

## AN ANALYSIS OF 306 CASES OF CONTRACTED PELVIS.

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AT the Simpson Memorial Hospital in Edinburgh the incidence of contracted pelvis is less than 3 per cent. in patients delivered in hospital after the twenty-eighth week of gestation.

In making an analysis of five years' cases, 306 in all, I have no apology to make for the relatively small number of cases for review because, apart from other considerations, this small number emphasises the relative incidence of the condition of contracted pelvis in Edinburgh and Glasgow. This dissimilarity in numbers also suggests that where there is such a difference in numbers other differences in the type and degree of contraction are present. The Edinburgh figures show that in only 13 per cent. of cases of contracted pelvis is the diagonal conjugate below 4 inches and in less than half of these is the diagonal conjugate below  $3\frac{1}{2}$  inches. A case of gross deformity is an extreme rarity.

Knowing that Dr MacLennan would give an analysis of a large number of cases and that would be sufficient to open the discussion I have confined my investigation to only a few features of the 306 cases occurring between 1932-36, believing that these figures would give a fair cross-section of the results in the Royal Maternity Hospital, without, at the same time, leading to a long repetition of statistics.

In the 306 cases under review there were 31 cases in which the diagonal conjugate was below 4 inches. There was 1 *maternal death* due to chloroform syncope during Cæsarean section. There were 4 *cases of spontaneous delivery* at term and in each case the delivery was fatal for the baby. Death was due to, or associated with, prolonged labour in 3 cases and in the fourth case, death took place after a few days from cerebral hæmorrhage. There were 25 *cases treated by Cæsarean section* with 4 *fætal deaths*, 2 were due to prolonged labour occurring before operation could be performed, 1 was due to prematurity in a case in which labour commenced about the thirty-third week spontaneously. One death remains

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unexplained; the baby was dead when extracted from the uterus.

The foetal death-rate is therefore 25 per cent. in this group. It is not for me to comment further on these cases, but having the advantage of being able to study all the details I may just say that had there been complete antenatal care exercised throughout, Cæsarean section would have been carried out, in many of these, not as a last resort but at the time of election, and, also, earlier application of forceps might have considerably reduced this high foetal mortality.

In introducing my second group of cases, 275 in number, in which the diagonal conjugate measured 4 inches or more but less than  $4\frac{1}{2}$  inches, I may say that the conclusions to be drawn from this study are neither specific nor particular but they are just those wide generalities already stated. The tremendous variations in the possible features of any case, I think, prohibit any dogmatic statements regarding treatment, except this, that any case of contracted pelvis must receive very special care. A contracted pelvis holds the potentialities for introducing into the case almost any, and sometimes many, of the abnormalities of labour, and such a case should always be under the care of those who have a wide experience of obstetric difficulties.

In order to go a little way towards substantiating my remarks about the variability of the features of cases with contracted pelvis, even in the mild degree group, as this is, and also to contrast further the Edinburgh figures with those given by Dr MacLennan, I shall now state in the briefest possible manner one or two details from the analysis of this group.

There were 7 maternal deaths, giving a maternal mortality of 2.5 per cent., and 58 foetal deaths, a foetal death-rate of 21 per cent.

Two of the maternal deaths were in a way unavoidable in that both patients had heart disease. One patient died in chloroform syncope during section, and 1 died seven days after operation from pyæmia from ulcerative endocarditis.

Five were associated with very long labours which terminated, 2 with Cæsarean section after labour had lasted many hours outside hospital, and 3 with forceps after prolonged labour.

With regard to the foetal deaths, I should like to read to you the following details of the conditions, resulting fairly

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directly from the pelvic deformity, which led to the deaths of the babies. In the following four groups:—

## GROUP 1.—*Spontaneous Delivery at Term.*

21 cases = 7·5 per cent. of the total.  
4 foetal deaths = 20·0 per cent.

The cause of death or the associated conditions were :

Prematurity . . . . .	2 cases
Cord prolapse . . . . .	1 case
Long labour . . . . .	1 „

## GROUP 2.—*Induction of Premature Labour.*

52 cases = 18·8 per cent. of the total.  
6 foetal deaths = 11·5 per cent.

