Brief Reports

Neonatal Sepsis and Meningitis in Haiti

by Olbeg Y. Désinor, Jorge Luis Zanzo Silva, and Marie José Dallemend Menos

Departments of Pediatrics and Microbiology, Haiti State University Hospital, Port-au-Prince, Haiti

Summary

The aim of the study was to determine the etiology of meningitis and sepsis in the newborn at the State University Hospital of Haiti and evaluate the susceptibility 'in vitro' of the pathogens to the antibiotics commonly used. This was a prospective case series study over a 10-month period (May 1997–February 1998) of 42 newborns with sepsis and/or meningitis. Besides the clinical signs, a positive blood culture and/or a positive culture of cerebrospinal fluid was present in each case. Gram-negative bacteria were most commonly found as a cause of early onset sepsis, with *Enterobacter aerogenes* as the most common agent. There were no such differences between Gram-negative and Gram-positive in late onset sepsis. Group B *Streptococcus* was associated with neonatal meningitis (44 per cent of cases) which was more related to Gram-positive bacteria (66 per cent). Risk factors were vaginal discharge and dysuria in mothers, and low apgar score in newborns. Thirty-three per cent of the pathogens found, among them *Klebsiella pneumoniae*, were resistant 'in vitro' to ampicillin and gentamycin. All were susceptible to amikacin. *Enterobacter aerogenes* is an important pathogen in the etiology of early onset sepsis in the newborn at the State University Hospital of Haiti, while Group B *Streptococcus* is the leading cause of meningitis in that age group. Resistance to gentamycin should be taken into consideration for the treatment of sepsis and meningitis in the newborn.

Introduction

The newborn is very vulnerable to infectious diseases because of the immaturity of his immune system.® Regarding the etiology of neonatal sepsis, pathogens may vary from one country to another and within a country from one hospital or region to another. In the USA and in Europe Group B *Streptococcus*, *Escherichia coli* and *Listeria* are the commonest.® Because of the importance of the problem in Haiti and because no previous study had been done in that respect, the objective of this study was to determine the etiology of the pathogens and their susceptibility to the antibiotics currently used in the neonatal ward.

Materials and Methods

This was a prospective case series study of 42 newborns with sepsis and/or meningitis. The diagnosis was made upon the result of a positive blood culture and/or a positive culture of the cerebrospinal fluid (CSF) besides the clinical signs, which at this age are very unspecific. Early onset sepsis was defined as presentation during the first week of life (0–7 days) and late onset sepsis between 8 and 30 days.

Antibiotic sensitivity was tested for penicillin, ampicillin, gentamycin, and amikacin. A sample of 1.5 ml blood was taken after asepsia and inoculated in a Trypticase soy agar. Blood culture bottles were incubated at 35–37°C and examined daily for evidence of bacterial growth. When growth appeared, the culture was inoculated to a blood agar plate and a Gram-stained smear was examined. Chocolate agar plate and MacConkey agar plate were also streaked. For Gram-negative rod identification *Kligler’s medium*, urea agar, methyl red test, citrate test, and the test for indol were used; coagulase for staphylococci, optochin susceptibility test for pneumococci, and *Streptococcus viridans* and bacitracin for Group A *Streptococcus*.

Immunological and serological tests were performed for identification of other streptococci (Group B, C, D...). For CSF, 2 ml were obtained after lumbar puncture. A Gram-stained smear was examined and the following media were inoculated: blood agar, chocolate agar, MacConkey agar, and thioglycollate medium. Culture was incubated at 35°C during 48 h in a candle jar. Susceptibility to
antibiotics was investigated according to the modified Kirby–Bauer method.

**Results**

Thirty-two cases of neonatal sepsis and 10 cases of neonatal meningitis were found during the period from May 1997 to February 1998. In the early onset cases with meningitis (0–7 days) there were nine newborns, seven male and two female. Group B *Streptococcus* was identified in four cases. In the age group 8–30 days, three neonates developed meningitis. Group B *Streptococcus* was again encountered in one case.

For early onset sepsis, nine newborns with weight between 1500 and 2000 g were affected. Four cases were found in the group of neonates weighing 2000–2500 g. In those groups there was an overwhelming presence of Gram-negative bacteria. For the newborns weighing more than 2500 g, 10 cases resulted in early onset sepsis. All pathogens in this later group were Gram negative. Regarding late onset sepsis, eight cases were found with either Gram-positive or Gram-negative bacteria. Two cases presented sepsis plus meningitis with the same pathogen isolated in blood culture and culture of CSF: *Enterobacter aerogenes* in an early onset infection and non-typable *Haemophilus influenzae* in a late onset sepsis. Fifty-eight per cent of neonates with early onset sepsis had low birthweight.

