women of ages 20 to 44 years who are 10% above ideal body weight and 19 cases/100,000 women of ages 20 to 44 years who are obese (>20% above ideal body weight). Depending on the exact criteria used, large proportions of patients in virtually all series were obese. Most studies demonstrated an age of onset between 11 and 58 years, with a mean of approximately 30 years. Men are affected less frequently. The incidence is 0.3 cases/100,000 men but increases to 1.5 cases/100,000 obese men

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(>20% above ideal body weight). Female-to-male ratios are approximately 4.3:1 to 8:1. (1) More than 93% of people with idiopathic intracranial hypertension (previously called pseudotumour cerebri and benign intracranial hypertension) are obese.[4]

The overall incidence of idiopathic intracranial hypertension is approximately two per 100,000, but is considerably higher among obese individuals and, given the global obesity epidemic, is likely to rise further.[5] Digre and Corbett emphasized; these modified Dandy criteria must be metfor a condition to be called IIH. (1) This criterion implies that the diagnosis may be established in asymptomatic patients with papilledema.[6]

The only major complication is visual loss. Early series reported that some 10% of affected eyes could end up blind. More recent studies have shown some degree of visual loss in up to 85% of cases if carefully sought.[7]

Among all patients (n = 353), the prevalence of those without papilledema was 5.7% (n = 20). Patients without papilledema reported photopsias (20%), and were found to have spontaneous venous pulsations (75%) and non-physiologic visual field constriction (20%) more often than did those with papilledema.[8]

Advantages of Lumbo-peritoneal shunting are that there is no direct involvement of visual pathways. It is readily obtained in neuro-surgical departments. The disadvantages include shunt obstruction, low-pressure headache, subdural haematoma, catheter migration/dislocation, radiculopathy/sciatica, back pain/arachnoiditis, shunt-related infection/meningitis, abdominal pain/infection/haemorrhage, tonsillar herniation, syringomyelia, and rarely death[7].

The risk of shunt obstruction was three times higher amongst the LP shunts, where there was a 2.5-fold increase in risk of shunt revision (9). Eggenberger and coworkers79 studied lumboperitoneal shunt retrospectively in 27 IIH patients. While initially successful, 56% required a shunt revision. Rosenberg and colleagues80 reported on 37 IIH patients that underwent 73 lumboperitoneal shunts and nine ventricular shunts with modest success (38% of patients successfully treated after one shunting procedure). Shunt failure occurring in 55% and low-pressure headaches in 21% were the most common causes for reoperation. The vision of most patients improved or stabilized from the procedure, but three who had initially improved later lost vision and six had a decrease in vision postoperatively. Serious complications occurred in 3.6%. Other series are similar81, 82 with the conclusion that there is initial success but at least half need reoperations. Also, when the procedure is done primarily for headache relief, long-term success is only about 50%.83 in hospital mortality for new shunts is a surprising 0.5% with 0.9% for ventricular shunts and 0.2% for lumbar shunts.[10]

The revision rate for lumboperitoneal shunts ranges from 38% to 64%, with an overall revision rate of 52% (78 of 150 cases). The number of revisions per patient is 2.3% to 6.6% (mean 3.9%), but this value may be skewed because of the small number of reported patients. The reported interval between shunt placements to first revision is 9 to 27 months. Major causes of shunt failure include catheter obstruction, low ICP, catheter migration, and lumbar radiculopathy.[11]

Postoperative visual acuity did not differ between ONSF (76.4 ETDRS equivalent letters) and shunt (76.4 letters), although there was a trend toward worse preoperative acuity in the ONSF cohort. Final MD was significantly better after shunt (“9.23 dB) compared to ONSF (“17.29 dB), U=52.0, p=0.036. Preoperative papilloedema was qualitatively worse in the ONSF group.[12]

Post-operatively, significantly fewer patients experienced declining vision and visual acuity improved at 6 (p¼0.001) and 12 months (p¼0.016). Headache continued in 68% at 6 months, 77% at 12 months and 79% at 2 years post-operatively. Additionally, post-operative low-pressure headache occurred in 28%. Shunt revision occurred in 51% of patients, with 30% requiring multiple revisions.[13]