The cause of death or the associated conditions were :

Prematurity . . . . .	1 case
Monster . . . . .	1 „
Long labour . . . . .	2 cases
High forceps . . . . .	2 „

## GROUP 3.—*Forceps Delivery.*

63 cases = 24 per cent. of the total.  
16 foetal deaths = 25 per cent.

The cause of death or the associated conditions were :

Prematurity . . . . .	2 cases	F.F.O. . . . .	2 cases
Breech . . . . .	3 „	High forceps . . . . .	2 „
R.O.P. . . . .	3 „	Diagonal conjugate 4 inches . . . . .	2 „
Long labour . . . . .	2 „	Cerebral hæmorrhage . . . . .	2 „

## GROUP 4.—*Cæsarean Section.*

131 cases = 47·5 per cent. of the total.  
12 foetal deaths = 9·2 per cent.

The cause of death or associated conditions were :

Prematurity . . . . .	5 cases
Long labour . . . . .	2 „
Neonatal death . . . . .	2 „
Post maturity . . . . .	1 case
Uncertain . . . . .	2 cases

## DISCUSSION.

*Dr Haultain*, Edinburgh, said that he hoped this would be the beginning of many conjoint meetings of the two Societies.

As both papers included so many statistics and figures it was difficult to discuss them without having these figures continually before him. He would have liked to have heard what deductions the openers drew from the figures. With regard to the foetal mortality

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rate in cases delivered by elective Cæsarean section, he could not see how it should be any higher in severe contracted pelvis than in more minor degrees, yet Dr MacLennan had indicated this was the case.

One had been taught to think that Cæsarean section was absolutely safe for the baby but this was not always the case as was shown principally by the Edinburgh figures; especially was this a fact in Cæsarean section for placenta prævia; Dr Haultain wondered if there was any reason for this fact and also for the disparity between the Edinburgh and Glasgow figures.

He thought it was extraordinary for Dr Robertson to state that premature labour quite frequently occurred in cases of contracted pelvis, because in Dr Haultain's experience it was quite the opposite, and often it was with great difficulty that they could be induced to start at full-time. He had certainly always wished labour would be early as that would have simplified delivery in many cases.

*Dr Lennie*, Glasgow, said that in cases of pelvic contraction the question of induction of premature labour was an interesting one. He thought this method of treatment had fallen into disuse but excellent results could be obtained in properly selected cases. He was glad to hear that the maternal mortality rate was better in cases which had been induced. As to the actual method employed, rupture of the membranes should never be used in cases of contracted pelvis.

Undoubtedly the most difficult type of contracted pelvis was the generally contracted one. Often a little rachitic woman had surprisingly powerful uterine contractions and so delivered her child successfully, while, on the other hand, the woman who seemed to be perfectly healthy and normal, might have a degree of general contraction of the pelvis which had been overlooked, and when labour commenced she might, in addition, suffer from uterine inertia. When labour was delayed in such cases it made the delivery very serious and difficult. If forceps were attempted in cases of general contraction they very often failed, and a generally contracted pelvis was one of the most difficult in which to do a craniotomy because there was little room to work in.

*Dr Fahmy*, Edinburgh, said that Dr MacLennan seemed to imply that, in his series of cases in which measures had been taken to prevent dystocia, the maternal mortality had been high. This point needed explanation.

In neither of the papers read was there any table of cases of trial labour. When properly carried out, this was a very valuable procedure in determining those cases in which Cæsarean section should be performed. For a trial labour, it was generally stated that the membranes should be ruptured and the patient in the second stage before an opinion could be finally given. In practice it was often unwise to allow the patient to carry on to this stage, and it frequently

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became advisable to operate before the cervix was fully dilated. In the milder degrees of contracted pelvis, a trial labour in an institution was always worth while, provided the co-operation of the patient could be gained—a point of clinical importance.

Dr Fahmy still believed there was a place for induction of labour in some cases of contracted pelvis. The size of the pelvis was not by any means the sole consideration; not only must the degree of disproportion be taken into consideration, but the condition of the soft parts also influenced the decision. He was extremely reluctant to induce labour in flat pelvis where the cervix was long and closed, but had often done so when the cervix was soft and partly taken up.

