observation of all those aspects about which there is current disagreement, will some light be thrown on the rather heated public and professional debate on modern obstetric practice.

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Obstetric practice in the Oxford Record Linkage Study Area 1965-72

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Summary

The secular trends in induction in 111 818 births over eight years in the largely rural areas of Oxfordshire and west Berkshire were analysed. Although the induction rate started to rise only in 1969, the forceps and episiotomy rates had been increasing throughout, but both procedures were always twice as prevalent in induced as in non-induced cases. The proportion of women given an anaesthetic was also consistently higher in induced cases, but that of women with long labours fell considerably over the period. The reduction in stillbirth rate was more apparent in induced than in non-induced births.

Introduction

The management of labour and delivery has become a subject of heated debate recently. The pointed questions about the value of induction, the dangers to the fetus, the possible harm to the mother, and the alleged increased need for anaesthesia, have come largely from the articulate lay public rather than the medical profession. It became apparent that there were little or no data on the prevalence and outcome of various obstetric procedures with which to answer the questions and possibly refute the allegations.

In an attempt to provide some basic data for discussion we have analysed two aspects of this subject. In this first paper we consider the epidemiology of induction in one area over eight years to show the trends. In a further study,¹ the results of induction in a hospital group covering some 5000 births a

year will be discussed in more depth for one particular year. We do not aim to provide definitive answers but rather to attempt to put the whole topic in perspective and provide data to focus attention on those areas in which further study seems to be advisable.

Methods

The Oxford Record Linkage Study^{2,3} collects information on every delivery in Oxfordshire and west Berkshire. The area is largely rural with several market towns and the two small cities of Reading and Oxford and has a total population of about 800 000. Details of each pregnancy, labour, and delivery and the subsequent morbidity of mother and child are abstracted from hospital case records and, in the case of domiciliary deliveries, midwives' notes. The degree of case ascertainment is checked by matching the cases with birth and stillbirth certificates, photocopies of which are forwarded to us by the Office of Population Censuses and Surveys.

In the present analysis we included all those deliveries to women resident and delivered in the area in 1965-72. Social class was coded using the definitions of the Registrar General (1961, 1966, and 1971) from information on paternal occupation recorded on the birth and stillbirth certificates. Parity is the number of previous pregnancies resulting in either a livebirth or a fetal death of gestation 28 weeks or more.

Induction was defined as a procedure, such as artificial rupture of the membranes or administration of oxytocin, designed to start contractions. Such procedures were not coded as inductions if they were intended merely to accelerate a labour that had already begun. The length of labour is the length of time from the onset of regular contractions to the delivery of the infant, and must, by definition, be less than the induction to delivery interval (IDI). Anaesthesia includes all general and local anaesthetics but excludes simple analgesic procedures such as "gas and air."

Results

The annual number of births fell gradually over the eight years, and the proportion of these delivered at home fell from 25% in 1965 to only 3% in 1972 (table I). The proportion of infants delivered to primiparae increased slightly throughout, whereas the proportion delivered to grand multiparae declined considerably. There was little variation in the illegitimacy rate, but, in accord with data for the country as a whole, the proportion of deliveries to women in the

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TABLE I—Characteristics of women giving birth in the area in 1965-72

Year of delivery	Total No of births	% Delivered at home	% With parity 0	% With parity ≥ 4	% Unmarried	% In social classes IV and V	% Aged <20	% Aged ≥ 35
1965	14 522	25.4	34.9	7.8	6.3	24.0		
1966	14 488	23.5	35.7	6.7	6.1	22.2	7.0	10.6
1967	14 114	18.3	36.5	6.4	6.3	21.5	9.0	9.1
1968	14 031	14.5	36.8	5.9	6.7	18.8	9.2	8.1
1969	13 796	10.4	37.7	5.4	6.3	19.5	9.2	7.6
1970	13 715	8.0	37.8	5.0	6.1	17.8	8.9	7.2
1971	13 510	4.8	38.8	4.6	6.5	17.6	9.0	6.7
1972	13 642	2.9	39.9	3.8	6.9	16.0	8.8	6.3

TABLE II—Variations in induction and type of labour and delivery

Year of delivery	Perinatal death rate (per 1000 births)	% Induced	% Delivered by Caesarean section	% Delivered by forceps	% with labour over 12 h	% Receiving anaesthetic	% Having episiotomy
1965	20.0	22.2	3.4	10.4	29.1	19.0	23.8
1966	20.9	24.0	3.3	11.8	29.0	20.1	28.2
1967	19.0	22.7	4.4	12.6	29.3	20.5	30.9
1968	17.9	21.6	4.4	13.2	27.2	20.3	32.7
1969	17.5	25.6	4.4	14.8	24.9	21.8	34.9
1970	16.5	28.0	4.1	15.7	22.7	22.0	39.0
1971	17.6	33.5	4.3	16.0	19.4	21.9	39.3
1972	15.9	35.7	5.1	18.9	16.7	25.5	47.0

social classes IV and V fell (Registrar General, 1975). There was little change in the proportion of teenage mothers but a gradual decrease in the proportion of women aged 35 or more.

