MEDICAL PRACTICE

Hospital Topics

Phototherapy: the hospital as risk factor

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Abstract

In a retrospective study over six years the incidence of phototherapy was examined in two groups of healthy neonates who were born spontaneously and at term in hospital. They were comparable in all respects except that one group was cared for at home and the other group was cared for in hospital. It appeared that the infants in hospital received phototherapy seven times more often than those at home, and surveillance at home was not inferior to that in hospital.

There is no reason to assume that neonatal jaundice occurred more often in neonates in hospital than in those at home. Thus the difference in the frequency of treatment with phototherapy between the two groups is ascribed to the influence of the hospital environment, which may encourage intervention.

Introduction

It is widely believed in Holland that normal deliveries of babies should be kept out of hospital. It is claimed that the hospital environment induces unnecessary medical intervention during what is considered to be a physiological event and that the care of the newborn can too easily become medicalised. Those who hold this view consider the hospital itself to be a risk factor.[1] Although this sounds plausible, no proof has yet been offered. There is no statistical comparison of the incidence of medical interventions in groups of women in labour whose place of delivery was randomised, and this will probably remain unattainable. It was, however, possible to carry out such a study retrospectively of healthy neonates. In two groups of neonates who were comparable in all respects apart from where they were cared for after birth we studied the incidence of one of the most common medical procedures carried out in the first weeks of life: phototherapy. We do not intend to discuss the indications for phototherapy. The frequency with which phototherapy is instituted is used here primarily as a measure of the medicalisation of the care given to healthy newborns.

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Patients and methods

In Holland until 1983 when a woman booked for antenatal care and delivery in a hospital she was offered the choice of going home 24 hours after delivery or staying with her child for seven days in hospital. The conditions for an early discharge were that the pregnancy and delivery had been uneventful, the baby was in excellent condition (an Apgar score of 7 or more), born at term and had a birthweight of 2500 g or more, and that labour was not induced or instruments used. The pregnant women could make such a choice if there was no medical reason to deliver in hospital—that is, there were no grounds on which to assume an increased risk of obstetric complications. The decision made early in pregnancy could not be altered except for medical or pressing social reasons. Until 1983 the fees were similar for both staying in hospital and being at home. For these infants the opportunity of being cared for at home or in hospital depended solely on the preference of the mother, stated some months before delivery, which makes it comparable to a random allocation.

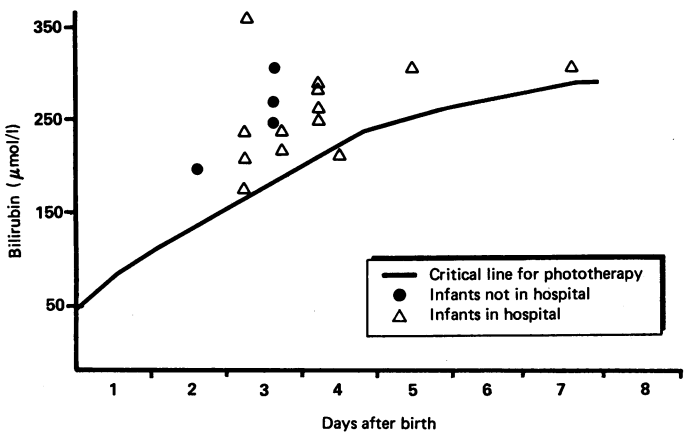
For babies born in the Slotervaartziekenhuis, which houses the Amsterdam Midwifery School, care at home and in hospital is closely similar (unless, of course, there is medical reason to remain in hospital). It is given by the same group of midwives, who work on rotation inside and outside the hospital. They pay daily visits to the mother and child at home just as they make their daily rounds in hospital. They have equipment to collect blood for bilirubin estimations, and it is their decision whether blood tests should be done and whether the results should be shown to the paediatricians. If the paediatricians want to give phototherapy the child and the mother are readmitted.

Thus it was possible to study two groups of healthy newborn babies that were comparable in all respects except that one group was cared for at home and the other was cared for in hospital. Children of mothers who were

advised to deliver in hospital but had an uneventful pregnancy and delivery were excluded from the hospital group. This study was done retrospectively over the years 1976 to 1982, because at that time many obstetric data were held on computer in an experimental data bank. Moreover, since 1983 early discharge after delivery has been encouraged—for example, by the introduction of different charges for hospital and home care. We restricted the study to infants whose mothers had had one or two children and were of Western European origin.