The question of craniotomy was of considerable interest. Some years ago, in collaboration with Dr Crowe, Dr Fahmy reported a personal investigation of 300 still-births to the Edinburgh Obstetrical Society; in that investigation emphasis was laid on the number of cases of craniotomy carried out in women who had previously had several living children. Some of these women had pelves showing mild contraction. The increase in size of the foetuses and the increasingly poor action of the uterine muscle together formed a combination of factors which might result in the need for the performance of craniotomy; if the need for earlier interference had been unrecognised. Professor F. J. Browne had stated that a woman who delivered herself of a 7 lb. child had no pelvic contraction; to the speaker, this seemed rather dangerous teaching, as it carried the implication that disproportion would not occur at a subsequent labour. In regard to the performance of Cæsarean section in cases of pelvic contraction, Dr Fahmy was in favour of the lower segment operation, unless there was adequate reason to carry out the classical procedure.

*Dr Sheehan* said he had picked out a series of thirty-six cases where the mother died of shock following dystocia or from a ruptured uterus following a certain amount of dystocia. Most, but not all the cases, had slightly contracted pelves. The twenty-six cases of dystocia, not associated with rupture of the uterus had an average time of labour of fifty-three hours. The ruptured uterus cases were as usual multiparæ with relatively short labours—about sixteen hours. The point he wanted to emphasise was that it was not only the quarter of an inch reduction in the size of the true conjugate in these slightly contracted pelvis cases that mattered but the size of the baby. The most common trouble was the presence of a large foetus. The mean weight of the babies in cases where the mother died from dystocia and shock or ruptured uterus was 9 lbs.—the mean weight for all the others where the mother survived was 7 lbs. 4 ozs. Was there any more satisfactory method than was employed at present to determine the probable size and weight of the baby before delivery? A knowledge of this during the antenatal period would be of great assistance, in deciding upon the proper treatment.

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*Dr Hewitt*, Glasgow, said that there was no room for complacency with a still-birth rate in the region of 20 per cent. He was in agreement with the emphasis laid on the importance of the minor degrees of contraction. Judgment as to treatment of the severe forms was easier and the results relatively good, whereas in the mild cases the results were relatively poor. According to *Dr MacLennan's* figures, 40 per cent. of the primigravidæ with mild pelvic contraction were delivered by forceps and that alone introduced an element of danger both to the mother and the child.

He was also interested in the question of induction of premature labour. In reviewing the different hospital reports he had always been struck by the fact that in Glasgow this method was seldom used whereas in other centres, as for example in Edinburgh, it was employed much more extensively. At Queen Charlotte's Hospital in 1936 thirty-nine cases of contracted pelvis were induced, whereas forty-one cases were delivered by Cæsarean section. In the same year at the Glasgow Maternity Hospital only twenty-nine cases were induced and one hundred and fifty-four were delivered by section.

In recent years he had been in charge of the Maternity Department at Oakbank Hospital. In that institution he conducted the antenatal clinics himself and was responsible for the treatment of patients from that clinic as well as of patients in labour admitted direct to hospital. There were over 1000 deliveries per annum and the incidence of pelvic contraction there was less than in the Glasgow Maternity Hospital. There were sixty to seventy cases of contracted pelvis per year, *i.e.* about 6 per cent., whereas in the Glasgow Maternity Hospital the percentage was fifteen. Moreover, the type of contracted pelvis seen in Oakbank was much less severe. During last year there were actually fifty-nine cases of pelvic contraction and of these only six required Cæsarean section; the other fifty-three cases were moderate or slight in degree.

It occurred to him that it might be a wise thing if he could avoid, as far as possible, forceps deliveries in the minor cases of pelvic contraction, and with that object in mind he decided to induce labour in these fifty-three cases of moderate or slight pelvic contraction. The method employed to do this was by rupture of the membranes with the catheter. Only one of the fifty-three patients was delivered by forceps; the other fifty-two were spontaneous deliveries. Of the children less than 5 per cent. were still-born or died shortly after delivery.

He would like to stress the fact that in his experience induction in the minor degrees of pelvic contraction was safer for the mother and definitely safer for the child. As regards the time of induction, only a few cases were induced earlier than two weeks before term. One or two were induced four weeks before term and a few three weeks before term, but the majority not more than two weeks, and the length of the subsequent labour did not appear to be materially different from that of a normal case.

