ten to twenty minutes after each injection. The other patients were constipated in spite of the injections, and required the same dose of aperients during as before treatment. Those patients having normal evacuation were unaffected by the treatment. Only one patient complained of transient abdominal griping following the injections, but this reaction was inconstant.

We are indebted to Mr. Victor Bonney and Mr. A. E. Webb-Johnson for permission to treat and observe some of their cases, and to Dr. Stanley White of Messrs. Parke, Davis and Co. for generous supplies of pituitrin and theelin. The urine analyses were carried out in the Courtauld Institute of Biochemistry, Middlesex Hospital. Lieut.-Colonel J. M. Weddell, R.A.M.C., kindly continued the treatment in one case, and allowed us to see the patient subsequently.

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SEPTIC FOCI AND NORMAL LABOUR

BY

HELEN LEYTON, M.D.

Though it is not always easy to say what constitutes a normal labour no one could deny that some of the cases met with in the Oxford district are both normal and ideal. One comes across women who have an almost painless first stage of labour and only some acute discomfort and a few expulsive pains in the second and third stages. If these were the usual cases the question of supplying anaesthetics in normal labour would not arise. The present investigation was undertaken to try to find out what there was in environment, physique, or general conditions which gave one normal woman an easy labour while others, apparently as normal, suffered so acutely.

With this object in view an exhaustive analysis was made of the notes of cases taken in during the last two years at the Oxford Maternity Hospital. Each detail was tabulated, and a comparison made between the short and long labours. From this it was found that one factor stood out prominently as being associated, not with short, but with long labours. This was the presence of a septic focus in the mother, as indicated either by a note made by the ante-natal doctor or by a rise of temperature during the puerperium.

After the notes had indicated this point, the hospital cases for the five years 1926 to 1930 inclusive were tabulated as to age, parity, pelvic measurements, and weight of baby (to cut out all cases of disproportion), presentation, the time of the first stage and the total length of labour respectively, and the presence or absence of any evidence of a septic focus in the mother. All cases of disproportion, malpresentation, placenta praevia, and abnormality other than sepsis were excluded, and only L.O.A. cases considered. (For the last two years R.O.A. cases are given for comparison.) These normal cases were divided into four groups—country primiparas and multiparas and town primiparas and multiparas—in order to see if the country women suffered less than their town sisters, as is the general impression of those working among them.

The B.M.A. standard was at first taken as indicating a + temperature, but it was soon found that this did not cover the cases in which notes had been made of a septic focus during the ante-natal period. Many of these cases showed a rise to only 99° F. on three or more occasions during the puerperium, and this latter standard was therefore taken as indicating the presence of some chronic septic process, even when no note had been made

of such by the ante-natal doctor. This is again, of course, a purely arbitrary standard, and probably all cases with a rise of temperature to 99° should be suspect. However, for the purposes of this investigation a rise of temperature to 99° on three or more occasions during the puerperium (usually ten days) is that called a + T°, although it is likely that a number of cases in which there was a more or less dormant infection are included in the negative cases.

The most common chronic infections noted were:

Septic teeth	17.7 per cent.
Pyelitis	2.9 ..
Chronic rheumatism	2.5 ..

while a previous septicaemia, or mastitis and gonorrhoea, all amount to about 1 per cent. of the total cases.

Since the average figures for each group do not indicate the frequency with which short labours occur, some of the actual figures are given.

TABLE I.—Total Percentage of + T° Cases. Among Town and Country Cases (all Types)

	Town	Country		Town	Country
1926	19.26	6.0	1929	62.9	52.7
1927	13.8	13.0	1930	45.2	47.7
1928	20.0	19.5			

