Three Lectures

ON

CONTRACTED PELVIS.

DELIVERED IN THE UNIVERSITY OF LONDON,
FOR ADVANCED STUDENTS,

BY

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I.

IN considering contracted pelves certain measurements have been laid down as normal, and, strictly speaking, any pelvis with measurements less than these is contracted from an anatomical aspect. From the obstetric aspect a more liberal view must be taken, as the condition only requires treatment if it interferes with normal delivery. The pronounced cases of contraction arise from malformation and are associated usually with marked deformity. The majority of such women do not marry or enter the domain of obstetrics, and the few who become pregnant are so obviously deformed that there is no question of treatment. On the other hand, the lesser degrees of contraction occur in women who, although somewhat under the normal of general development, show no deformities or physical disabilities. These women enter the province of child-bearing with equal frequency to the women with anatomically normal pelves and so furnish the vast majority of obstetrically contracted pelvis cases. The absence of physical disability excludes the suspicion of disproportion from the minds of these women and their friends, and consequently the question is frequently not raised until difficulty in parturition has developed. This oversight is further promoted by the fact that numbers of small-built women go through parturition without any difficulty.

From the obstetric aspect there are two factors that enter into the difficulty in delivery when all other conditions are normal; these two factors are the size of the pelvis and the size of the infant.

The normal pelvis has been defined as having an antero-posterior diameter of $4\frac{1}{2}$ in. or 10.5 cm. and a transverse diameter of $5\frac{1}{2}$ in. or 13 cm. at the brim. The cavity of the pelvis is practically circular, with 5 in. diameters at its greatest and $4\frac{1}{2}$ in. at the smallest planes. The dilated outlet is also practically circular, with diameters of $4\frac{1}{2}$ in. The normal newborn infant is commonly looked upon as weighing 7 to $7\frac{1}{4}$ lb., and the diameters of the head which engage in the pelvis with a normal presentation are both $3\frac{3}{4}$ in. There is considerable variation on both sides of the average in the weight of infants and the size of their heads; little notice is taken of this unless it causes difficulty, but in the case of the pelvis anything under the average is classed as contracted. In a given case the pelvis is of a certain size and remains so, but the foetal head is capable of reduction in proportion to its consistence. Whether such reduction will be compatible with the well-being of the infant depends upon the amount demanded, but it has an enormous influence upon the obstetric outcome.

In the past various efforts have been made to classify contracted pelves in simple groups based upon the type and the dimensions of the antero-posterior diameter, with a view to laying down a suitable treatment for each group. It was not till near the end of the last century that an attempt was first made to bring in the ratio of the foetal head as a means of checking the conclusions drawn from the estimated size of the pelvis; still, the number of anomalies was found to be very great. This is well illustrated in the tables given by Munro Kerr in his work *Operative Midwifery*, and particularly in the tables made from cases observed by himself; his observation is worth repeating:

"From these figures it is perfectly evident that the possibility of spontaneous delivery through a narrow brim is greater than is generally supposed, and as my experience increases I am more and more convinced of this; but I find it very difficult to persuade others of the fact."

The tables which I have compiled for the purpose of these lectures illustrate this fact very clearly and correspond very closely with the results obtained by earlier observers.

They clearly demonstrate that it is not possible to classify contracted pelves so as to lay down the treatment of cases in groups, and further show that each individual case must be treated on its merits and with careful observation. The degree of contraction greatly influences the prognosis of the case, but it does not exclude pelvic delivery even in the major degrees nor assure pelvic delivery in the minor degrees.

When I took charge of the Rotunda Hospital I endeavoured to base my treatment of contracted pelvis upon the dimensions of the pelvis and the recognized methods of estimation. In a very short time I found that doing so indicated Caesarean section as the treatment in a number of cases wholly out of proportion to what was found necessary by my predecessors, and patients who theoretically should deliver themselves easily failed to do so, while others who should be quite incapable of delivery by the natural passages delivered themselves easily and successfully without the question of contraction being raised until their measurements were considered afterwards. In consequence I have adopted the practice of testing each individual case, with the exception of a few with pronounced evidence of disproportion. From the practical point of view, I think this is important, and certainly for the teaching of obstetrics. If the student is taught to look upon contracted pelvis as a condition calling for Caesarean section, when he goes into practice and meets a case in circumstances which preclude section he looks upon it as hopeless of delivery by the normal passages, calling for interference from the start, and as the result of this interference ending in disaster, and thus further confirming the belief that contracted pelvis means a hopeless case. It is therefore essential to teach the student how to recognize contracted pelvis, how to estimate the proportions, and above all how to observe the progress of a case so as to recognize, at an early stage, those incapable of delivery through the pelvis, so that proper treatment may be adopted. By so doing 70 to 80 per cent. of cases of contracted pelvis will terminate after a no more difficult labour than normal cases, and those cases requiring obstetric surgery can be conveyed to where such can be properly carried out, before complications or distress have developed, and without being subjected to harmful premature efforts at delivery which preclude proper treatment.