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Dr Hewitt said that cases of contracted outlet were sometimes met with ; they were usually not severe and on very few occasions was it necessary to do Cæsarean section for that type of pelvis. In estimating a contracted outlet, he had used for many years a purely clinical method as distinct from X-ray. If he could place two fingers close up under the pubic arch, then the contraction, if there was one, was not sufficient to require any treatment. If a small triangle remained in advance of the two fingers, labour should be induced prematurely.

*Dr Rose*, Edinburgh, said that it was important to consider the size of the infant as well as the degree of contraction in individual cases. The figures given by the opening speakers showed a high still-birth rate, and, by the judicious use of induction of labour, she thought this rate could be reduced. Like Dr Hewitt she believed that about two weeks before term one could judge whether or not the head was likely to fit into the pelvis, and in suitable cases she thought it was good practice to induce labour by puncture of the membranes. She did not think that this method was to be recommended if the head was floating above the brim, unless there was an associated hydramnios in which case the withdrawal of fluid might encourage descent of the head. If a preliminary bacteriological examination had been made to ensure that the cervix was not infected this procedure did not rule out a trial labour followed by Cæsarean section if necessary.

*Dr Mackay*, Renfrew, said he had considerable experience of the use of X-rays in the management of labour in cases of contracted pelvis and found it helpful. He resorted to this examination in border-line cases which had been given a trial of labour and in which spontaneous delivery had not occurred. It was carried out late in labour after indications that labour would require to be terminated artificially had appeared and a decision between Cæsarean section or delivery with forceps had to be made. A carefully taken lateral view gave exact information regarding the position and level of the foetal head and also the amount of moulding which it had undergone. These data were useful in arriving at the correct procedure to adopt. If he found the head lying transversely in the upper pelvis, as was so often the case, he preferred to carry out a lower Cæsarean section. Previously he had delivered a large number of such cases with Kielland's forceps, applying one blade behind the symphysis pubis and the other in front of the promontory of the sacrum, but it was a difficult operation and the foetal mortality was too high. By employing X-rays the risk of vaginal examinations was eliminated and one performed Cæsarean section late in labour with less hesitation.

*Dr Clifford Kennedy*, Edinburgh, noted that in cases of severe contraction of the pelvis 14·2 per cent. of primiparæ and 8·2 per cent.

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of multiparous patients delivered themselves spontaneously. Dr Kennedy wondered why there was a smaller percentage of spontaneous deliveries in the multiparous patients in this group. Was it because the average weight of the child was greater in multiparæ, or did the laxity of the soft parts in parous women play a smaller rôle than the relative weakness of the abdominal and uterine musculature?

He was impressed by the high foetal mortality rate in primiparous patients with a moderate degree of contraction; 19.3 per cent. where the deliveries were spontaneous and 36.4 per cent. where the patients were delivered by forceps. He wondered whether there had been some special contra-indication to carrying out Cæsarean section in certain of these cases and whether this operation might not have been more frequently done with advantage.

In the recognition of a contracted outlet Dr Kennedy was of opinion that more information could be gained regarding the transverse diameter by comparing it with the breadth of the closed fist than by taking measurements which were practically always incorrect.

*Dr Sturrock*, Edinburgh, said that the incidence of contracted pelvis was diminishing. A decrease of 25 per cent. was to be noted when the five-year period 1932 to 1936 during which 306 such cases were admitted to the Edinburgh Royal Maternity Hospital was compared with the preceding five-year period 1927 to 1931 during which 413 cases were dealt with. The proportion of generally contracted pelvis to flat pelvis was greater in Edinburgh than in Glasgow. This he thought partly accounted for the higher percentage of Cæsarean sections carried out in Edinburgh.

Dr Sturrock then presented tables and graphs to show how the foetal risk suddenly increased in a long labour and how Cæsarean section carried out late in labour in the interests of the child was not invariably followed by survival of the child and was often not justified because of the greater maternal risk involved. The tables and graphs were prepared from figures taken from the records of cases of contracted pelvis delivered at the Edinburgh Royal Maternity Hospital during the ten-year period 1927 to 1936 (inclusive).