In 1969 the prevalence of induction appears to have begun to increase in this area (table II). In contrast the forceps rate rose steadily from 1965. The caesarean section rate showed a slight but irregular rise over the whole period, as did the proportion of women receiving anaesthesia. In contrast, there was an overall fall in the proportion of women whose labour lasted over 12 hours, but only from 1968. As in the Cardiff study⁴ the most dramatic increase was in the proportion of women who had episiotomies.

Although a fairly constant 12% of inductions have been purely medical over the years, after 1969 there was a large increase in the proportion of women who had their membranes ruptured and also received oxytocin and a corresponding fall in the proportion induced by surgical means alone (table III).

TABLE III—Type of induction

Year of delivery	Total No induced	No (%) having only oxytocin infusion	No (%) having only artificial rupture	No (%) having oxytocin and artificial rupture
1965	3218	417 (13)	2548 (79)	253 (8)
1966	3472	532 (15)	2541 (73)	399 (12)
1967	3198	456 (14)	2364 (74)	378 (12)
1968	3023	259 (9)	2433 (80)	331 (11)
1969	3531	259 (7)	2758 (78)	514 (15)
1970	3833	440 (11)	2569 (67)	824 (22)
1971	4521	462 (10)	2342 (52)	1717 (38)
1972	4869	678 (14)	1172 (24)	3019 (62)
ALL	29665	3503 (12)	18727 (63)	7435 (25)

Unfortunately data on the time intervals from induction to delivery were only recorded from 1968, but they showed a strong trend: in 1968 26% of inductions had an IDI of over 24 hours and 6% an IDI of over 48 hours, whereas by 1972 only 5% had an IDI over 24 hours and only 0.5% had one of over 48 hours. The fall in the proportion of very long intervals presumably resulted from the increased use of oxytocin after rupture of the membranes.

Further analysis showed that for every year the forceps rate when labour had been induced was about twice that occurring after spontaneous onset. The caesarean section data were less easy to interpret. There was a slight decrease in the number of induced pregnancies resulting in a caesarean section and an increase in the remainder, but without a detailed analysis of the reasons for the sections it would be naive to suggest any meaningful interpretation of this.

A change in length of labour began in 1968 (table IV). Until then the proportion of long labours seemed to have been fairly static. From 1968 the proportion of long labours fell quite dramatically among women whose labours were induced but in a far more leisurely fashion among the group with spontaneous onset. Unfortunately we

TABLE IV—Percentage of all patients delivered in hospital with labours lasting 12 hours or more

Year of delivery:	1965	1966	1967	1968	1969	1970	1971	1972
Labour induced	27.1	28.0	27.5	21.2	19.9	17.5	14.4	10.4
Spontaneous labour	29.9	29.5	29.9	29.1	26.9	25.0	22.2	20.4

have no details on whether labour had been accelerated with oxytocin in any of this group.

Variation in characteristics of women being induced—The tendency throughout has been for induction to be prescribed more for older women and either primiparae or grand multiparae (table V). There was little variation with social class: if anything, the women of social classes IV and V were slightly less likely to be induced in spite of their higher risk of perinatal death.

Effect on mortality—Throughout the area the perinatal death rate fell from 20 per 1000 in 1965 to 16 per 1000 in 1972 (table II). This

TABLE V—Variation in percentage of labours induced according to maternal characteristics

	1965-8	1969-72	Secular change
Maternal age			
<20	21%	27%	29% Increase
20-24	21%	29%	38% Increase
25-29	22%	31%	41% Increase
30-34	24%	33%	38% Increase
≥ 35	28%	37%	32% Increase
Social class			
I and II	23%	32%	40% Increase
III	23%	31%	35% Increase
IV and V	23%	29%	30% Increase
Parity			
0	25%	33%	32% Increase
1-3	21%	29%	38% Increase
≥ 4	25%	33%	32% Increase

TABLE VI—Stillbirth and neonatal death rates (per 1000 births) among infants weighing 2000 g and over. Numbers of deaths are given in parentheses

