

137 MATHEMATICAL APPROACH TO THE SELECTION OF THE BEST DIAGNOSTIC PROCEDURES IN NEONATAL SEPTICAEMIA. Mitkowska Z.A., Pietrzyk J.J., Pryjma J., Róžański B.S. Medical Academy, Institute of Pediatrics, Cracow, Poland.
 Early diagnosis of neonatal sepsis is the main factor in prognosis. Therefore we tried to find the best diagnostic tests using the mathematical methods. In 25 neonates with sepsis of late onset and 20 healthy ones discriminant analysis was performed taking into consideration the following parameters: mini-ESR, WBC, immature/total neutrophils, IgG, IgA, IgM levels. Additionally chemiluminescence (CL) in whole blood after latex stimulation in 3 doses (0.2, 0.05, 0.02 µl) was measured. Depending on the value of WBC the septic neonates were divided into 2 groups: I > 12 000/mm³, II < 12 000/mm³. In group I the significantly discriminating parameters for F₀ = 4.13 and DF=1;35 appeared: mini-ESR (F = 21.06), WBC (F=9.15) and IgG level (F = 7.66), while in group II for F₀ = 4.13 and DF = 1;30 the only parameter was WBC (F₀ = 10.25). The percentage of correct classification for the I and II group respectively was as following: control - 95.2 and 66.7, sepsis - 86.6 and 80.0, total - 91.7 and 70.0. On the above outcome the discriminant function was defined. Simultaneously performed measurements of CL showed the decrease or quenching of the neutrophils activity. The results justify the necessity of further researches and the need of including CL into discriminant analysis.

138 COAGULASE NEGATIVE STAPHYLOCOCCI (CNS) ARE TRUE PATHOGENS IN NEWBORN INFANTS: A PROSPECTIVE COHORT STUDY. B Schmidt, E Kirpalani, L Ford-Jones, M Corey and AGS Philip, Department of Paediatrics, Hospital for Sick Children, Toronto, Ontario, Canada, and Maine Medical Center, Portland, Maine, USA.

We compared prospectively newborn infants with CNS bacteraemia (group 1) to infants with sepsis due to recognized pathogens (group 2), controls (group 3) and infants with suspected infection but negative blood-cultures (group 4). Ten clinical signs, complete blood cell counts and acute phase proteins (C-reactive protein, α1-acidglycoprotein, prealbumin) were recorded at the time of culture. 81 of 799 blood cultures (10.1%) became CNS positive, 25 (3%) grew other pathogens. 70 controls were matched to CNS positive cases for birthweight, gestational age and post-natal age.

Logistic regression analysis demonstrated only marginal differences between groups 1 and 2, with lethargy being more common in group 2 (p < 0.05). Significant differences were found between group 1 and groups 3 and 4, respectively. CRP was the single best laboratory discriminator (p < 0.001) and superior to all haematological tests of which the best was the immature/total neutrophil ratio. Hyperthermia, increased F102 requirements ≥ 15% and lethargy were the best clinical signs. Specificity of discriminating variables was consistently higher than sensitivity.

We conclude that (1) CNS is a true pathogen in newborns and (2) a normal CRP and the absence of hyperthermia, increased F102 requirements and lethargy are most useful in predicting infants whose blood cultures will remain negative.

139 BLOOD-CSF BARRIER PERMEABILITY IN NEWBORN INFANTS WITH INFECTION. Temesvári P, Kumlien B, Holthausen H, Bidlingmeier F, Versmold H, Depts of Pediatrics & OB GYN, Univ. of Munich

Blood-CSF barrier alterations had been demonstrated in children with sepsis and claimed to be a useful indicator of infection. No information is available, whether infection affects the barrier in term and preterm neonates. We studied 58 neonates (31 term; 27 preterm: GA 28-3, mean 32.1 wks). Sepsis with positive blood culture was present in 11/31 term infants and 7/27 preterm. Albumin (Alb) and IgG levels were measured by immunodiffusion in serum and CSF sampled to exclude meningitis. Results (mean ± SD):

	CSF x 100 serum	No infection	Sepsis	Amnionitis
Term	Alb ratio	15.4 ± 5.9	14.7 ± 3.9	15.8 ± 12.1
	IgG ratio	8.9 ± 4.8 (n=9)	9.9 ± 4.6 (n=11)	10.4 ± 8.6 (n=11)
Preterm	Alb ratio	22.6 ± 9.2	32.4 ± 11.9	26.4 ± 7.5
	IgG ratio	14.6 ± 5.4 (n=9)	20.4 ± 4.5 (n=7)	20.7 ± 4.1 (n=11)

CSF/serum ratios of Alb and IgG were higher (p<0.05 unpaired t-test) in all groups of preterm compared to term infants. Sepsis and amnionitis had no significant influence on the blood-CSF barrier. Our data of noninfected infants agree with previous reports. Forming from our data the Link's index (IgG ratio/Alb ratio), it appears that local CNS IgG production is negligible in these infants. In conclusion blood-CNS barrier permeability is inversely related to maturity. In contrast to previous speculations it is not a useful indicator of neonatal sepsis.