TABLE II.—Normal L.O.A. Cases, 1926

	Average Time, 1st Stage	Total Time	Age	Weight of Baby
Town primiparas (42 cases):				
14 + T°	18 hours	19½ hours	24	7.4 lb. (Conj. 7)
28 - T°	11½ "	15½ "	23½	7.4 lb. (Conj. 7)
Country primiparas (28 cases):				
8 + T°	18 "	20 "	23	8 lb. (Conj. 7)
20 - T°	10 "	11 "	22½	6.7 lb.
Town multiparas (46 cases):				
3 + T°	8½ "	9½ "	31	7.4 "
43 - T°	5½ "	6½ "	22½	7.2 "
Country multiparas (24 cases):				
All - T°	6 "	7 "	28	7.4 "
Town Primiparas {	Of the - T°s 2 were under 5 hrs. 1st stage, 6 hrs. total.			
	2 " " 6 " " " 7 "			
	All + T°s were over 10 " " 11 "			
Country Primiparas {	Of the - T°s 1 was under 4 hrs. 1st stage, 5 hrs. total.			
	1 " " 5 " " 6 "			
	2 " " 6 " " 7 "			
	2 " " 7 " " 8 "			
	Of the + T°s 1 was " 11 " " 14 "			
	All others were over 14 " " 16 "			
Town Multiparas {	Of the - T°s 2 were under 2 hrs. 1st stage, 3 hrs. total			
	1 was " 3 " " 4 "			
	9 were " 4 " " 5 "			
	6 " " 6 " " 7 "			
	Of the + T°s 1 was " 4½ " " 6 "			
	Others were over 10 " " 11 "			
Country Multiparas {	Of these 1 was under 50 min. 1st stage, 1 hr. total.			
	3 were " 2 hrs. " 3 "			
	3 " " 3 " " 4 "			
	6 " " 6 " " 7 "			

TABLE III.—Normal L.O.A. Cases, 1927

	Average Time 1st Stage	Total Time	Age	Weight of Baby
Town primiparas (60 cases):				
16 + T°	15½ hours	17 hours	25½	6.13 lb.
44 - T°	9½ "	11½ "	23½	6.12 "
Country primiparas (32 cases):				
7 + T°	11½ "	13 "	23	7.0 "
25 - T°	7 "	10 "	20	6.13 "
Town multiparas (58 cases):				
3 + T°	11 "	13½ "	33	7.11 "
55 - T°	6½ "	7½ "	28	7.0 "
Country multiparas (41 cases):				
4 + T°	14½ "	16 "	30	7.11 "
37 - T°	5 "	6 "	30	7.0 "

TABLE III.—*continued*

<i>Town Primiparas</i>	Of the - T ^o 's 1 was under 1 hr. 1st stage, 2 hrs. total.	2 were " 2 hrs. " 3 "	4 "	5 "
	Of the + T ^o 's only 1 was " 5½ " " 8 "	2 were " 3 " " 4 "	3 " " 4 " " 5 "	4 " " 5 " " 6 "
	Of the - T ^o 's 1 was under 2 hrs. 1st stage, 3 hrs. total.	2 were " 3 " " 4 "	3 " " 4 " " 5 "	4 " " 5 " " 6 "
	Of the + T ^o 's 1 was " 4 " " 5 "	2 were " 3 " " 4 "	3 " " 4 " " 5 "	4 " " 5 " " 6 "
<i>Country Primiparas</i>	Of the - T ^o 's 1 was under 1 hr. 1st stage, 1 hr. total.	2 were " 1 " " 2 hrs. " 3 "	3 " " 2 hrs. " 3 "	4 " " 3 " " 4 "
	Of the + T ^o 's the shortest was 10 " " 12 "	7 " " 1 " " 2 hrs. " 3 "	8 " " 2 hrs. " 3 "	9 " " 3 " " 4 "
	Of the - T ^o 's 1 was under 1 hr. 1st stage, 1 hr. total.	3 were " 1 " " 2 hrs. " 3 "	4 " " 2 hrs. " 3 "	5 " " 3 " " 4 "
	Shortest + T ^o 12 " " 14 "	7 " " 1 " " 2 hrs. " 3 "	8 " " 2 hrs. " 3 "	9 " " 3 " " 4 "