Year of Delivery	Stillbirth rate		Neonatal death rate	
	Induced	Non-induced	Induced	Non-induced
1965	11.2 (35)	5.4 (59)	2.9 (9)	2.7 (29)
1966	12.1 (41)	5.4 (58)	4.7 (16)	2.1 (23)
1967	10.6 (33)	6.0 (64)	4.5 (14)	2.1 (22)
1968	9.8 (29)	4.8 (51)	5.8 (17)	2.7 (29)
1969	5.3 (18)	2.5 (25)	4.4 (15)	2.2 (22)
1970	6.7 (25)	3.7 (35)	3.0 (11)	1.5 (14)
1971	4.7 (21)	6.7 (58)	4.1 (18)	2.2 (19)
1972	6.1 (29)	3.2 (27)	2.5 (12)	1.8 (15)
1965-8	11.0 (138)	5.4 (232)	4.4 (56)	2.4 (103)
1969-72	5.7 (93)	4.0 (145)	3.4 (56)	1.9 (70)
% Decrease	48.2	25.9	22.7	20.8

fall was due to a reduction in stillbirths. Further analyses indicated that only a third of this reduction could be attributed to the changes in parity, age, and social class of the mothers.⁵ Thus it seems reasonable to conclude that the remainder of the reduction was a function of either improved health and diet in the general population or changes in obstetric and paediatric practice. Further analysis of all births in which the infant weighed more than 2000 g (table VI) showed that whereas the neonatal death rate fell proportionally at the same rate whether the labour was induced or of spontaneous onset, the stillbirth rate fell most among the induced cases.

Discussion

Obviously interpreting data on induction is difficult because the populations of women who undergo induction and those who do not are not strictly comparable. The former group contains more women with abnormalities such as diabetes, pre-eclampsia, heart disease, and poor obstetric history, whereas the non-induced group will include infants born at very early gestation.

As the prevalence of induction increased over the period, the group of women being induced would probably have been, on average, slightly less at risk. The non-induced group would probably also have become gradually more and more "fit." Thus merely by increasing the chance of induction one would

expect the perinatal mortality rate to fall in both non-induced and induced groups, though not overall.

That there has been an overall fall in perinatal mortality can be explained partly by a reduction in the proportion of high-risk elderly women and those of high parity and low social class, but changes in obstetric practice may also have caused an overall reduction, especially in stillbirths.

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e Antigen in acute hepatitis B

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Summary

To examine the association between e antigen and hepatitis-B surface antigen (HBs Ag) we studied 90 inpatients with acute viral hepatitis type B. e Antigen was present in 24 of the patients; these patients had detectable levels of HBs Ag for significantly longer than the 66 with no e antigen in their serum. The HBs Ag subtypes D (adw) and Y (ayw) were similarly distributed among patients with e antigen and among those without, and no differences in the results of biochemical liver function tests were observed between the two groups during the acute phase of illness. Three of the five patients who developed clinical and histological signs of chronic liver disease were positive for e antigen, a finding which supports the hypothesis that e antigen has a prognostic value in hepatitis B.

Introduction

In 1972 new immunological specificities closely related to the synthesis of hepatitis B surface antigen (HBs Ag) were identified.¹ One of the specificities in this new antigen-antibody system

was designated e. Unlike the determinants of HBs Ag described by Le Bouvier,² e was not a surface component of HBs Ag but represented another distinct antigen carried on free particles physicochemically different from HBs Ag. Further characterisation of e antigen indicated that it had a considerably lower molecular weight than HBs Ag, and, in contrast to HBs Ag, the e antigen was not a lipoprotein, as judged from its buoyant density and non-staining with lipid stains.³ Clinical studies showed that the e antigen was commonly associated with HBs Ag-positive chronic liver disease after hepatitis B.⁴⁻⁶

We report here the results of studies designed to assess the significance of the e antigen in inpatients with acute hepatitis-B infection.

Patients and methods

We studied 90 patients with HBs Ag-positive acute hepatitis who were admitted to the clinic for infectious diseases, East Hospital, Göteborg, from July 1972 to July 1973. Viral hepatitis was diagnosed on the basis of raised aminotransferase levels (at least 10 times the upper limit of normal). Only patients admitted within 10 days after the onset of illness (first appearance of dark urine) were included.

In most cases liver biopsy was not performed, but the diagnosis was histologically confirmed in 30 patients.

All patients received the same treatment, which included a stay in hospital during the period of overt jaundice. Follow-up with repeated biochemical tests of liver function about every two weeks was continued until the values became normal. Corticosteroids were given to 14 patients because of prolonged nausea and vomiting. They initially received 30 mg of prednisolone daily, but this was gradually reduced by about 5 mg a week.

HBs Ag was determined by immunodiffusion and immunoelectrophoresis (IEOP) in parallel, as described.⁷ HBs Ag was subtyped as described elsewhere.⁸ e Antigen and e antibodies were determined by immunodiffusion as described by Magnius and Espmark.¹ The e reagents used have been described in another report.³

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