Headache and vomiting was observed in 368 (90%) and 327 (80%) cases respectively. Two hundred and eighty six patients (70%) had fever. Fundoscopy revealed papilledema in 326 (80%) cases. Eighty (20%) cases had seizures and pupillary abnormality and hemiparesis was seen in 32 (8%) cases. The neurological status was evaluated on the basis of Glasgow Coma Scale. A total of 30 patients died following surgery; nine died within 6 months[14]. IIH patient management should include serial perimetry and optic disc grading or photography. Then, the proper therapy can be selected and visual loss prevented or reversed. Although there is no evidence

based data to guide therapy, there is an ongoing randomized double blind controlled treatment trial of IIH investigating diet and medical therapy.[15]

Materials and method:

This is an observational study which included IIH patients. A total of six (n=6) patients were diagnosed with IIH were treated with LP shunt in the Department of Neurosurgery of NINS from September 2013 up to January 2015. All patients were females. The average patients were between 18 to 45 years. After proper history taking, neurological examination and relative investigations were done.

Their MRI was Normal, Visual field was compromised and fundus showed signs of bilateral papilloedema.

All patients were treated with Lumbo-peritoneal shunt system manufactured by Surgiwear© Inc. all patients were regularly followed up and sutures were removed on day 8 to 10.

All the patients were followed up after surgery. They were clinically monitored for surgical as well as for their visual complications. The surgical symptoms looked for were wound infection, shunt infection, spinal headache. Other symptoms were visual acuity and dimness or deteriorating vision. Fundoscopy, visual field analysis and fundal photograph was done to asses visual symptoms on the 10th post-operative day.

Results:

Six patients were treated for IIH with Lumboperitoneal shunt system. All patients presented with Headache, Vomiting and visual disturbances. After surgery all patients had improved.

Table-I

Outcome of patients after surgery (n=6)

Symptoms/signs	No. of pt. improved	Percentage
Headache	6	100%
Vomiting	6	100%
Visual dimness	6	100%
Papilloedema	6	100%

According to the table 1, all patients had benefitted from surgery. Their headache, vomiting and visual problems had improved. Their papilioedema had improved following surgery which was observed with ophthalmoscope and confirmed by fundal photography.

Table-II

Post-operative Complications

Complications	No. of patients	Percentage
Spinal headache	4	66.66%
Wound infection	0	0
CSF leakage	0	0
Meningitis	0	0
Intestinal obstruction	0	0
Shunt revision	0	0

According to table 2, four patients (66.66%) out of 6 had suffered from spinal headache. No patients had suffered from wound infection, CSF leakage, Meningitis, intestinal obstruction , and shunt revision. They had unremarkable recovery.

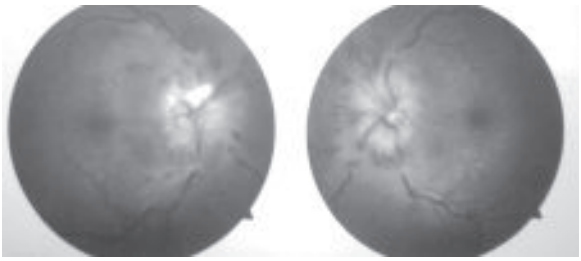

Fig.-1: *Pre-operative fundal photograph*

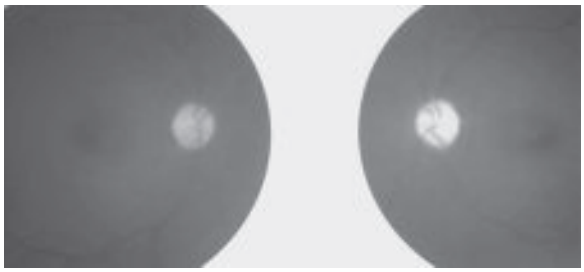

Fig.-2: *Post-operative fundal photograph*

Discussion:

Lumbo- peritoneal shunt is a standard procedure for Idiopathic intracranial hypertension. In our study six patients were treated with lumboperitoneal shunt system. They had excellent recovery from surgery and they had no short time complication. Four patients developed spinal headache which resolved after four days.

No patients developed any other complication. This is also true for studies by other investigators. Wound infection is common for any surgical procedure. In this study no infection was seen. Many patients develop intestinal obstruction following surgery.

Meningitis and CSF leak is also seen. But in this study none were noted whatsoever.

Conclusion:

Lumboperitoneal shunt surgery is a good treatment for Idiopathic intracranial hypertension. It is not an alternative to othr modalities. The lumboperitoneal shunt surgery is a good option for relieving patients from headache and blindness. In our instituition it is safe and relatively complication free. However longterm followup is needed for a better result.

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