The first table and the graphs were compiled from the booked cases of cephalic presentations delivered vaginally; thus were excluded the added risks associated with breech deliveries either primary or after internal version. The table and graphs show that the foetal mortality suddenly increased after labour had lasted from between thirty to forty hours. This increase was present and occurred at the same time-interval in both spontaneous and forceps delivery. It was higher in forceps deliveries, but the sudden increase could not be entirely blamed on the forceps. Forceps indeed might often save children if applied at the first evidence of real foetal distress. As a possible indication of this the sustained high foetal mortality in the forty to fifty hour period for spontaneous deliveries was to be noted.



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TABLE I.

*Fœtal Mortality in Contracted Pelvis in Relation to Duration of Labour.*

Fœtal Mortality in 270

Booked Cases.

*Includes :*

Spontaneous onset of labour—Spontaneous delivery.

Forceps delivery.

Craniotomy.

Induction of labour—Spontaneous delivery.

Forceps delivery.

Craniotomy (1 case).

Cephalic Presentations delivered

*per vaginam.*

Duration of Labour.	Total Cases. F.M.	Spont. Deliv. F.M.	Forceps. F.M.
Under 10 hrs.	6 in 79 = 7.6 %	5 in 67 = 7.4 %	1 in 12 = 8.3 %
10-20 "	8 ,, 78 = 10.2 %	4 ,, 59 = 6.7 %	4 ,, 19 = 21.0 %
20-30 "	8 ,, 51 = 15.6 %	4 ,, 32 = 12.5 %	4 ,, 19 = 21.0 %
30-40 "	7 ,, 16 = 43.6 %	1 ,, 3 = 33.3 %	6 ,, 13 = 46.1 %
40-50 "	4 ,, 19 = 21.0 %	3 ,, 9 = 33.3 %	1 ,, 10 = 10.0 %
50-60 "	4 ,, 16 = 25.0 %	1 ,, 6 = 16.6 %	3 ,, 10 = 30.0 %
Over 60 "	2 ,, 11 = 18.1 %	1 ,, 4 = 25.0 %	1 ,, 7 = 14.2 %
	39 in 270	19 in 180	20 in 90

Proportion of cases exceeding 30 hours in labour is 62 in 270 = 23.6 per cent. Of these 62 cases, 40 were delivered by forceps, *i.e.* 64.5 per cent.

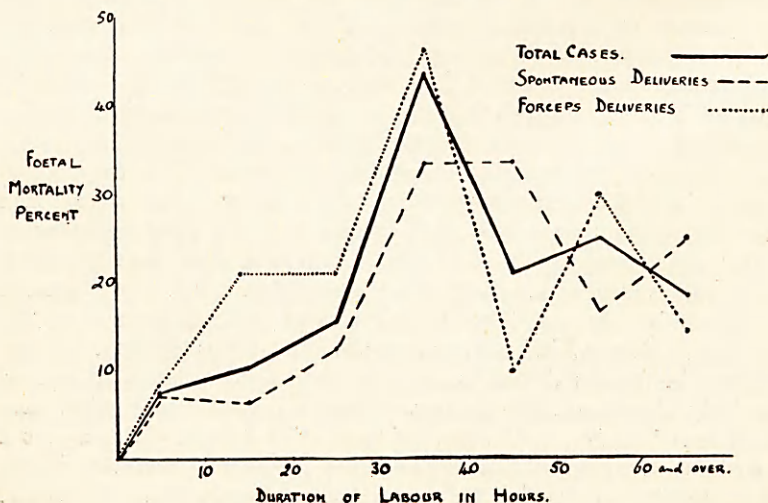
Maternal mortality was 5 cases, *i.e.* 1.8 per cent.

4 occurred between 20-30 hours in labour.

1 occurred between 50-60 hours in labour.

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GRAPH OF FOETAL MORTALITY IN RELATION TO DURATION OF LABOUR.



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Had some of these cases been delivered earlier, provided forceps delivery was safe, the foetal mortality in that group might have been reduced. On the other hand, the sudden drop in the foetal mortality rate, when delivery by forceps took place in the forty to fifty hour period, suggested that had some of the cases in the thirty to forty hour group been left a little longer so that the head might reach a lower level, an easier and safer delivery could have been undertaken, and the forceps foetal mortality rate reduced.

When labour had lasted over thirty hours therefore the chances of the child surviving were considerably diminished. The question of effecting delivery by the abdominal route when the second stage had not been reached within thirty hours, depended on the comparative maternal and foetal risks associated with delivery by Cæsarean section when labour had been in progress for between twenty to thirty hours.