TABLE IV.—*L.O.A. Cases, 1928*

	Average Time, 1st Stage	Total Time	Age	Weight of Baby
<i>Town primiparas (67 cases):</i>				
23 + T ^o	18½ hours	21 hours	25	7.1 lb.
44 - T ^o	9 "	12½ "	24½	6.10 "
<i>Country primiparas (45 cases):</i>				
16 + T ^o	15 "	17 "	24	7.0 "
29 - T ^o	8½ "	10 "	24	7.1 "
<i>Town multiparas (57 cases):</i>				
8 + T ^o	10.40 "	11.40 "	29	7.6 "
49 - T ^o	5.50 "	6.20 "	28½	7.8 "
<i>Country multiparas (56 cases):</i>				
11 + T ^o	13.30 "	14 "	31	8.3 "
45 - T ^o	5.40 "	6.30 "	32	8.12 "

<i>Town Primiparas</i>	Of the - T ^o 's 2 were under 1½ hrs. 1st stage, 2 hrs. total.	2 " " 2 " " 3 "	3 " " 3 " " 4 "	4 " " 4 " " 5 "
	Of the + T ^o 's shortest was 5 " " 6 "	2 " " 2 " " 3 "	3 " " 3 " " 4 "	4 " " 4 " " 5 "
	All others were over 9 " " 10 "	2 " " 2 " " 3 "	3 " " 3 " " 4 "	4 " " 4 " " 5 "
	Of the - T ^o 's 2 were under 2 hrs. 1st stage, 3 hrs. total.	3 " " 3 " " 4 "	4 " " 4 " " 5 "	5 " " 5 " " 6 "
<i>Country Primiparas</i>	Of the + T ^o 's only 1 was " 8 " " 9 "	2 " " 2 " " 3 "	3 " " 3 " " 4 "	4 " " 4 " " 5 "
	All others were over 10 " " 11 "	2 " " 2 " " 3 "	3 " " 3 " " 4 "	4 " " 4 " " 5 "
	Of the - T ^o 's 4 were under 2 hrs. 1st stage, 3 hrs. total.	7 " " 7 " " 8 "	8 " " 8 " " 9 "	9 " " 9 " " 10 "
	Of the + T ^o 's the lowest was 6 " " 7 "	7 " " 7 " " 8 "	8 " " 8 " " 9 "	9 " " 9 " " 10 "
<i>Town Multiparas</i>	Of the - T ^o 's 8 were under 2 hrs. 1st stage, 3 hrs. total.	6 " " 6 " " 7 "	7 " " 7 " " 8 "	8 " " 8 " " 9 "
	Of the + T ^o 's 2 " " 7½ " " 9 "	6 " " 6 " " 7 "	7 " " 7 " " 8 "	8 " " 8 " " 9 "
	All others were over 10 " " 12 "	6 " " 6 " " 7 "	7 " " 7 " " 8 "	8 " " 8 " " 9 "
	Of the - T ^o 's 1 was under 3 hrs. 1st stage, 4½ hrs. total.	4 were " 5½ " " 6½ "	5 " " 5 " " 6 "	6 " " 6 " " 7 "

TABLE V.—*L.O.A. Cases, 1929*

	Average Time, 1st Stage	Total Time	Age	Weight of Baby
<i>Town primiparas (48 cases):</i>				
26 + T ^o	14.1 hours	16.1 hrs.	24.7	6.11 lb.
22 - T ^o	12.4 "	13.9 "	24	7.0 "
<i>Country primiparas (44 cases):</i>				
31 + T ^o	15.31 "	17.2 "	24.8	6.4 "
13 - T ^o	8 "	9.4 "	24.8	6.7 "
<i>Town multiparas (47 cases):</i>				
15 + T ^o	13 "	14 "	25	7.3 "
32 - T ^o	5.8 "	6.4 "	28.7	7.2 "
<i>Country multiparas (45 cases):</i>				
11 + T ^o	10.6 "	11.8 "	30.2	8.4 "
34 - T ^o	5.6 "	6.3 "	31	7.3 "

