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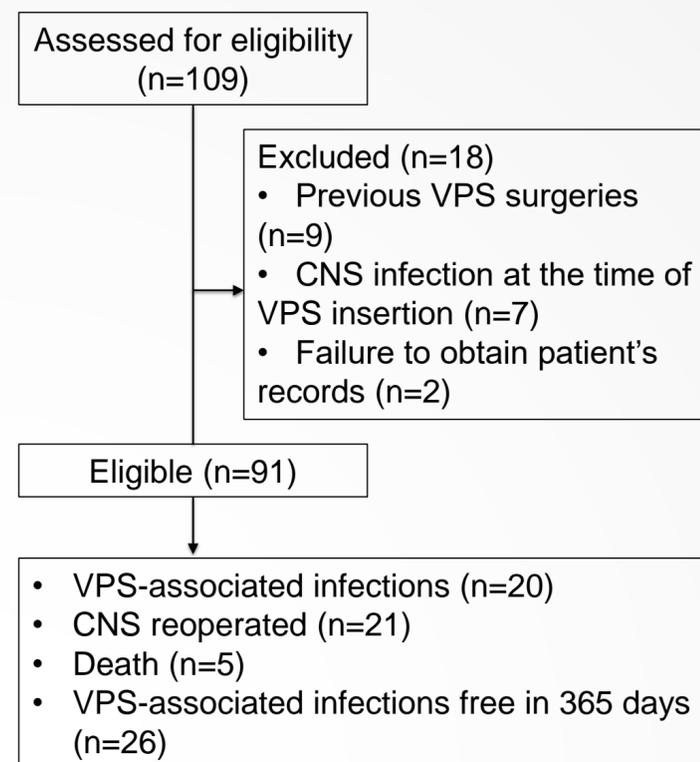
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**Background:** Ventriculoperitoneal shunting (VPS) is the most common neurosurgical procedure to treat patients with hydrocephalus, an abnormal accumulation of cerebrospinal fluid (CSF) in the brain. Tackling VPS-associated infections, nonetheless, remain a challenge. Its prevalence can range from 0.19% to 50%<sup>1</sup>, and average from 10% to 20%. Higher prevalences are associated to higher neurological morbidity, mortality and expenditures, covering antimicrobial therapy and shunt reinsertion. Studies suggest that the implementation of a full institutional, technical and behavioural, protocol for VPS is the best strategy for lowering the risk of these infections. This study aims to determine the prevalence of VPS-associated infections at one quaternary health centre, and some of its underlying risk factors.

**Material/methods:** Retrospective cohort single-centre study that followed for up to 365 days, from January 2013 to December 2015, patients who underwent elective VPS at Irmandade da Santa Casa de Misericórdia de São Paulo, a quaternary hospital in São Paulo, Brazil. Were considered eligible individuals who underwent elective first-time VPS insertions. The primary endpoint was shunt-associated Central Nervous System (CNS) infection. Alternative endpoints

were other CNS-surgeries, death, evasion and absence of shunt-associated CNS-infections in 365 days. Data noted over hydrocephalus aetiology, age, sex, CSF cytological, biochemical and culture analysis, blood leucocytosis (>12,000 leukocytes/mm<sup>3</sup>), high protein C reactive (>5mg/dL), haemoculture, other CNS-surgeries, and date of infection diagnosis were obtained from patients' records, CNS infection diagnosis were adapted from the CDC/NHSN criteria<sup>2</sup>, defined as: (1) occurs until 365 days after surgery; and (2) happens not before nor after shunt insertion; with (3) positive CSF culture; or (4) positive CSF cytology/biochemistry in the presence of compatible clinical signs or extensive antibiotic use (when clinical information on patients charts were short). We assumed from experience at our service, a 20% VPS-associated infection prevalence, estimating a sample size of 105 individuals, in a 5% confidence limit and 80% power. Categorical variables are presented in frequencies and Chi-square analysis, whereas continuous variables in means and standard-deviation and t-Student analysis. We considered values for p≤0.05 statistically significant. Epi Info 7® software was used for analysis.

**Results:** 109 patients underwent elective VPS in the institution from January 2013 to December 2015. Of these, 18 were excluded, of which nine had previous VPS, seven had CNS infections by the time of the operation, and in two, the patient's records were not available. 91 individuals were found eligible for the study (following flow-chart).



Overall, mean age was 30.4 years and sex ratio 1.1 men/woman. The most frequent aetiologies were CNS-malformation (25.2%) and neoplasm (20.8%), whereas the least was trauma (6.6%). 35.1% of subjects underwent CNS-reoperation in the following 365 days, 34.4% of these, due to CNS-malformation. Shunt-associated CNS-infection prevalence was 21.9% (CI 95% 13.9 - 31.8), at a mean of 32.6 days after surgery (SD 21.4). Half of the infected subjects were less than 17 years old, and common aetiologies were CNS-malformation and post-infectious diseases (30% each). We found no significance between such factors and VPS-associated infections (Table 1). 15% of the patients presented a positive blood culture (one Gram-negative rod and two *Staphylococcus aureus*) and 60% a positive CSF culture (three Gram-negative rods and nine *Staphylococcus aureus*).

**Table 1. Comparison of shunt infection rates among the categories of variables among patients (univariate analysis)**

Variable	Total number of patients (n=91)	Patients with infection (n=20)
Age		
mean/median	30.4/21	28.3/11.5
Paediatric (<18 years)	46.1%	50%
Adults (≥18 years)	53.9%	50%
Male sex	53.8%	65%
Underlying neurosurgical condition		
CNS malformation	25.2%	30%
CNS neoplasm	20.8%	20%
Post-infectious	18.7%	30%
CNS haemorrhage	18.7%	15%
Normal-pressure hydrocephalus	15.4%	15%
Trauma	6.6%	5%

**Conclusions:** The VPS-associated CNS-infection prevalence and in our institution is similar to the higher end of the 20% average of other centres. We acknowledge our insufficient sample size. These results, nevertheless, reinforces the need of a full institutional preventive protocol for VPS and the study of potentially institutional risk factors.

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2. Horan TC, Andrus M, Dudeck MA. CDC/NHSN surveillance definition of health care-associated infection and criteria for specific types of infections in the acute care setting. Am J Infect Control 2008 Jun;36:309-32.