Twenty-three newborns were male and 19 were female: a sex ratio of 1.21. In 14 cases there was a history of vaginal discharge and dysuria in the mother. Fourteen newborns had a history of low apgar score and 13 presented seizures. Premature rupture of membranes was reported in seven cases, and fever in the mother was reported in nine cases. Low white blood cell count was associated with Gram-negative sepsis and Group B *Streptococcus*. In five out of 10 deaths, the complete blood count was normal. Twenty-seven patients survived, five left the hospital without the consent of the medical team, and 10 died. Gram-negative sepsis was responsible for eight deaths and in five fatality cases the weight was between 1500 and 2500 g. The incidence for sepsis and meningitis was 8.4/1000 live births. Antibiotic sensitivity showed a resistance to gentamycin in 14 cases.

**Discussion**

In Haiti, there is no previous study of the etiology of neonatal sepsis. Identification of the etiology is important since it can induce a change in policy management even before birth. Use of penicillin at least 2 h before delivery lowers the risk for Group B *Streptococcus* transmission from mother to the newborn. An overwhelming presence of Gram negative bacteria was found in that study as a cause of early onset sepsis. *Enterobacter aerogenes* was the commonest pathogen (Fig. 1). This predominant presence of Gram-negative bacteria in neonatal sepsis has been reported previously in other regions. In a study in Zimbabwe, 43 per cent of the pathogens in blood culture were *Klebsiella pneumoniae*. In another study in Israel, *Klebsiella* sp. was again the most important cause of neonatal sepsis and with *E. coli* and *Enterobacter* sp. representing 45 per cent of all the pathogens and 79 per cent of the Gram-negative bacteria. In Panama, Moreno, et al. found over a 18-year period that 61 per cent of the pathogens responsible for neonatal sepsis and meningitis were Gram-negative bacteria, particularly *Klebsiella* and *E. coli*. In Gauleiloupe a study over 4 years showed the predominance of Group B *Streptococcus* in Europe and the United States.

In the case of late onset sepsis, there was not much difference between Gram-positive and Gram-negative bacteria. Group B *Streptococcus* was responsible for 44 per cent of early onset cases with neonatal meningitis and 41.6 per cent of cases with meningitis between 8 and 30 days. Overall, Gram-positive bacteria was responsible for 66 per cent cases of meningitis in this study. There was an outbreak of sepsis by *Pseudomonas aeruginosa* in the time period of the study. Of the five cases diagnosed, four were premature babies. The source of the outbreak, most probably nosocomial, had not been identified but the number of cases dropped sharply after enforcement of preventive sanitary measures inside the neonatal ward.

Antibiotic sensitivity revealed in 14 cases (33 per cent) the resistance of bacteria, mainly Gram-negative, to ampicillin and gentamycin. This lead to a review of our antibiotic therapy in the neonatal ward. Cefotaxime plus amikacin is used when the evolution or condition at admission require it.
pathogens were not considered in any case as contaminants and their presence were related to the evolution of the patients.10-12

This study certainly has some limitations including the relatively small number of patients (42) and even though no definitive conclusion can be drawn, there is a strong predominance of Gram-negative bacterin infection in the neonates at the State University Hospital of Haiti. Enterobacter aerogenes has been the most common pathogen responsible for early onset sepsis. Group B Streptococcus was associated with neonatal meningitis. Both bacteria represented 52.3 per cent of all pathogens in this study. Regarding late onset sepsis, the etiology was the same as reported in the medical literature. Gentamicin is still a first-line antibiotic in the empirical treatment of neonatal sepsis13 but the resistance ‘in vitro’ of Gram-negative bacteria such as K. pneumoniae and E. aerogenes has been taken into account.14 A longer study period with more patients will be the next step.

References

Congenital Toxoplasmosis in Uberlândia, MG, Brazil

by Gesmar Rodrigues Silva Segundo, a Deise Aparecida Oliveira Silva, a José Roberto Mineo, a and Marcelo Simão Ferreira b
aLaboratório de Imunologia, Instituto de Ciências Biomédicas, Brazil
bServiço de Doenças Infecciosas, Departamento de Clínica Médica, Faculdade de Medicina, Universidade Federal de Uberlândia, Uberlândia, MG, Brazil

Summary

Almost all babies suffering from congenital toxoplasmosis, if undiagnosed and untreated, will develop visual or neurological impairments by adulthood. The aim of this study was to investigate the occurrence of congenital toxoplasmosis in two hospitals from Uberlândia, Brazil. A total of 805 serum samples of cord blood were collected, 500 from public hospital and 305 from private hospital, and all patients answered a questionnaire about pregnancy and newborns. ELISA was accomplished to detect IgG antibodies to Toxoplasma gondii and positive sera were re-tested to verify specific IgM and IgA antibodies in a capture ELISA. Seroprevalence of IgG antibodies against T. gondii was 51.6 per cent in the hospitals, while the frequency of congenital toxoplasmosis was 0.5 per cent, with specific IgM and/or IgA antibodies. The main clinical alterations was choiroiretinits (an inflammatory process of the retina and uveal tract). The high seroprevalence in this population and expressive rate of congenital disease show the requirement of screening programmes for toxoplasmosis during pregnancy.

Journal of Tropical Pediatrics Vol. 50, No. 1