<i>Town Primiparas</i>	Of the - T ^o 's 1 was under 3 hrs. 1st stage, 4½ hrs. total.	4 were " 5½ " " 6½ "	5 " " 5 " " 6 "	6 " " 6 " " 7 "
	Of the + T ^o 's 1 was " 2 " " 3 "	3 were " 6 " " 8 "	4 " " 4 " " 5 "	5 " " 5 " " 6 "
	Of the - T ^o 's 1 was under 1½ hrs. 1st stage, 5 hrs. total.	3 were " 7 " " 8 "	4 " " 4 " " 5 "	5 " " 5 " " 6 "
	Of the + T ^o 's the shortest was 6½ " " 8 "	3 were " 7 " " 8 "	4 " " 4 " " 5 "	5 " " 5 " " 6 "
<i>Country Primiparas</i>	Of the - T ^o 's 2 were under 1 hr. 1st stage, 1½ hrs. total.	10 " " 1 " " 2 hrs. " 3 "	11 " " 1 " " 2 hrs. " 3 "	12 " " 1 " " 2 hrs. " 3 "
	Of the + T ^o 's only 1 was " 3 " " 4 "	10 " " 1 " " 2 hrs. " 3 "	11 " " 1 " " 2 hrs. " 3 "	12 " " 1 " " 2 hrs. " 3 "
	Of the - T ^o 's 1 was under 1 hr. 1st stage, 1½ hrs. total.	3 were " 2 hrs. " 3 "	4 " " 2 hrs. " 3 "	5 " " 3 " " 4 "
	Of the + T ^o 's 1 was " 2 " " 3 "	6 " " 3 " " 4 "	7 " " 3 " " 4 "	8 " " 4 " " 5 "

TABLE VI.—*L.O.A. Cases, 1930*

	Average Time, 1st Stage	Total Time	Age	Weight of Baby
<i>Town primiparas (67 cases):</i>				
47 + T ^o	15.1 hours	17.7 hrs.	24.5	7.0 lb.
20 - T ^o	10 "	13.9 "	22.7	7.2 "
<i>Country primiparas (54 cases):</i>				
33 + T ^o	16.6 "	22.5 "	25	6.5 "
21 - T ^o	11.7 "	13.6 "	26.4	6.8 "
<i>Town multiparas (62 cases):</i>				
19 + T ^o	11.1 "	13.4 "	32	7.5 "
43 - T ^o	5.9 "	7.6 "	30.7	8.1 "
<i>Country multiparas (59 cases):</i>				
29 + T ^o	12.9 "	14.5 "	30.3	7.2 "
30 - T ^o	4.3 "	5.1 "	28.3	7.7 "

<i>Town Primiparas</i>	Of the - T ^o 's 4 were under 5 hrs. 1st stage, 6 hrs. total.	2 " " 8 " " 8½ "	3 " " 8 " " 8½ "	4 " " 8 " " 8½ "
	Of the + T ^o 's 2 " " 2 " " 4 "	5 " " 6 " " 8 "	6 " " 6 " " 8 "	7 " " 6 " " 8 "
	All others were over 11 " " 13 "	5 " " 6 " " 8 "	6 " " 6 " " 8 "	7 " " 6 " " 8 "
	Of the - T ^o 's 3 were under 5 hrs. 1st stage, 7 hrs. total.	3 " " 7 " " 8 "	4 " " 7 " " 8 "	5 " " 7 " " 8 "
<i>Country Primiparas</i>	Of the + T ^o 's 2 " " 5 " " 7 "	3 " " 5 " " 7 "	4 " " 5 " " 7 "	5 " " 5 " " 7 "
	Of the - T ^o 's 3 were under 1½ hrs. 1st stage, 2 hrs. total.	4 " " 2½ " " 3 "	5 " " 2½ " " 3 "	6 " " 2½ " " 3 "
	Of the + T ^o 's 4 " " 4½ " " 5½ "	7 " " 5½ " " 6½ "	8 " " 5½ " " 6½ "	9 " " 5½ " " 6½ "
	All others were over 9 " " 12 "	3 " " 7 " " 8 "	4 " " 7 " " 8 "	5 " " 7 " " 8 "
<i>Town Multiparas</i>	Of the - T ^o 's 5 were under 2 hrs. 1st stage, 3 hrs. total.	7 " " 3 " " 4 "	8 " " 3 " " 4 "	9 " " 3 " " 4 "
	Of the + T ^o 's 1 was " 1 hr. " 2 "	8 " " 5 " " 6 "	9 " " 5 " " 6 "	10 " " 5 " " 6 "
	5 were " 5 hrs. " 6 "	5 " " 5 " " 6 "	6 " " 5 " " 6 "	7 " " 5 " " 6 "
	All others were over 10 " " 12 "	5 " " 5 " " 6 "	6 " " 5 " " 6 "	7 " " 5 " " 6 "