There were 1700 neonates in the hospital group, of whom every tenth child was studied. The other group consisted of 388 neonates. They were all admitted into the study.

Because differences in the incidence of phototherapy could be explained by one of the two groups having been insufficiently observed and thus serious jaundice missed we examined at which bilirubin concentrations phototherapy was instituted and whether there were early or late signs of neurological bilirubin toxic damage. For the last, hearing loss (perceptive deafness with a typical audiographic pattern[2]) at the age of 1 year was used as a measure. This was possible because an audiological screening programme was run by the municipal health authorities. At about 1 year of age all children are given a Ewing test twice.[3] If there is hearing loss they are referred to the Municipal Audiological Service for specialist examination. Between 1976 and 1982 the programme reached all but 10% (range 8-11% yearly) of the children, most of the 10% belonging to the immigrant population, which was excluded from this study.



Bilirubin concentrations at which phototherapy was started.

The indications for phototherapy are in accordance with the usual practice in Holland. The critical concentrations of serum bilirubin at which phototherapy was started in healthy newborns are shown in the figure. Bilirubin concentrations were assessed according to the direct differential absorbance method.

Results

The table gives the number of neonates and the mean birth weight for each group, the number whose bilirubin concentrations were measured, and the number who were treated with phototherapy. The differences between the two groups for the last two variables were highly significant. The neonate who was given the exchange transfusion was admitted on the 4th day of life with pneumonia and severe jaundice—bilirubin concentration 400 μmol/l.

Details of infants in both study groups

	Cared for:	
	In hospital (n=170)	At home (n=388)
Mean (SD) birth weight	3310 (663)	3330 (621)
No (%) whose bilirubin concentration was measured	40 (23·5)	12 (3·1)
No (%) given phototherapy	13 (7·6)	4 (1·03)
No given exchange transfusion		1
No referred with hearing disorder on Ewing test:	8	25
No hearing disorder	4	18
Conduction deafness	3	6
Perceptive deafness	1	1

The records of the screening programme showed that all the children had had Ewing tests at about 1 year of age. The table shows that 33 infants were referred for special audiological examination. Two had perceptive deafness, but this was not of the bilirubin toxic type.

Discussion

The results of this study show a large difference in the frequency with which phototherapy was given to healthy infants with neonatal jaundice in hospital compared to those being cared for at home. In all respects the infants were comparable except for the place where they were cared for. All of them were born at term, were in excellent condition at birth so no medical intervention was required, and were cared for by the same staff. There is no reason to assume that the incidence of neonatal jaundice was lower in the infants cared for at home than in those cared for in hospital. The frequency of breast feeding was the same, and the difference in exposure to natural light was not great. If there had been a difference it might have increased the incidence of jaundice in infants at home over that in infants in hospital since the hospital wards are usually brighter than rooms in Dutch houses. It cannot be assumed that serious jaundice in the infants who were cared for at home was missed. In their daily visits midwives monitored the course of jaundice. That they did this properly is substantiated by the bilirubin concentrations on admission for phototherapy and the absence of kernicterus and late bilirubin toxic hearing disorders.

These findings imply that the group of infants in hospital, whose rate of phototherapy was seven times higher than that in the group of infants at home, was exposed too often to light treatment. Recent studies on the usefulness of this treatment for healthy newborns support this conclusion. There is a growing consensus that phototherapy has been given too often in the past and that it may be ineffective in preventing exchange transfusion in healthy term neonates.[4-6] It has even been claimed that phototherapy has no place in the treatment of neonatal jaundice in these children, but that awaits further proof.[7]

A discussion of the indications for phototherapy, however, falls outside the scope of this paper. We are dealing here with two groups of newborns to whom the same indications applied but who received phototherapy with a widely varying frequency. The only difference between the groups was the place where they were cared for. Staying in hospital increased considerably the chance of receiving phototherapy independent of the degree of jaundice, the quality of care, or who monitored the jaundice.

The underlying causes cannot so easily be identified. It may be argued that it is easier to decide to give phototherapy to an infant who is already in hospital than to decide to readmit an infant. This was not the case, however. The decision rested solely on the bilirubin concentrations. Only when the critical concentrations that had been set for phototherapy were reached was treatment begun.