Table II. showed this risk when section was carried out after a patient had been in labour for twenty to thirty hours, and again when it was performed after thirty hours. Here non-booked cases as well as booked cases were included, as the total number was small and the problem of the best method of delivery so often presented itself in the emergency admission with disproportion.

TABLE II.

*Risk from Cæsarean Section carried out after Patient  
has been 20-30 Hours in Labour.*

	Total.	Booked.	Non-booked.
No. of cases . . . . .	17	10	7
Maternal mortality . . . . .	1 = 5.8 %	0	1 = 14.2 %
Foetal mortality . . . . .	3 = 17.6 %	1 = 10 %	2 = 28.5 %

*Risk from Cæsarean Section carried out after Patient  
has been over 30 Hours in Labour.*

	Total.	Booked.	Non-booked.
No. of cases . . . . .	13	7	6
Maternal mortality . . . . .	2 = 15.3 %	0	2 = 33.3 %
Foetal mortality . . . . .	6 = 46.1 %	2 = 28.5 %	4 = 66.6 %

Dr Sturrock concluded that although the number of cases in those groups was small, it indicated that in booked cases where labour had been conducted aseptically and all the facts of the case and the full course of labour were known, the maternal risk was not increased in either group. In non-booked cases the maternal risk was much

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greater especially when labour had lasted for more than thirty hours. If after labour had been in progress for from twenty to thirty hours in a booked case, and vaginal delivery could not be anticipated within the next few hours, Cæsarean section should be considered in the interests of the child. In non-booked cases this procedure was not justifiable, because compared with vaginal delivery the maternal risk with a mortality of 14·2 per cent. was much greater than the total mortality for cephalic vaginal deliveries which in the booked cases of this series was 5 in 270 or 1·8 per cent. and in 97 non-booked cases dealt with during the same ten-year period was 4 or 3·9 per cent. Further, the foetal mortality was high. After thirty hours in labour Cæsarean section even in booked cases was seldom justified in the interests of the child as the foetal mortality by that route did not show a sufficient reduction.

Dr Sturrock also pointed out that the graph of the foetal mortality rate in spontaneous deliveries showed a slight drop between ten and twenty hours from the point plotted for deliveries occurring spontaneously within ten hours. The probable explanation was that some of these labours were too rapid. This was a definite risk in cases induced by medical measures when an extra dose of pituitary extract might be given without it being realised that labour had begun. In three of the six still-births in the group delivered under ten hours, castor-oil, quinine and pituitary extract had been used to induce labour.

*Dr Douglas Miller*, Edinburgh, said that it was instructive to note the progressive decrease in the statistics which had been presented of cases of contracted pelvis which had been treated by induction of labour. He thought this was representative of a general trend in obstetric opinion, and instanced Dr Davidson's paper (from the Rotunda Hospital) as one of the very few which in recent years had advocated this method of treatment. Dr Miller's practice was to leave all cases of contracted pelvis, with few exceptions and irrespective of the degree of contraction, to go to term and then to divide them into two groups, those in which Cæsarean section was obviously necessary and those in which a test of labour might be given. He disagreed strongly with the view that a test of labour had no place in the treatment of this complication. The character of the uterine contractions and the extent to which moulding would occur were two variables which were impossible to assess until after labour had been in progress for some hours, but on which in many cases the possibility or otherwise of vaginal delivery depended.

The chief argument against induction of labour was the uncertainty of the response. Medicinal induction was seldom successful where carried out more than a week before term, and mechanical measures not only compromised a subsequent abdominal delivery if an error in judgment had been made, but were not infrequently followed by a slow, unsatisfactory kind of labour. What was gained in respect

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of the child being smaller was often lost in a less effective type of contraction.

Dr Miller was in full agreement with what Dr Sturrock had said in regard to the risks to both mother and child which prolonged labour involved; in such cases the prevention of dehydration and of hypoglycæmia and the danger of chloroform anæsthesia were of great importance.

*Dr Morris*, Ayr, expressed personal disappointment that the discussion had dealt so much with the management of contracted pelvis recognised in the antenatal period, since in the hospital where he was working he was much more commonly faced with obstructed labour due to contracted pelvis previously unrecognised.

