Central Nervous System Bacterial Meningitis

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Introduction

Meningitis is a severe acute infectious disease caused by several microorganisms, including viruses, bacteria, parasites, and fungi. Fatality rates associated with this disease can be as low as 2% in infants and children, and as high as 20–30% in neonates and adults. Transient or permanent deafness, or other neurological sequelae, arise in up to a third of survivors. Since their advent, antimicrobial agents have had a profound effect on the clinical course and prognosis of meningitis.[1]

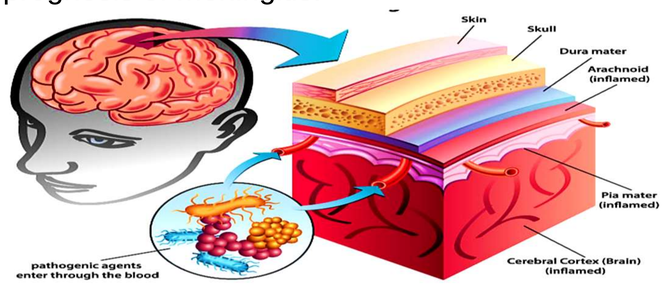


Figure (1) Breach of blood-brain barrier by infection of meninges

Twelve year outcomes following bacterial meningitis

- A prospective cohort of 166 children, aged 3 months to 14 years, admitted to the Royal Children's Hospital, Melbourne with bacterial meningitis was established during October 1983 to September 1986. Overall, eight children died, leaving a cohort of 158 survivors. Between 1991 and 1993, 130 of the surviving cohort were evaluated at a mean age of 9 years and a mean of 7 years since their meningitis.[2]
- During 1996 and 1997,109 meningitis survivors who participated in the seven year follow up study were reassessed at a mean of 12 years after their meningitis.[3]

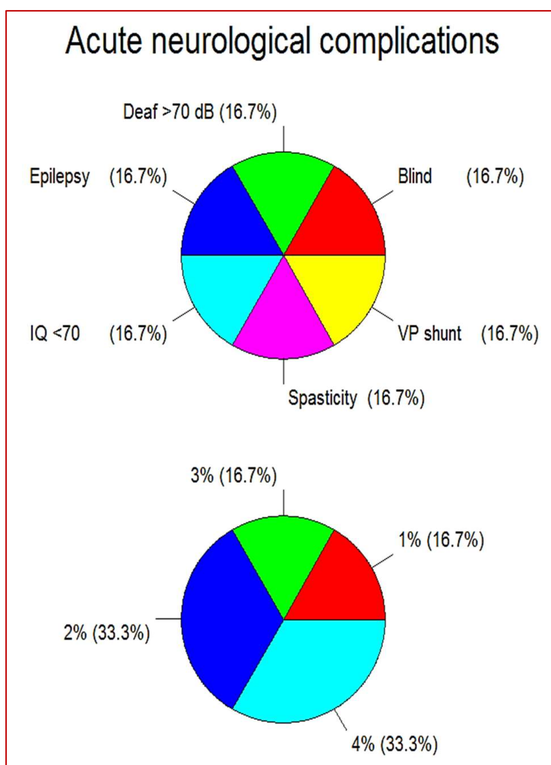


Chart (1) Major impairment

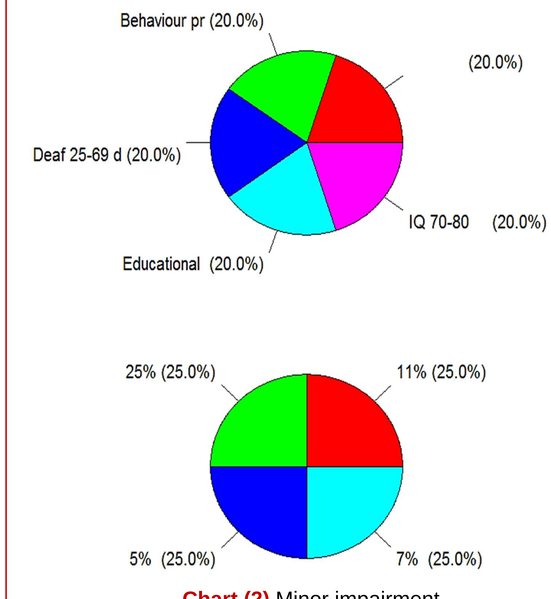
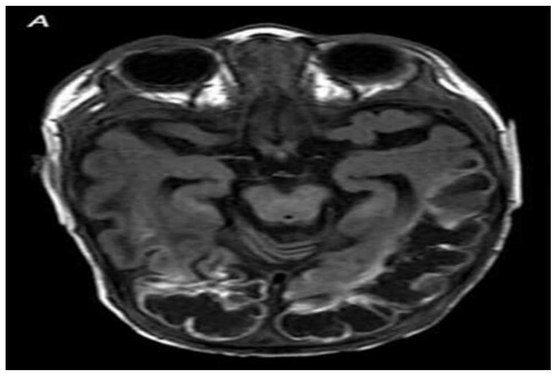


Chart (2) Minor impairment

MRI can predict neurodevelopmental outcome of meningitis

Figure (2-3)
MRI, T1 weighted sequence performed at postnatal day 9 of a full-term neonate who developed GBS meningitis on the first day after birth.[4]



A) Extensive bilateral lesions in the occipital lobes. [4]

B) Extensive bilateral lesions in the thalamus. [4]

Conclusion

According to the prospective cohort outcomes bacterial meningitis in children is associated with substantial excess risk of intellectual, cognitive, and auditory impairment that persists into adolescence.

References

1. Sáez-Llorens X, McCracken G. Bacterial meningitis in children. The Lancet. 2003;361(9375):2139-2148. doi:10.1016/s0140-6736(03)13693-8.
2. Grimwood K, Anderson VA, Bond L, et al. Adverse outcomes of bacterial meningitis in school-age survivors. Pediatrics 1995;95:646–56.
3. Grimwood K,Nolan TM,Bond L,Anderson VA,Catroppa C, Keir E. Risk factors for adverse outcomes of bacterial meningitis. J Paediatr Child Health 1996;32:457–62.
4. Bok L, Martis J, Halbertsma F, van Straaten H, Groenendaal F. Brain imaging and neurodevelopmental outcome of Group B streptococcal meningitis in neonates. European Journal of Paediatric Neurology. 2017;21:e67. doi:10.1016/j.ejpn.2017.04.1161.