

# PRESSURE-RELATED SYMPTOMS OF ISOLATED CSF HYPERTENSION IN HEADACHE SUFFERERS

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## Background

Absence of papilledema makes the diagnosis of isolated CSF hypertension difficult. The objective of this study is to identify the pressure-related symptoms of idiopathic intracranial hypertension without papilledema (IIHWOP) in headache sufferers.

## Materials and methods

We prospectively performed 1 hour-lumbar CSF pressure monitoring through a spinal needle in order to measure CSF opening pressures and to monitor the CSF pressure in 134 consecutive headache sufferers suspected of having high CSF pressure without papilledema or sixth nerve palsy. All patients underwent a complete neurological and ophthalmological evaluation, Trendelenburg positioning test, brain MRI, and cerebral MR venography (Figure 1) before lumbar puncture (Figure 2).

Patients	
Age, y, mean ± SD	39.7 ± 13.9
Sex, F/M	17/117
Body mass index, kg/m <sup>2</sup> , mean ± SD	29.6 ± 6.2
Headache duration, y, mean ± SD	5.2 ± 7.1
<b>Headache diagnoses, n (%)</b>	
Chronic migraine	95 (71%)
Chronic Tension-type headache	39 (29%)
<b>Headache profile, n (%)</b>	
Unilateral	38
Bilateral	96
Pulsating	92 (68)
Moderate	89 (66.5)
Severe	45 (33.5)
Overuse medication	26 (19)
<b>Patient's disability score</b>	
Beck Depression Inventory-II (BDI-II), mean±SD	12.4 ± 9.7
Hamilton Anxiety Scale (HAMA), mean±SD	16.1 ± 9.1
Migraine Disability Assessment (MIDAS), mean±SD	27.1 ± 25.3
Normal Brain MRI	134 (100)

Table 1 Demographic and characteristics of 134 headache sufferers suspected of having high CSF pressure

