

# The Subjective Experience of Patients Undergoing Shunt Surgery for Idiopathic Normal Pressure Hydrocephalus (iNPH)

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## Figure 1. Semi-structured interview template used to conduct patient interviews.

Figure 1. Interview template

### Preoperative Experiences

Please describe how you were doing prior to neurosurgery and the events that lead you to see a neurosurgeon.

How did you make the decision whether or not to have shunt neurosurgery? What factors did you consider?

What did you hope to gain from the surgery?

Was there any anxiety surrounding the surgery and what factors were responsible?

### Postoperative Outcomes

What was the most significant benefit that you experienced after shunt surgery?

Has your ability to walk improved after shunt surgery? Describe how you feel it has improved.

Has your ability to clearly think improved after shunt surgery? Describe how you feel it has improved.

Have your urinary symptoms improved after shunt surgery? Describe how you feel they have improved.

### Patient Reflections

Are you satisfied with your decision to have shunt surgery? Are you satisfied with the outcome after surgery? Please explain.

What were some things the neurosurgeon did well or did not do well in your interactions?

Is there anything during the course of your illness and treatment that you would have done differently?

What have been the most difficult things for you throughout the course of your illness?

How would you counsel another patient with normal pressure hydrocephalus? Would you recommend shunt surgery? What things would you discuss with them?

Other than what the doctors told you, did you use any outside resources or information?

## Results

Thirty-one patients who underwent shunt surgery for iNPH were interviewed to reach saturation of themes. Seven themes were identified: 1) long preoperative course causes morbidity; 2) the decision to have shunt surgery is easy to make; 3) patients primarily desire to gain independence; 4) patients display variable levels of anxiety; 5) comorbid conditions interfere with postoperative assessment; 6) patients stand by their decision to have shunt surgery; 7) outside information is utilized prior to surgery.

Table 1. Patient characteristics (n=31)

Characteristic	Number of Patients (%)
<b>Age</b>	
Median	77 years
Range	64 - 90 years
<b>Sex</b>	
Male	14 (45%)
Female	17 (55%)
<b>Race</b>	
Caucasian	29 (94%)
African-American	1 (3%)
Asian	1 (3%)
<b>Medications</b>	
Anti-hypertensive	23 (74%)
Lipid lowering	19 (61%)
Anti-platelet or anti-coagulation	17 (55%)
Anti-diabetic	10 (32%)
Anti-psychotic	4 (13%)
Anti-depressant	15 (48%)
Benzodiazepine	8 (26%)
Anti-Parkinson's disease*	4 (13%)
Cognition enhancing**	6 (19%)
<b>Comorbid cardiovascular disease</b>	
Any	26 (84%)
Hypertension	21 (68%)
Hyperlipidemia	15 (48%)
Coronary artery disease	8 (26%)
<b>Comorbid neurological disease</b>	
Stroke	7 (23%)
Alzheimer's disease	0 (0%)
Parkinson's disease	3 (10%)
<b>Other comorbid condition</b>	
Diabetes mellitus	10 (32%)

\* includes carbidopa-levodopa and rasagiline

\*\* includes rivastigmine, donepezil, and memantine

Table 2. Patient preoperative symptoms and outcomes after shunt surgery (n=31)

Characteristic	Number of Patients (%)
<b>Preoperative symptoms</b>	
Gait disturbance	31 (100%)
Cognitive impairment	22 (71%)
Urinary incontinence	25 (81%)
<b>Duration of preoperative symptoms</b>	
≤ 1 year	21 (68%)
> 1 year	10 (32%)
<b>Time between surgery and interview</b>	
Median	30 months
Range	16 - 56 months
<b>Patient reported outcome at interview</b>	
Gait improvement	23 (74%)
Cognitive improvement	10 (45%*)
Urinary improvement	11 (44%**)
<b>Other interview information</b>	
Satisfied with shunt surgery	25 (81%)
Would recommend surgery to another patient	28 (90%)
Caregiver participated in interview	12 (39%)

\* represents 10 out of 22 patients

\*\* represents 11 out of 25 patients

## Conclusions

Patients often present to the neurosurgeon frustrated and desperate after a long preoperative course. It is important to acknowledge the uncertainty regarding diagnosis and response to shunting when counseling patients. Comorbid conditions interfere with the ability to assess progression of iNPH and the effectiveness of the shunt. Patient caregivers play a large role in decision-making and clinical course, and should be included when counseling patients.

## References

- Mori E et al. Guidelines for management of iNPH (2nd edition). Neurol Med Chir (Tokyo) 52:775-809;2012.
- William MA et al. Diagnosis and management of iNPH. Neurol Clin Pract 3:375-85;2013.

## Learning Objectives

To understand the subjective experience of patients with iNPH who undergo VP shunt insertion.