In view of the support given by Dr MacLennan's figures to his own clinical impression with regard to the heavy mortality in high forceps operations in such cases, Dr Morris felt that very often, even at a late stage, Cæsarean section was preferable although a forceps delivery was theoretically possible.

*Dr D. F. Anderson*, Glasgow, said that high forceps deliveries could be avoided entirely by the employment of the lower segment Cæsarean section operation. The question of the size of the child had already been discussed. A week ago there was admitted to the Glasgow Maternity Hospital a woman who had had six spontaneous deliveries with no trouble whatsoever. On this occasion, however, she had had a very long labour; the position was left occipito-posterior, and in that case a lower uterine segment Cæsarean section was performed because definite disproportion was found to be present. This proved to be the patient's largest child. The placenta was expressed *per vaginam*, thereby minimising the risk of infection. So far the patient has shown no untoward symptoms. He was of opinion that the lower uterine segment type of operation reduced the maternal and certainly the foetal mortality rate in such cases.

*The President* thanked the openers of the discussion for the trouble they had taken in analysing and classifying large numbers of cases, and congratulated them on the excellent reports they had presented to the meeting. He also thanked all the others who had contributed to the discussion, and especially Dr Sturrock and Dr Sheehan for the special contributions they had prepared.

The series of tables and wealth of statistics contained in the opening papers were certainly difficult to absorb in the time available, but when printed in the Edinburgh Society's *Transactions* they would be a most valuable addition to the literature of this difficult obstetric problem.

Several points stood out very clearly from the discussion. Dr MacLennan had emphasised the fact that while the gross forms of rachitic deformity were disappearing as a result of earnest public health campaigning, they were still in Glasgow left with a very large

number of cases of moderate and slight pelvic deformity. The gross types of rachitic pelvic deformity did not present a serious problem to the obstetrician: in most cases the only possible treatment was Cæsarean section. The other cases required much more consideration and the tables presented showed how serious those lesser deformities were for the mother, and even more so for the child.

The most careful measurements of the pelvis and of the foetal skull, even during the later weeks of pregnancy still left labour a clinical experiment in each case. Fractions of an inch or millimetres in pelvimetry might be measured by modern radiography, but there were much more important factors, particularly the exact degree of disproportion: the relationship of the presenting part to the pelvic brim: the mouldability of the foetal skull and above all the uterine response in labour. The use of radiography to view the course of delayed labour, as suggested by Dr McKay, was likely to be helpful—it would make less and less justifiable repeated vaginal examinations. Even without radiography very accurate estimates of progress in such cases could be obtained by skilful abdominal palpation over the pelvic brim. The difference in the incidence of contracted pelvis in Glasgow and Edinburgh, referred to by Dr Robertson, was very striking.

The next important point was the great advantage in having all cases with any indication of pelvic disproportion in hospital from the onset of labour. The cases could be selected in the late weeks of pregnancy by efficient antenatal supervision and those cases which had been missed should be sent to hospital as soon as any evidence of dystocia appeared. In hospital it was possible to give adequate consideration to every factor in the case—in the event of dangerous delay, appropriate treatment could be carried out under the most favourable circumstances. He did not want to stress too hard the need for mature judgment in the management of such cases, but there was no finer proof that while obstetrics must be based on scientific principles, the application of these principles was essentially an art, and a very fine art.

Reference had been made by several speakers to the importance of the variations in the size of the foetus in the same patient in different pregnancies. This was a clinical fact which Professor Hendry always impressed upon students. It was fairly common to find that one woman may have had six or seven babies born spontaneously and then in later pregnancies, particularly if she was forty years of age or more, there was a steady increase in the size of her babies until she was found in one labour to have absolute dystocia requiring Cæsarean section.

Dr Robertson's report that women with contracted pelvis often go into labour prematurely was far from the President's experience. On the contrary, he believed that the present care of those patients in hospital was partly responsible for those pregnancies being protracted rather than shortened. Reliable clinical observations had

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shown that if a pregnant woman was allowed to continue her ordinary domestic duties, labour was likely to come on more promptly than if she was brought into hospital and carefully rested in bed for some time before labour was due. They should have some form of regulated exercises for these patients while waiting in hospital.