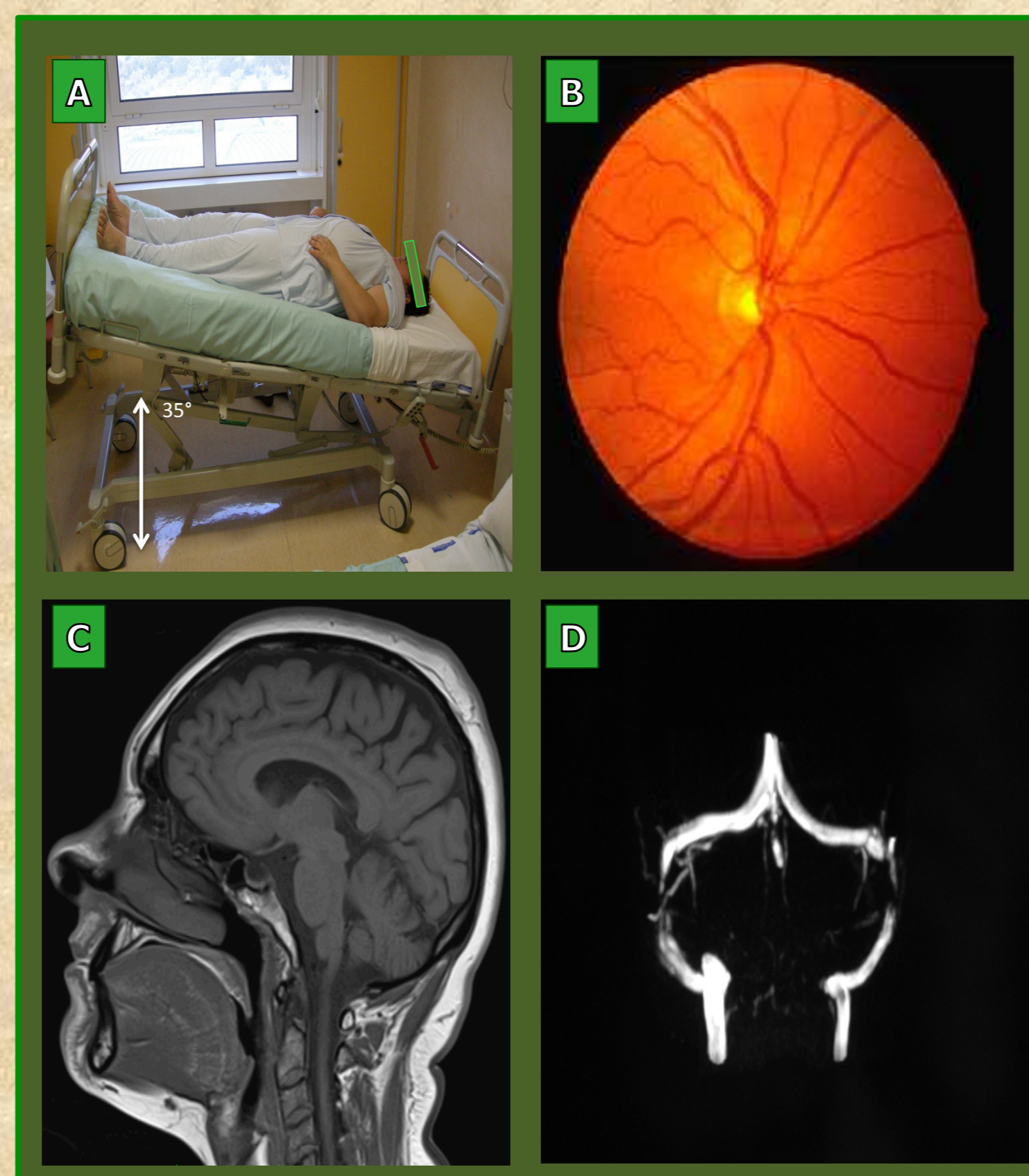


Figure 1. Patients assessment  
A. Trendelenburg positioning test.  
B. Ophthalmological evaluation.  
C. Brain MRI.  
D. Cerebral MRI venography

