Clinically appraised topic (11/11/10)

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Lumbar Puncture in Pediatric Bacterial Meningitis: Defining the Time Interval for Recovery of Cerebrospinal Fluid Pathogens After Parenteral Antibiotic Pretreatment
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Study design:
Retrospective study involving the pediatric population at children’s Hospital San Diego
1st study to try to “determine duration of a time interval within which previous parenteral antibiotics will not affect CSF culture studies” per authors’ claims.

Population:
Children admitted between 1/1/92-12/31/96 with diagnosis of bacterial meningitis or suspected bacterial meningitis

Inclusion criteria:
- CSF culture +
- CSF Ag + and CSF wbc>10
- CSF gram stain + and wbc>10
- Blood culture + and wbc>100
- CSF wbc>4000

Exclusion criteria:
- CSF viral study + and no known bacterial pathogen
- Neural tube defect, CSF shunt/catheter
- Penetrating cranial injury
- Neurosurgical procedure in the previous month

Intervention: Parenteral antibiotic administration

Comparisons: LPp (patient who received LP before start of parenteral antibiotics), LPp/p (patient who had LP before and after parenteral therapy), LPd (patients who had LP only after parenteral therapy)

Outcome: Yield of CSF cultures by organism and time from antibiotic administration

Summary of results:
1. In patients who had LP before start of parenteral therapy (including those who had oral antibiotic exposure before the LP) 92% had culture positive LP
2. In patients who had LP after parenteral therapy 30% had culture positive CSF
3. In patients who had LP before any antibiotic therapy (oral or parenteral) 97% had culture positive LP
4. In patients who had only oral antibiotic therapy before LP 67% had culture positive CSF
5. In LPp/p group all cultures became negative after 3 hours of parenteral antibiotics
6. CSF cultures became sterile the fastest in the case of *N. meningitidis* infection (all cultures negative after 3 hours of parenteral therapy)

Study validity:
There are significant limitations due to the design of the study: retrospective study, results depend on the assumption that documentation was done accurately, small number of patients in each group, no statistical analysis looking at significance of change in culture characteristics, type/course/dosage of antibiotic therapy not standardized.

Also in applying results to adult patient population, there is the challenge of dealing with different pathogen risks and antibiotic regimens.