Short reports

Duration of antibiotic courses for neonates

D ISAACS, A R WILKINSON, AND E R MOXON

Department of Paediatrics, University of Oxford, John Radcliffe Hospital, Oxford

SUMMARY A survey of the use of antibiotics in a neonatal unit for two years showed a considerable reduction in the mean duration of courses prescribed without any appreciable change in morbidity.

Because of their relative immunodeficiency neonates are highly susceptible to bacterial infection. Signs of sepsis are often non-specific. Thus there must be a low threshold for prescribing antibiotics. Courses of longer than 72 hours have been associated with increasing colonisation by potentially pathogenic Gram negative bacteria.¹ It is customary to complete a course of antibiotics lasting several days to minimise the risk of emergence of resistant organisms. Recent evidence however, suggests, that the opposite is true: resistant organisms are more likely to be selected the longer antibiotics are continued.² It would be rational, therefore, to stop antibiotics after 48 to 72 hours if no organisms are grown on culture.

Methods

On 1 May 1984 we began a prospective survey of all antibiotics prescribed to babies with systemic sepsis in the neonatal unit at this hospital. When sepsis was suspected, a surface swab and samples of blood, urine, and cerebrospinal fluid were sent for culture. An x-ray of the chest was taken and antibiotics were started. Results of cultures were reviewed after 48-72 hours and if no organisms were grown, and the x-ray did not suggest pneumonia, antibiotics were stopped. Pneumonia was treated with antibiotics for five to seven days, septicaemia for at least seven days and definite necrotising enterocolitis for 10 days. Necropsy, including histological examination of meninges and lungs, was performed on over 90% of the babies who died. Blood was then taken for culture if it had not been taken previously.

We present the results of the first two years of the survey. Statistical analysis was by Student's *t* test,

the data on the number of days' treatment having been converted to achieve a normal distribution, and analysis of the significance of differences in proportions was by the χ^2 test.

Results

The Figure and Table show that the total weight of antibiotics used in six month periods decreased after the first six months of the survey. This was initially due to a smaller number of babies being given antibiotics. Over the two years, however, there was no significant change in the proportion of babies prescribed antibiotics. The decrease in their use was not due to the fact that smaller babies received antibiotics, as the weight of antibiotics used per baby-day fell concurrently. The population did not change over the two years; there were no changes in admission policy and the birthweight distribution was similar over the four six month periods ($\chi^2=19.5$, 15df, $p>0.1$).

The most noticeable change in prescribing habit was that the median duration of courses of antibiotics decreased progressively and there was a highly significant fall in the mean duration of courses between the first and second years of the survey.

Figure Grams of antibiotics used in four week periods from 1 May 1984 to 30 April 1986.

Table Antibiotics in neonatal unit (1 May 1984 to 30 April 1986)

	May 84– October 84	November 84 April 85	May 85 October 85	November 85 April 86	P value
Baby-days on neonatal unit	4368	3994	4383	3872	
Cases of late onset sepsis	4	8	12	4	NS
Weight of antibiotics (g)	202.7	131.7	156.6	122.1	
Weight of antibiotics per baby-day (mg)	46.4	33.0	35.7	31.5	
Proportion of babies given antibiotics (%)	57.7	42.5	37.3	45.5	NS
Mean (SD) duration of antibiotic course per days	5.45 (4.04)	5.59 (3.66)	4.74 (4.36)	3.61 (4.62)	
	May 84–April 85		May–April 86		
Mean (SD) duration in days of course	5.51 (3.89)		4.25 (4.50)		<0.0001

There was no significant change in the incidence of late onset sepsis (septicaemia or bacterial meningitis after 48 hours) nor was there any increase in mortality from any form of sepsis. No blood cultures grew organisms after antibiotics had been stopped, and no baby developed an infective illness within 48 hours of discontinuing antibiotics. No significant effect on antibiotic resistance of organisms colonising babies or causing infections was found.

Discussion

Others have attempted to reduce the proportion of babies receiving antibiotics by identifying those that are septic. A significant reduction has been described using a 'sepsis screen,' comprising several rapid laboratory tests.³ It may, however, be just as important to shorten the duration of courses of antibiotics in babies who do not have infective illness, as those given antibiotics for more than 72 hours are likely to become colonised with virulent Gram negative organisms.¹ Such a practice is likely to be safe as 96% of blood cultures from bacteraemic neonates grew organisms within 48 hours and 98% within 72 hours.⁴

The number of false negative blood cultures is unknown, but most neonatologists have cared for babies with a clinical picture typical of early onset group B streptococcal sepsis or listeriosis who were heavily colonised with the organism but whose blood cultures were sterile. Under these circum-

stances we would assume that the result was a false negative, probably due to the small size of the inoculum in neonatal blood cultures, and would continue antibiotics for seven or more days as we have for confirmed sepsis. Our study shows that antibiotics can be stopped after two to three days, when cultures are negative, without apparently increasing morbidity. The intensive surveillance of sepsis and antibiotic use was probably at least partly responsible for the reduction in the mean duration of courses of antibiotics because medical staff were continually reminded to review the need for antibiotics.

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Correspondence to Dr D Isaacs, Department of Paediatrics, John Radcliffe Hospital, Oxford OX3 9DU, England.

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