140 BRAIN ULTRASONOGRAPHIC STUDY IN NEONATAL SEPSIS: NEW CONCEPTS OF PATHOPHYSIOLOGY OF CEREBRAL DAMAGES AND EARLY DEVELOPMENTAL OUTCOME. CL Fawer, A Calame, B Vaudaux, C Bammatte. Dpt Paed. CHUV, Lausanne, Switzerland.

This study was performed to detect among newborn infant brain damages associated with neonatal sepsis and to clarify physiopathological mechanisms leading either to death or to later functional disabilities. Over a 3-year period (1982-85), 56 neonates (Group A:40 preterm. Group B:16 term) were admitted to the Neonatal Unit with proved bacterial sepsis and/or meningitis. The distribution of the germs was similar in both groups (Listeria, Group B streptococcus, Coli, Klebsellia, others) but clinical pictures, ultrasound (US) findings, mortality rate and neurodevelopmental outcome were different.

	Meningitis	Shock	US changes	Mortality	Major sequelae
Group A	30 %	52 %	50% (12 PVH/PVL +8 ventriculitis)	45 %	4/19
Group B	50 %	12 %	8.3% (ventriculitis)	0 %	0/14

Our results indicate that prediction of survival and morbidity should be considered in terms of brain maturation and hemodynamic conditions. Death or major sequelae could be in most cases ascribed to septic shock and circulatory disturbances leading to periventricular haemorrhage (PVH) and/or leukomalacia (PVL). Virulence and toxicity of the microorganism appeared to represent an additional adverse factor. The various etiopathogenic models will be discussed.

141 THE OUTCOME FOR PREMATURE, VERY PROLONGED (>99 HOURS) MEMBRANE RUPTURE IN THE PREMATURE INFANT. McINTOSH, N Dept of Child Health, St George's Hospital, London SW17 0QT, U.K.

In the 5 years 1980-1984, 89 infants (mean birthweight range = 1466g, 710-2710; mean gestation, range = 29.9 weeks, 25-36) were born at St Georges Hospital after the foetal membranes had been ruptured for more than 99 hours (mean 19 days range 4-119). 1 baby with renal agenesis was excluded from consideration. 18 of the remaining infants had musculoskeletal abnormalities compatible with compression deformity resulting from oligohydramnios (mean duration rupture = 35 days, range 4-119). 11 infants had hypoplastic lungs - 9 died (mean duration rupture = 43 days, range 21-112). There were seven other deaths in the series, 3 shortly after birth as a result of hyaline membrane disease and 3 later from bronchopulmonary dysplasia. 1 infant with a severe neural tube defect died on the 15th day of life after no active treatment had been offered. The duration of membrane rupture in these other deaths was 18 days, 4-63 (mean, range).

Despite purulent liquor being noted in 16 cases and "smelly babies" being recorded in 8 cases, no infant in this series died as a direct consequence of infection.

It is postulated that the duration of premature rupture of foetal membranes is only important to the foetus if the associated oligohydramnios is sufficient to restrict foetal breathing movements and curtail lung development over a finite period of time.

142 TRANSCUTANEOUS BLOOD GASES AND APNOEA PROFILE DURING SLEEP IN PREVIOUSLY PRETERM INFANTS

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We assessed oxygen and carbon dioxide tension during sleep in 7 healthy preterm infants between 36 and 52 wks. conceptual age in 4 wks. intervals and related the mean values, obtained separately during both regular (without apnoea) and periodic breathing in quiet sleep to the entire profile of apnoea at each age studied.

During regular breathing the mean oxygen tension gradually increased from 71 mmHg at 40 wks. to 80 mmHg at 52 wks. and the mean carbon dioxide tension decreased over the same period of time from 57 to 51 mmHg, while the total amount of apnoea showed a sharp decline from 13% at 40 wks. to 1.7% at 52 wks. Thus, there was an inverse relation between the mean oxygen tension during regular breathing (without apnoea) and the total amount of apnoea beyond 40 wks. conceptual age. During periodic breathing the mean oxygen tension also steadily increased from 63 to 73 mmHg between 40 and 52 wks. but remained always well below (7-10 mmHg) the corresponding values of regular breathing. Whereas in general recurrent hypoxemia is supposed to be due to single apneic events, our data clearly show that also oxygen tension during regular breathing is related or even determined by the apnoea profile.