

## PER-OPERATIVE FINDINGS OF BLOCKED VENTRICULOPERITONEAL SHUNT: A STUDY OF 72 CASES

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**Background:** Most patients with hydrocephalus are treated with ventriculo-peritoneal (VP) shunt placement; however, malfunction is common and is usually caused by mechanical failure. The aim of this study was to evaluate the per-operative findings accompanying presumed VP shunt malfunction. **Methods:** This is a descriptive study of 72 patients operated for shunt malfunction in the Department of Neurosurgery, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar from January to December 2008. Presenting symptoms and signs, clinical shunt function, operative findings and outcome were recorded. **Results:** Common presenting features were vomiting, irritability and general toxic look of patients. Male to female ratio was 3:1. Upper end block was observed in 39 patients while lower end and reservoir block was noted in 13 and 2 patients respectively. Choroids plexus was found in 29.2% of cases with upper end block, shunt revision was performed in most of cases (80.6%). **Conclusion:** The importance of clinical features cannot be overlooked in a patient with shunt malfunction. Upper end block due to choroids plexus is common operative finding.

**Keywords:** VP shunt, shunt malfunction, choroid plexus

### INTRODUCTION

Most patients with hydrocephalus are treated with ventriculo-peritoneal (VP) shunt placement; however, malfunction is common and is usually caused by mechanical failure.<sup>1</sup> Most cases of shunt malfunction are due to occlusion of the proximal ventricular catheter.<sup>2</sup> In majority of the cases infection is the cause of shunt malfunction when a distal malfunction is suspected.<sup>3</sup> The incidence of VP shunt malfunction requiring revision is up to 70%.<sup>4</sup> The presentation of shunt block may undoubtedly be with what might be termed 'classical' symptoms, namely headache vomiting and drowsiness.<sup>5</sup> This study was carried out to determine the per-operative findings of blocked VP shunt.

### PATIENTS AND METHODS

This study was carried out at the Department of Neurosurgery, Government Lady Reading Hospital Peshawar from January to December 2008 on 72 consecutive surgically treated cases of blocked VP shunt. The signs and symptoms, clinical status of shunt function, and per operative findings were analysed using SPSS-11.

### RESULTS

A total of 72 patients with shunt malfunction were operated from January 2008 to December 2008. The age groups of the patients are given in Table-1.

There were 54 (75%) male and 18 (25%) female patients with a male to female ratio of 3:1. Majority of the patients presented with features of raised intracranial pressure in the form of loss of

consciousness in 26 (36.1%) and vomiting in 57 (79.2%) patients. Most of the paediatric age group patients presented with irritability 43 (59.7%).

Pre-operatively clinical status of shunt function was determined which showed upper end block in 41 (56.9%), lower end block in 15 (20.8%), infected shunt tract in 10 (13.9%) patients.

CT scan of the brain was obtained in suspected upper end block and X-Ray erect abdomen in suspected lower end block patients. CT brain showed dilated ventricles in 40 (55.6%) and peri-ventricular oedema in 30 (41.7%) while in 2 (2.8%) patients the scans were reported normal. In 11 (15.3%) patients of lower end malfunction, X-Ray erect abdomen showed peritoneal catheter lying extra peritoneal.

Operative findings of blocked VP shunt are given in Table-2. Choroids plexus causing ventricular catheter block was identified in 21 (29.2%) while debris in ventricular catheter were noted in 29 (40.3%) of patients. Suboptimal ventricular catheter length was found in 27 (37.5 %) which was long in 24 (33.3%) and short in 3 (4.2%) of cases. Shunt revision was performed in 58 (80.6%), new shunt insertion in 10 (13.9%) and only removal of the malfunctioning shunt in 4 (5.6%) of patients.

**Table-1: Age groups of the patients**

Age group (years)	Number of patients	%
<1	14	19.44
1-14	42	58.33
15-45	10	13.88
>45	6	8.33
<b>Total</b>	<b>72</b>	<b>100</b>

**Table-2: Operative findings of blocked VP shunt**

Per-operative findings	Number	%
Upper end block	39	54.2
Lower end block	13	18.1
Reservoir	2	2.8
Both ends block	4	5.6
Infected shunt tract	8	11.1
Patent shunt	6	8.3
<b>Total</b>	<b>72</b>	<b>100</b>

## DISCUSSION

Ventriculo-peritoneal shunts are widely used for treating hydrocephalus. These devices are prone to malfunction with up to 70% requiring revision. Shunt infection and obstruction comprise the majority of malfunctions and usually present dramatically.<sup>4</sup>

Ventriculo-peritoneal shunt insertion is one of the commonest procedures in neurosurgical practice. A significant problem encountered in shunt procedure is infection, with infection rate ranging from 2–27%.<sup>6-10</sup> In the current study infected shunt was noted in 10 (13.9%) of cases.

In the largest reported cohort of 1719 patients, 56% experienced at least one episode of shunt block in the 12 years following insertion.<sup>11</sup> Lazareff and colleagues reported 44% prevalence of shunt malfunction including block.<sup>12</sup>

In our study upper end block was noted in 54.2% of cases per operatively, in whom 29.2% were due to invagination of choroid plexus while debris in ventricular catheter were responsible for block in 40.3% of cases. Most of patient with congenital hydrocephalus have maximally dilated ventricular system. In these cases optimum length of ventricular catheter is required for proper shunt function, as the openings in catheter can easily slip out of ventricle upon a CSF drainage and ventricular collapse. In the present study suboptimal ventricular length was found in 37.5% of cases. The importance of prompt diagnosis and operative treatment of blocked VP shunt cannot be overemphasised. Death or major neurological sequelae, including blindness, are well described sequelae of delayed treatment.<sup>13</sup>

Shunt revision was done in 86.6% and new shunt insertion in 13.9% of cases. In 5.6% of cases infected shunt removal was performed only.

## CONCLUSION

The presentation of acute shunt block is heterogeneous. Shunt malfunction should be considered in a patient having headache, vomiting, and irritability or drowsiness. Choroid plexus invagination into the ventricular catheter is the commonest cause of upper end block.

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