Review: adjuvant corticosteroid therapy reduces death, hearing loss, and neurological sequelae in bacterial meningitis


Clinical impact ratings IM/Ambulatory care ★★★★★ Internal medicine ★★★★★ Neurology ★★★★★ Infectious disease ★★★★★

Q In children and adults with acute bacterial meningitis (ABM), is adjuvant corticosteroid therapy more effective than placebo for reducing mortality, hearing loss, and neurological sequelae?

METHODS

Data sources studies were identified by searching the Cochrane Central Register of Controlled Trials (2003), Medline (1966 to January 2003), EMBASE/Excerpta Medica (1974 to April 2002), and Healthline (1988 to April 2002); reviewing current trials published before April 2002; scanning reference lists; hand searching abstracts of congresses; and contacting researchers and experts.

Study selection and assessment studies in any language were selected if they were randomised controlled trials that compared any type of corticosteroid therapy to an antibiotic with placebo in patients with ABM and recorded case fatality rates. Two reviewers independently assessed the quality of studies using the Jadad scale.

Outcomes mortality, severe hearing loss (bilateral hearing loss > 60 dB or requiring bilateral hearing aids), and short term (discharge to 6 wk) or long term (6 to 12 mo after discharge) neurological sequelae.

MAIN RESULTS

18 studies (1853 patients) met the selection criteria. Overall, fewer patients who received corticosteroids died than those who received placebo (table). Fewer patients in the corticosteroid than in the placebo group had severe hearing loss (table). Children with ABM from pathogens other than Haemophilus influenzae who received corticosteroids also had a reduced risk of hearing loss (RR 0.42, CI 0.20 to 0.89). Although the groups did not differ in 7 studies for short term neurological sequelae (RR 0.72, CI 0.48 to 1.06), the corticosteroid group had a reduction in risk of long term neurological sequelae (table). Groups did not differ for adverse events.

CONCLUSION

In children and adults with acute bacterial meningitis, adjuvant corticosteroid therapy reduces mortality, hearing loss, and long term neurological sequelae.

For correspondence: Dr D van de Beek, University of Amsterdam, The Netherlands. d.vandebeek@amc.uva.nl

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Commentary

ABM remains one of the most catastrophic of infectious diseases. Victory against ABM requires the same strategies used against other life threatening infectious diseases: prevention (with vaccination and effective public health measures), killing of invading organisms, and suppressing the host’s deleterious immune response. Although recent vaccine developments against ABM have shifted the proportion of infections to adults in developing countries, ABM continues to threaten both children and adults in developing countries.

Failed treatment of ABM is rarely a bug and drug problem despite recent concerns about drug resistant pneumococci and meningococci. The fact that a host’s immune response causes the bulk of neurological morbidity in ABM (which can be attenuated by adjunctive corticosteroids before administering antibiotics) has been supported by extensive animal research. Vancomycin does not cross the rabbit blood brain barrier effectively when meningeal inflammation is reduced, raising the concern that corticosteroids might reduce the effectiveness of vancomycin in humans. However, in children with ABM caused by cephalosporin resistant pneumococci, cerebrospinal fluid penetration of vancomycin seems unaffected by adjunctive use of corticosteroids.1

van de Beek et al should be commended on a sound review of the effect of corticosteroids on ABM in children and adults. A similar meta-analysis done with fewer eligible studies reached similar conclusions for childhood ABM and remained cautious regarding the use of corticosteroids in adults with ABM.2 More importantly, a recent randomised controlled trial by de Gans et al showed that corticosteroids were beneficial in ABM, especially in pneumococcal meningitis (which has the gravest prognosis).3 Corticosteroids should be given as early as possible in all cases of ABM, using the published dose of dexamethasone, 10 mg every 6 hours in adults, or 0.4 to 0.6 mg/kg per day divided in 4 daily doses for children for 4 days. Ideally, dexamethasone should be administered before the antibiotics.

Andrew M Morris, MD, MSc
McMaster University
Hamilton, Ontario, Canada