Contracted pelvis in itself has no detrimental effect upon a woman, and neither has normal labour in the presence of contracted pelvis. The harm arises from the prolongation of ineffectual labour, and this is a gradual development. With the present-day facilities for travel there are very few spots in these countries too remote for the conveyance of a patient to a centre where she can be safely treated before secondary complications have developed. In those few places too remote the practitioner can deal with the case by possibly undesirable methods, such as craniotomy, when the impossibility of successful pelvic delivery has been demonstrated, but before complications have arisen, and subsequent labours can be arranged for during pregnancy to be conducted under suitable conditions.

VARIETIES OF CONTRACTED PELVIS.

A very large number of types of contracted pelvis have been described, but these for practical purposes can be divided into four main groups containing the majority of cases and one miscellaneous group including the irregular and rare types. The four main groups are:

1. The symmetrically contracted pelves.
2. The small round pelves or transversely contracted pelves.
3. The generally contracted flat pelves.
4. The simple flat pelves.

These are all dependent upon the length of the diameters compared with the normal standard and each group includes variations of the ratio of the diameters so that the different groups approach each other.

In the normal pelvis the antero-posterior diameter of the brim is the narrowest passage through which the foetus has to pass; the transverse diameter is amply spacious. In contracted pelvis any or all the diameters may be reduced, but it is reduction in the antero-posterior diameter that first influences the prognosis for delivery. A

relatively small reduction in the antero-posterior diameter brings it down to the length of the diameter of the normal foetal head that has to pass through. In the transverse direction there is room for a very considerable reduction before the size of the foetal head is reached. When both the antero-posterior and the transverse diameters are reduced the influence is more pronounced because the power of the transverse diameter to compensate for the reduction in the antero-posterior is lessened, but this loss of compensation is not felt till the antero-posterior diameter is reduced to the size of the foetal head. It is this that makes it advisable to divide contracted pelvis into four groups based upon the diameters at fault. In my tables there are 190 cases of contraction met with during one year. I have not included cases with an external conjugate of more than 18 cm. except in the table of round pelvis and two cases with marked difficulty in flat pelvis. The average external measurements of these 190 contracted pelvises are: interspinous 23.25 cm. (9.3 in.); intercrystal 25.85 cm. (10.3 in.); and external conjugate 17.78 cm. (7.1 in.); thus showing a considerable reduction in all the diameters, although some of the cases only had reduction in one diameter, as in the simple flat pelvis and some of the small round pelvis.

The average weight of the infants born is 7 lb. 0.3 oz. I think I can claim that the cases I have classed as contracted pelvis are admissible compared with other centres, as the average measurements of 99 consecutive cases submitted to Caesarean section on account of contracted pelvis in another hospital were: interspinous 9.2 in.; intercrystal 10 in.; and external conjugate 7.2 in.; while the average weight of the infants delivered was 6 lb. 14½ oz.

Comparison of Average External Measurements in Rotunda Cases with Cases in another Hospital, treated by Caesarean Section.

	I.S.	I.C.	E.C.	Weight of Infants.
190 Rotunda cases ...	9.3 in.	10.3 in.	7.1 in.	7 lb. 0.3 oz.
99 cases submitted to Caesarean section in another hospital for contracted pelvis	9.2 in.	10.0 in.	7.2 in.	6 lb. 14½ oz.

I.S. = Interspinous. I.C. = Intercrystal. E.C. = External conjugate.

I have based the diagnosis upon external measurements, as these can be taken of every case, whereas other methods are impossible in numerous cases. I take the intercrystal measurement as the basis for the transverse. It is more constant than the interspinous, which is often increased by splaying in the rachitic cases irrespective of the internal dimensions.

Symmetrically Contracted Pelvis.