TABLE VII.—*R.O.A. Cases, 1929*

	Average Time, 1st Stage	Total Time	Age	Weight of Baby
<i>Town primiparas (25 cases):</i>				
16 + T ^o	21.9 hours	25.2 hrs.	25.6	6.8 lb.
9 - T ^o	9 "	11 "	27	7.5 "
<i>Country primiparas (27 cases):</i>				
19 + T ^o	20.1 "	23.7 "	25.1	7.0 "
8 - T ^o	12.5 "	15 "	26.5	7.5 "
<i>Town multiparas (33 cases):</i>				
15 + T ^o	8.8 "	10.3 "	27.2	7.7 "
18 - T ^o	5.5 "	6.6 "	23	7.2 "
<i>Country multiparas (25 cases):</i>				
8 + T ^o	7.5 "	9.3 "	29.8	7.0 "
17 - T ^o	6.2 "	7.2 "	29.2	7.7 "

TABLE VIII.—*R.O.A. Cases, 1930*

	Average Time, 1st Stage	Total Time	Age	Weight of Baby
<i>Town primiparas (31 cases):</i>				
14 + T ^o	12.6 hours	15.5 hrs.	23	7.1 lb.
17 - T ^o	11.4 "	13 "	23	7.3 "
<i>Country primiparas (22 cases):</i>				
12 + T ^o	17.7 "	19.8 "	25	7.0 "
10 - T ^o	15.6 "	17.5 "	22.2	6.1 "
<i>Town multiparas (38 cases):</i>				
17 + T ^o	9.9 "	11.2 "	27	7.3 "
21 - T ^o	5.5 "	6.5 "	29.8	7.3 "
<i>Country multiparas (25 cases):</i>				
12 + T ^o	10.2 "	11.8 "	27	7.3 "
13 - T ^o	5.3 "	6 "	29.4	7.6 "

Note.—The average external conjugate measurement of the cases included in the tables was 7.4.

The above tables show that in the year 1926 the number of patients coming from the country districts who had a

+ T° was only 6 per cent., whereas among the town women it was 19.26 per cent. The average length of labour in primiparas and multiparas respectively is approximately the same in town and country cases if they are grouped according to the presence or absence of a septic focus or + T°. The actual number of patients with a + T° was three times as great among the town patients in 1926, and the increase in the length of labour is associated with the + T° cases. In 1927 the number of + T° cases fell somewhat among the town women, but doubled among those coming from country districts. In 1928 the numbers increased again, and have become almost equal in both types. In 1929 the figures have trebled among the town patients, and nearly so among the country women. In 1930 a fall is seen again in the figures of the + T° cases for both types of patient, but the averages are approximately equal, and the total more than double 1926. In each year the cases with evidence of a septic focus are those associated with a prolonged labour, and this is evidenced by the length of the second and third as well as the first stage.

DISCUSSION

When every possible allowance has been made for the influence of changes of personnel in the hospital staff the above figures indicate a serious increase in the number of women suffering from some chronic infection, and show that there is a factor at work associated with the infection which is causing an actual increase in the length of time labour pains have to be endured.

Whether the toxins of the infection cause the increase in the labour pains, or whether there is a common factor causing both, we have not enough evidence to say, but it is hoped that this point may be investigated in the near future.