We think that two other interrelated factors may explain the difference. Firstly, the availability of laboratory facilities makes it easy to estimate bilirubin concentrations, so such tests may take the place of clinical observation. Bilirubin tests were carried out for only 12 of the 388 infants who were cared for at home compared with 40 of the 170 cared for in hospital. In all of the infants in hospital the tests were repeated, and in 18 they were repeated three or more times. Evidently the chance of finding a concentration just above the critical one set for phototherapy is enhanced by this. Thus treatment is begun for healthy and normal neonates on relatively small fluctuations in bilirubin concentrations that would hardly result in clinically observable intensification of the jaundice. This is clearly illustrated by phototherapy being started after a bilirubin test in a third of the infants in each group (four of 12 and 13 of 40). Also, the concentrations at which phototherapy was started were not much different in the two groups, though it might be expected that concentrations would be higher in the proportionally smaller group of tested infants at home than in the ones in hospital.

Secondly, the midwives tell us that they are inclined to conform when working in a hospital to the prevailing "medical" attitude and treat those under their care as patients. It is then a small step from

viewing neonatal jaundice as being physiological to seeing it as a mild disease that has to be monitored by bilirubin assessments and whose course should be managed by precautionary and therapeutic procedures.

Being in a hospital has thus become a factor in its own right and determines the frequency of medical interventions. In this case it concerned phototherapy, but it might also apply to the frequency with which many obstetric procedures are carried out, which is at present widely criticised.

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For Debate . . .

Inequalities in health in Britain: specific explanations in three Lancashire towns

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Abstract

The reasons why mortality is higher in the poorer areas of Britain are largely unknown. Thus how to reduce inequalities in health is a matter of conjecture. In three neighbouring towns in northern England the rates of death from all causes differ greatly. Socioeconomic conditions in the towns are similar though below average for England and Wales. The pattern of disease specific rates was analysed and related to past differences in infant mortality.

It is suggested that past differences in maternal health and physique and in the postnatal environment, particularly infant feeding, housing, and overcrowding, may be determinants of current differences in adult mortality.

Introduction

The geographical and social class differences in mortality in Britain reflect differences in death rates from several chronic diseases. They correlate with variations in a range of socioeconomic indexes, with rates being higher in poorer places and groups.[1,2] How specific socioeconomic influences determine variations in mortality from chronic diseases is, however, largely unknown, and therefore how inequalities in mortality can be reduced is a matter of conjecture.[3]

During 1968-78 variations in ischaemic heart disease, chronic bronchitis, and stroke accounted for 93% of the total variance in mortality from all causes between the 212 local authority groupings in England and Wales—that is, the county boroughs (large towns), London boroughs, urban areas within counties, and rural areas. We have shown that these three diseases have a close geographical relation with certain causes of infant mortality during the early years of the century.[4,5] We interpret this as evidence that events in prenatal life and early childhood are important in the aetiology of these diseases. Specifically, the physique and health of the mother and the prenatal and postnatal growth and development of the infant may be determinants of ischaemic heart disease and stroke, and respiratory infection in early childhood may be a determinant of chronic bronchitis.

It follows that differences in maternal characteristics and in the postnatal environment may be determinants of the current differences in adult mortality. Census data from the past give some insight into the childhood environment. Indexes of crowded housing and of family income were geographically correlated with infant mortality.[6] The value of such indexes, however, is limited because they do not, for example, describe nutrition.

In 1914, after a national survey,[7] the Local Government Board published a report on infant mortality in Lancashire.[8] The report focused on the three neighbouring towns of Burnley, Colne, and Nelson, situated side by side on the western slopes of the Pennine Hills (figure). Each had developed as a cotton weaving town, and for the six miles from the centre of Burnley through Nelson to Colne there was hardly a break in the line of houses. Yet the infant mortality rates differed greatly. In 1911-3 there were 177 deaths per 1000 births in Burnley, 130 in Colne, and 87 in Nelson.

The current mortality in the towns differs also. During 1968-78 mortality at all ages and from all causes was 21% above the national average in Burnley, 10% above in Colne, and 4% above in Nelson.[9] The detailed description of the towns in the 1914 report gives an insight into the way in which past environmental differences that affected the health and development of infants might have determined the current differences in mortality among adults.

Methods

Data on past conditions in the three towns were taken from the 1911 census[10] and from two Local Government Board reports, the first (1913) covering all 241 urban areas of England and Wales[11] and the second (1914)

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