

INTRA-ABDOMINAL PRESSURE: THE NEGLECTED VARIABLE IN SELECTING THE VENTRICULOPERITONEAL SHUNT FOR TREATING HYDROCEPHALUS

Juan Sahuquillo, M.D., Ph.D.

Department of Neurosurgery,
Neurotraumatology and Neurosurgery
Research Unit,
Vall d'Hebron Research Unit,
Vall d'Hebron University Hospital,
Autonomous University of Barcelona,
Barcelona, Spain

Fuat Arıkan, M.D.

Department of Neurosurgery,
Neurotraumatology and Neurosurgery
Research Unit,
Vall d'Hebron Research Unit,
Vall d'Hebron University Hospital,
Autonomous University of Barcelona,
Barcelona, Spain

Maria A. Poca, M.D., Ph.D.

Department of Neurosurgery,
Neurotraumatology and Neurosurgery
Research Unit,
Vall d'Hebron Research Unit,
Vall d'Hebron University Hospital,
Autonomous University of Barcelona,
Barcelona, Spain

Montserrat Noguer, M.D.

Department of Anesthesiology,
Neurotraumatology and Neurosurgery
Research Unit,
Vall d'Hebron Research Unit,
Vall d'Hebron University Hospital,
Autonomous University of Barcelona,
Barcelona, Spain

**Francisco Martínez-Ricarte,
M.D.**

OBJECTIVE: In the selection of a ventriculoperitoneal cerebrospinal fluid shunt, the intra-abdominal pressure (IAP) is traditionally neglected as a result of the idea that its value is close to 0 mmHg. Our aim was to explore the relationship between body mass index (BMI) and IAP with the goal of providing clinically relevant data that could help neurosurgeons to estimate IAP and select the appropriate shunt for patients with hydrocephalus and especially those with normal-pressure hydrocephalus syndrome.

METHODS: Sixty patients requiring the placement of a ventriculoperitoneal shunt were included in the study. We determined weight, BMI, and IAP. IAP was measured through an intraperitoneal catheter during the shunt surgery. To determine whether a linear relationship existed between quantitative variables, linear regression analysis was used.

RESULTS: BMI was 28.1 ± 4.8 kg/m². Eighteen patients (30%) had normal weight, 21 (35%) were moderately overweight, and 21 (35%) were obese. IAP was related to patient BMI. A significant positive linear correlation was identified between BMI and IAP ($r = 0.52$; $P = 0.018$) with a slope of 0.31 ($P < 0.001$) and an intercept of -5.5 .

CONCLUSION: In our study, we determined that IAP had a strong positive linear relationship with BMI. This correlation was independent of sex. An IAP of 0 mmHg can, therefore, only be assumed for patients with a normal BMI who are recumbent. In obese or overweight patients, neurosurgeons should take IAP into account when selecting both the most adequate differential pressure valve to be implanted and in which distal cavity to place the distal catheter to avoid shunt underdrainage induced by high IAP.

KEY WORDS: Body mass index, Cerebrospinal fluid shunts, Hydrocephalus, Intra-abdominal pressure, Normal pressure hydrocephalus, Ventriculoperitoneal shunts