Changes in diet as a possible factor do not appear to account for the increase, for although a deterioration in the diet of the country people undoubtedly took place during the war, there has not been any appreciable change during the last few years. The increase of the motor industry in the neighbourhood may account for some of the increase among the country cases, as the sudden influx of employees to the district has necessitated many of them finding temporary accommodation in the villages around, but this does not account for the increases among the town people themselves.

The researches of Dr. Delbet and his co-workers (published in the *Bull. de l'Acad. de Méd.*, 1929 et seq.) do, however, suggest an explanation of the above state of affairs. He draws attention to the diminution of magnesium in the food supply of civilized communities following the extended use of artificial manures and the tendency to "purify" such articles as salt and flour. The so-called "table" salt which is sold now at all the village shops in place of the old-fashioned "bars" is depleted of the deliquescent magnesium chloride (and its associated sulphate), and this means a loss to the population of from 40 to 50 grams of magnesium per head per annum.

Further, plants are continuously abstracting magnesium from the soil, and whereas this was formerly returned to it in the manure, the use of artificial fertilizers largely excludes this return, and does not supply the deficiency except in so far as magnesium occurs as an impurity in lime, which is applied only at long intervals. The influence of magnesium in preventing colic and regulating the action of non-striped muscle, as also the need for it at the synapses and neuro-muscular junctions, suggest that it may play a large part in decreasing the pains and shortening the time of their occurrence in normal labour. Pain in the first stage of labour must be looked upon as a form of colic—that is, irregular action of the non-striped muscle—and as it is obviously normal, and used to be not uncommon, for a first stage to pass without

any pain we must aim at getting back to this condition if we are to have normal labours again. It is easy to see also that the degree of pain suffered in the second stage may be influenced greatly by the unhealthy condition of the synapses and neuro-muscular junctions, and therefore the addition of magnesium to the diet of pregnant women seems urgently indicated.

Dr. Delbet advises the use of MgCl₂, MgI, and MgF, but these are not so easy to administer or so palatable as the MgSO₄, and it would probably be easier to get the patients to take the latter form, or, if expense is not in question, the glycerophosphate, as being much better assimilated.

SUMMARY

An analysis of the records at the Oxford Maternity Home for the five years 1926–30 shows that the average length of normal labours in that institution has increased. The number of normal women living in the town of Oxford who had long labours (primiparas over twelve hours and multiparas over six hours) increased from 19.26 per cent. in 1926 to 45.25 per cent. in 1930. Among the women living in the country districts around Oxford it rose from 6 per cent. in 1926 to 13 per cent. in 1927, 19.5 per cent. in 1928, 52.75 per cent. in 1929, and 47.73 per cent. in 1930. The only common factor found in cases of long labour was evidence of a chronic septic focus.

A study of the T° charts of patients in whom a chronic septic focus had been noted at the ante-natal clinic revealed the fact that their T° usually rose to 99 on three or more occasions during the puerperium (usually ten days). An analysis of the notes of the other normal cases which showed a rise of T° on three or more occasions during the puerperium showed that these almost invariably were long labour cases, and, conversely, that short labours had an even T° during the puerperium.

Comparatively short labours are appearing in the recent records more rarely, and the actual average length of time spent in labour has increased by two hours in the last five years.

Only straightforward cases with L.O.A. presentations were included in the statistics, though two years of R.O.A. cases are included for comparison. All the cases were grouped according to age, parity, district, etc., and any case with evidence of disproportion was excluded.

The therapeutic possibilities of magnesium salts added to the diet of pregnant women are discussed, but the number of cases which have received this treatment is at present too small for conclusions to be drawn.

SPINAL ANAESTHESIA IN ACUTE OBSTRUCTION

BY

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It is notorious that the treatment of acute intestinal obstruction is attended by a very high mortality, and it would seem that any material reduction in this is unlikely except as a result of advances in surgical methods and technique. Nevertheless, it is the authors' belief that some improvement would follow the more frequent adoption of spinal anaesthesia.

DRAWBACKS OF INHALATION ANAESTHESIA

The disadvantages of inhalation anaesthesia have long been recognized. The production of adequate muscular relaxation and the often protracted nature of the operation necessitate the use of large amounts of anaesthetic.