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Conservative management of cerebrospinal fluid shunt infections

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Background

Brown *et al.* [1] published a favourable experience with treatment of *Staphylococcus coagulase* negative (SCoN) caused cerebrospinal fluid shunt (CSF) infections without surgery using Rifampin (Rif). We have presented our management of CSF shunt infections, in part indicating surgery is not needed for some cases. This paper is to further describe our experience over the last 45 years.

Materials and methods

We describe a retrospective review of prospectively collected data stored in two computer databases for 3,889 shunt related operations involving 1,226 patients. Infections were defined as positive cultures of the CSF or the shunt. Antibiotic levels in the CSF and Minimal Bactericidal (MBC) levels are expressed in ug/ml. Operative procedures as part of the treatment were complete shunt removal, ventriculostomy, antibiotics (abx) until CSF was sterile, then replacement of the shunt ((CSR+V+abx+R), externalization of the distal limb + abx + replacement + (Ex+abx+R) and other procedures. Analysis was by transfer to Excel files, Fisher Exact and Student t-test. A cure was defined as 16 months without recurrent infection or a new infection with another organism.

Results

195 infections (5.0% of shunt procedures) involved 176 patients (15.9%) of which 62 were due to SCoN organisms (32%), 122 that were insensitive (61%), including

41 due to *Staphylococcus aureus* (21%), 13 (7%) due to Enterococcus, 15 *E. coli* (8%), and 14 due to other sensitive organisms (concentration of CSF antibiotic ≥ 10 mcg/dl) including *Streptococcus pneumoniae* (5; 1:245) and *Hemophilus influenzae* (9; 1:136). 28 of S Co N were treated medically of which 22 (79%) were cured. The proportion of cures was not different compared to CSR+V+abx+R 38 of 42 (90%), Fisher Exact $P = 0.5$, but better when compared to Ex+abx+R = 6/12 (50%), $P = 0.01$. Severity of infection, as measured by white blood cell count in the CSF, was the same for the medically treated (Mean 217, Range 0–939) and those with surgery (Mean = 368, Range 1–1380), t-test $P = 0.3$. When polymorphonuclear cells alone were evaluated, the similarity remained, $P = 0.48$.

Conclusion

1) Rifampin and another antibiotic, to prevent resistance, can cure some S Co N shunt infections. 2) Patients with CSF shunts should be immunized against *H. influenzae* and *S. pneumoniae*, 7 valent under 2 years of age with addition of 23 valent agent for older and after age 2 years.

References

1. Brown EM, Edwards RJ, Pople IK: **Conservative management of patients with cerebrospinal fluid shunt infections.** *Neurosurgery* 2006, **58**:657-664.