While no specific reference had been made to "Trial Labour" by Dr MacLennan in his opening paper, the President's own policy in cases of contracted pelvis was certainly *trial labour*. The practice in his unit in the hospital was to allow all patients, even those with marked degrees of disproportion, to go into labour. He found that a woman with a flat pelvis, in which the conjugate diameter was very short, would sometimes develop strong labour pains very quickly and expel spontaneously a child weighing 7 lbs. or more. In the practice of *trial labour*, constant and skilled supervision was required: exhaustion of the mother and danger to the foetus must be anticipated. Dr Douglas Miller's remarks on this point were very valuable. Many years ago French obstetricians recommended cane sugar as a stimulant for the uterus in protracted labour: a very sound physiological principle, in that carbohydrates are the most economical sources of energy production. His own practice in cases of prolonged labour was to administer not only glucose, but also such sedative drugs as would save the patient from mental exhaustion. The interference with the sympathetic nervous system by emotional strain under such circumstances was a serious handicap. For this purpose such simple sedatives as chloral and bromides were helpful: morphia and its derivatives, hyoscine, and barbiturates were more powerful and required careful administration, but could be very satisfactory.

Several references had been made to the prognosis for the foetus in Cæsarean section performed for pelvic disproportion. He had made a note from the Annual Report of the Royal Maternity Hospital for 1936. In that year 154 cases of contracted pelvis were treated by Cæsarean section—108 by the classical operation and 46 by the lower uterine segment operation: an interesting indication of the types of operation favoured by the three units in the hospital. In the classical group there was one still-born child, and two children died in hospital—one in a case where the contracted pelvis had been complicated by placenta prævia, and the other a poor-developed twin. In the lower uterine segment group all the children were born alive: one died from pneumonia in hospital, and another from debility, the mother being a poorly nourished woman with extreme pelvic deformity.

While the opening papers indicated that induction of premature labour had lost favour as a form of treatment, Dr Hewitt had made a good case for its continued consideration. The President supported Whitridge Williams's view in considering primigravidæ, but he was prepared to induce premature labour in selected multiparæ. He adopted this variation in policy because one of the most important factors in prognosis was the woman's response to labour, or "labour

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equation." When that was known, careful selection for induction could secure very good results in subsequent pregnancies.

Another very important principle emerged from Dr Hewitt's contribution to the discussion. In Oakbank Hospital the patients were all during pregnancy under the personal supervision of the obstetrician who was going to be responsible for the conduct of labour in each case. This system showed the art of obstetrics at its best. It was an argument for continuous control by the same unit of the woman through pregnancy, labour and the puerperium, with an institution as the most satisfactory place for the confinement of not only abnormal but also normal cases. Again, the best type of institution was that which was under the control of one obstetrician whose personal attendance was continuously available. When they were dealing with labour in contracted pelvis, mature judgment and skill must always be immediately available—the best results could not be obtained when the doctor in charge might have to deviate in his judgment about the optimum moment for interference because of other professional demands.

*Dr MacLennan*, in replying, said that he was replying also on behalf of Dr Robertson. He expressed regret that, owing to the wide scope of the subject, it had been impossible to refer to every aspect.

With regard to the question raised by Dr Fahmy of the high death-rate amongst patients for whom steps had been taken to prevent dystocia, as shown in Table V, Dr MacLennan drew the attention of the meeting to the fact that figures in this Table did not give a *percentage death-rate*, but were actual numbers in a group of seventy-five deaths. Actually, the death-rate in this group was higher than is generally appreciated. The cause of death in these cases was due chiefly to post-operative pneumonia, post-operative shock or to generalised peritonitis following upon a selective Cæsarean section.

He agreed with Dr Lennie that cases in which general pelvic contraction existed, the management was a more difficult problem, and stressed the point that slight contractions in this type of pelvis were readily overlooked.

He felt that Dr Hewitt and Dr Rose, in advocating induction in slight cases, and in producing figures which showed excellent results, had focussed the attention of the meeting on one of the most important aspects of the management of labour in contracted pelvis.

The dangers associated with large babies had been strongly put forward by Dr Sheehan and had been dealt with by the Chairman, who had also been good enough to answer several other queries, including that of Dr Haultain's.

It remained with him only to thank the meeting for the attention they had afforded the openers, their forbearing criticism and interesting discussion.