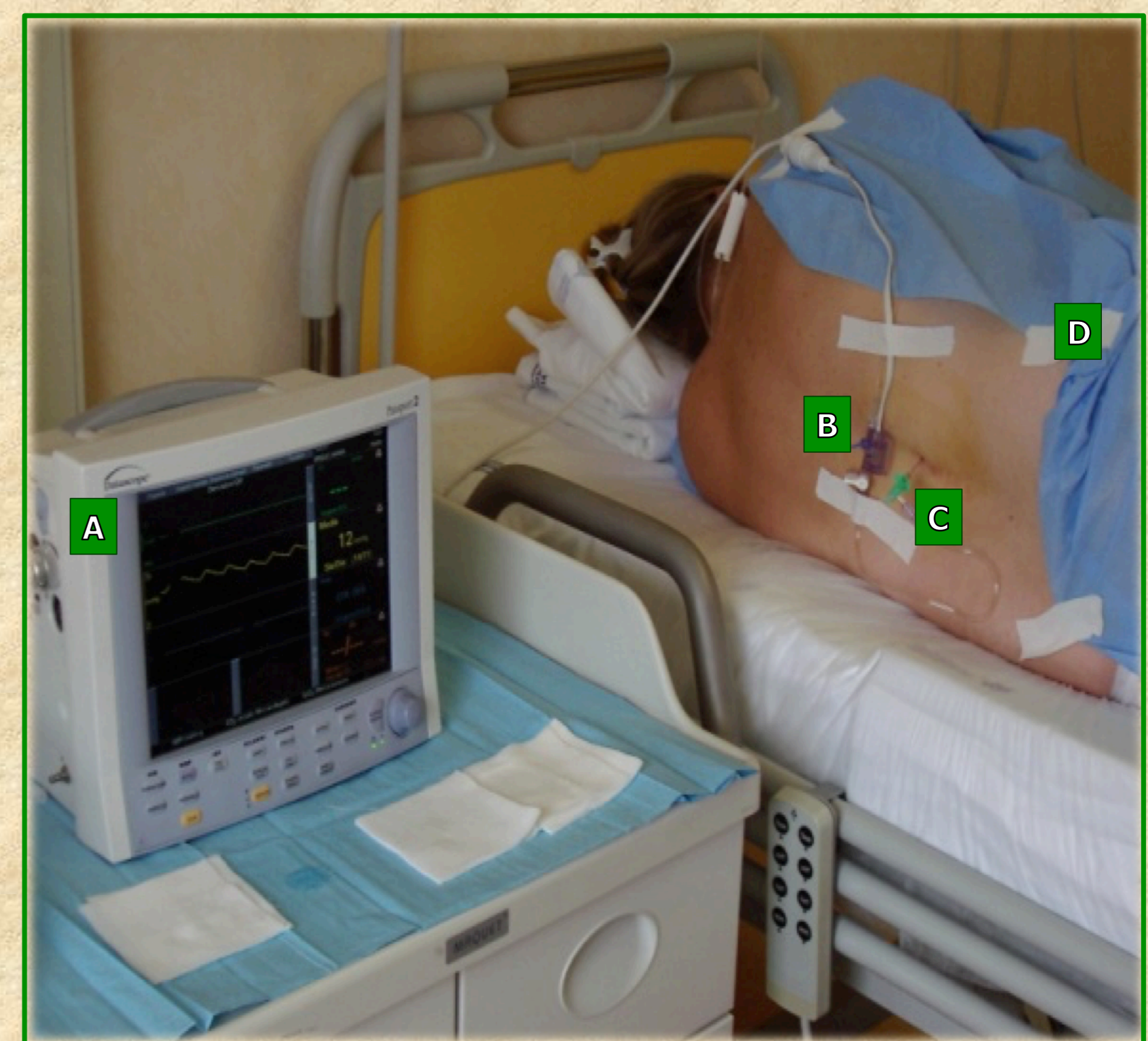


Figure 2. Short-term lumbar CSF pressure monitoring in a patient suspected of having high CSF pressure.  
A. Monitor.  
B. Pressure transducer.  
C. Spinal needle.  
D. Patient in lateral decubitus position.

## Results

Out of 134 headache sufferers, 79 patients had isolated CSF hypertension without papilledema. The most of these had postural headache with nocturnal head pain attacks. Severe headaches and visual disturbances with intracranial noise are common in 2 patients with higher CSF pressure (> 300 mmH<sub>2</sub>O), while chronic headache and vertigo occurred in 20 patients with CSF pressure between 250 and 300 mmH<sub>2</sub>O. Less severe CSF-pressure elevation (from 200 to 250 mmH<sub>2</sub>O) with abnormal CSF pressure waves was also detected in 57 patients with moderate chronic headache and tinnitus. Bilateral transverse sinus stenosis was detected in two thirds of the patients. (Table 2.)

Characteristics	Opening pressure < 200mmH <sub>2</sub> O (n=55)	Opening pressure 200-250 mmH <sub>2</sub> O (n=57)	Opening pressure 250-300 mmH <sub>2</sub> O (n=22)
<b>CSF pressure measurement's values</b>			
CSF opening pressure (mmH <sub>2</sub> O); mean ±SD	138.7±28.1	231.8±12.4	282.2±32.3
CSF mean pressure (mmH <sub>2</sub> O); mean ±SD	154.3±26	228.3±15.5	301±36.9
Peak (mmH <sub>2</sub> O); mean ±SD	196.9±32.1	316.2±45.8	398.1±60.7
B Waves, n (%)	1 (2)	38 (66)	15 (68)
<b>Headache profile, n (%)</b>			
Unilateral headache	15 (27)	17 (30)	9 (41)
Bilateral headache	31 (56)	40 (70)	13 (59)
Pulsating	39 (71)	29 (51)	17 (76)
Severe	5 (4)	45 (79)	18 (81)
Daily	15 (27)	30 (53)	13 (60)
Nocturnal headache	4 (7)	22 (39)	14 (62)
Postural headache	0	46 (80)	18 (81)
<b>Associated symptoms, (%)</b>			
Visual disturbances	0	23 (41)	11 (49)
Tinnitus	11 (20)	27 (48)	13 (59)
Vertigo	8 (14)	16 (28)	7 (30)
Other	0	2 (3)	0
<b>Radiological features</b>			
Full or partially empty sella	4 (7)	33 (58)	15 (68)
Bilateral Transverse Sinus Stenosis	0	39 (68)	17 (76)

Table 2 Pressure-related features of 134 headache patients (79 with IIHWOP and 55 with normal CSF pressure) and comparison of CSF pressure values.

## Discussion and Conclusions

Postural and nocturnal headaches are linked to posture/sleep-related changes in CSF pressure.

Intracranial noise, tinnitus, and visual disturbances are fluctuating symptoms due to spontaneous intermittent daily CSF pressure pulsations.

Our data show that there is a continuous, graded, relationship between CSF pressure elevation and features of isolated CSF hypertension without papilledema.

