

A REAPPRAISAL OF CONTRIBUTING FACTORS LEADING TO SHUNT INFECTION

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Infection is a frequent complication of shunt operations which lead to prolong hospital stay, 3 times more operative procedures than the non-infected cases and have twice the fatality rate¹, with a reported incidence varying from 3.3%^{2,3} to 23%⁴, although very low rates (0.4%) have been reported by Choux and colleagues⁵ by the use of meticulous surgical techniques. In this study we reviewed the incidence of CSF shunt infections in our practice and tried to identify the contributing factors.

We looked into 121 patient notes that underwent ventriculo-peritoneal, ventriculo-atrial, ventriculo-pleural and lumbo-peritoneal shunt procedures between 1994 to 1999. All these patients received pre, per and post operative antibiotics.

TYPES OF SHUNTS (NEW)

Types	Frequency n=97
Ventriculo peritoneal	83(85.57%)
Lumbo peritoneal	10(10.3%)
Ventriculo pleural	03(3.09%)
Ventriculo atrial	01(1.03%)

Table 1

Out of 121 patients, 65 patients were females and 56 males. The total number of shunts procedures performed in these patients was 151. Age of patients ranged from 1month to up to 83 years. Ten patients were less than 6 months of age. The total number of shunt procedures done was 151. In these 151 patient, 97 patients underwent 1st time shunt procedures, which included 83 Ventriculo peritoneal, 10 Lumbo peritoneal, 3 Ventriculo pleural and 1 Ventriculo atrial shunts (Tble-1). The rest had revision of shunts (51 VP, 2 LP, and 1 VP) Table-2).

TYPES OF SHUNT (REVISION OF SHUNT)

Types	Frequency n=54
Ventriculo peritoneal	51(94.4%)
Lumbo peritoneal	02(3.7%)
Ventriculo pleural	01(1.9%)

Table 2

COMPLICATIONS

Complications	Frequency n=151
Primary infection	01 (0.66%)
Secondary infection due to ruptured appendix and colon	02 (1.32%)
Total	3 (1.98%)

Table 3

The review of these 121 patients showed only three cases of shunt infection (Table-3). All were adults (2 males, 1 female) and in all of them shunt was inserted 1st time. Among the three, only one was true infection, which was caused by staphylococcus epidermis. While in remaining two, it was secondary to infection in the abdomen (Due to ruptured appendix and perforated colon).

We also looked into surgeon rank and found that 69 of shunt procedures were performed by consultants and the rest 82 by trainees. We also considered the time factor and found that the duration of surgery ranged from 30 to 180 minutes. The variation in time taken by different surgeon was due to surgeon skill and experience and also time taken for shunt revision. The total no of infected cases were 3(2 male and 1 female), however among these 3, only one was truly infected, which was due to staph. epidermidis, while the remaining two was due to primary infection in abdomen due to perforated colon and ruptured appendix.

This study was conducted to evaluate the importance of different factors contributing to shunt infection. In an early study by Mollman et al⁶, the incidence of shunt infection was high (5 to 20%) in the presence of factors such as young age of the patient, operation performed by junior registrar, longer duration of operation and in shunt revision.

However our study did not find any correlation between these factors and the incidence of shunt infection. The lower infection rate (0.7%) in our study is due to a strict aseptic technique and the prophylactic use of antibiotics. The benefit of strict aseptic technique had also been confirmed by Choux and colleagues⁵ and the efficacy of prophylactic use of antibiotics was reported in an

early study by Z. Kinderchir et al, who showed 3.27 times greater risk of infection in those who did not receive antibiotics than those who did.²

Our results highlight the importance of strict aseptic technique and the prophylactic use of antibiotics in the prevention of shunt infection. However for further confirmation, a double blind, randomized prospective study is needed.

REFERENCES

1. Waters BC, Hoffman HJ, Hendrich EB, Humphreys RP. CSF shunt infection: Influences on initial management and subsequent outcome. *J Neurosurgery* 60: 1014.
2. Walters BC, Hoffman HJ, Hendrick EB, Humphrey RP. Decreased risk of infection in CSF shunt surgery using prophylactic antibiotics, a case control study. *Z Kinderchir* 1985; 40(suppl 1): 15-8.
3. Overton MC, Snodgrass SR. Ventriculo-venous shunts for infantile hydrocephalus. A review of five years' experience with this method. *J Neurosurg* 1965; 23: 517.
4. Schoenbaum SC, Gardner P, Shilotto J. Infections of cerebrospinal fluid shunts: epidemiology, clinical manifestations and therapy. *J Infect Dis* 1975; 131: 543.
5. Choux M, Genitori I, Lang D, Lena G. Shunt implantation: reducing the incidence of shunt infection. *J Neurosurg* 1992; 77: 875.
6. Mollman HD, Haines SJ. Risk factors for postoperative neurosurgical wound infection. A case control study. *J Neurosurg* 1986;64(6):902-6.

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