My first table shows 33 cases of symmetrically contracted pelvis. In this group the antero-posterior measurement ranged from 18 to 15 cm. and the transverse diameter was reduced in proportion; thus the cases with a conjugate of 18 cm. had an intercrystal of within a fraction either way of 26 cm., and the case with a conjugate of 15 cm. had an intercrystal of 22 cm. I am very strongly inclined to believe that this type of contracted pelvis is more an hereditary characteristic than a developmental fault, the women being merely a small-statured type, and therefore may be expected to have small infants compatible with the maternal pelvis. This expectation is upset in some cases by a disproportionate paternal stature. The proportion of low forceps to spontaneous deliveries in this group is not greater than the common average of all cases. There is one case of upper strait forceps, and this must be considered due to the contraction, but the infant was large for the group. Three patients were delivered by Caesarean section; in all the infant was small; two of the cases had had previous sections done. The third case is especially interesting.

A primipara was given a trial of labour; the proportions seemed bad. At the end of twelve hours' labour the membranes ruptured, and two hours later I decided to do a section, although my assistant, who had been watching the case, maintained that progress was perfectly satisfactory according to the principles laid down for prognosis, and indicated a normal termination. I

Small Symmetrically Contracted Pelvis.

External Conjugate.	No. of Cases.	Spontaneous Vertex.	Forceps.		Pubiotomy.	Caesarean Section.	Infant.		Maternal Mortality.	Other Presentations and Modes of Delivery.
			Low.	Upper or Middle Strait.			Average Weight (lb./oz.)	Born Dead or Lived.		
cm. 15	1	—	—	—	—	1 R. 6/5	—	—	—	
15½	—	—	—	—	—	—	—	—	—	
16	2	2	—	—	—	—	7/1	—	—	
16½	4	2	—	Upper 7/1	—	1 6/8	7/0	—	—	
17	6	4	1 8/4	—	—	1 R. 4/10	7/1	—	—	
17½	11	9	1 6/4	—	—	—	7/2	—	—	Version for transverse; 7/5.
	9	9	—	—	—	—	7/3	—	—	
	33	26	2	1		3				1

Note.—In this and the following tables the actual or average weight of the infants delivered by any operative means is indicated by the smaller figures (for example, 6/12). An asterisk indicates the mode of delivery of infants born dead or which died. Forceps: Low = head or perineum; middle = head through brim but not to perineum; upper = head still gripped by brim. The average weight of infants is exclusive of difficult or premature cases. R. under Caesarean section indicates a repeated operation.

performed the section two hours later, and when I opened the uterus I found the head, very little moulded, had passed the brim so completely that I had to apply forceps to bring it up again. The patient would probably have delivered herself within an hour, and has delivered herself spontaneously at term, in a subsequent pregnancy, of a 6½ lb. baby after ten hours' labour—one and a half hours second stage.

The case treated by version for transverse presentation was a 2-para, admitted well on in labour with a hand prolapsed; her previous delivery was of a breech. This malpresentation must be looked upon as due to the pelvis, although final delivery was relatively easy. Altogether five cases, or 14.4 per cent., in this group called for greater operative interference than normal cases, or, omitting the unjustified Caesarean section, 12.12 per cent.

Transversely Contracted or Small Round Pelvis.

The next table is of transversely contracted or small round pelvis; it contains 69 cases. The antero-posterior measurements run from the normal 20 cm. down to 17 cm. With each of the antero-posterior measurements there may be almost any degree of transverse contraction; thus one case had interspinous 21 cm., intercrystal 23 cm., external conjugate 20 cm., and similar transverse measurements were associated with each antero-posterior measurement.

Transversely Contracted (Round) Pelvis.

External Conjugate.	No. of Cases.	Spontaneous Vertex.	Forceps.		Pubiotomy.	Caesarean Section.	Infant.		Maternal Mortality.	Other Presentations and Modes of Delivery.
			Low.	Upper or Middle Strait.			Average Weight (lb./oz.)	Born Dead or Lived.		
cm. 17	3	2	—	Upper 6/12	—	—	6/8	—	—	
17½	5	3	2 6/13	—	—	—	6/12	—	—	
18	36	27	3 7/1	Mid. 3* 8/0	1 6/15	1* 8/4	6/15	2	—	Breech; difficult.
18½	10	5	3* 7/2	—	1* 7/0	—	6/15	2	—	Breech; arrested
19	9	2	2* 7/12	Upp. 2* 7/15	1 9/0	—	7/9	3	—	
20	6	?	1 7/11	—	2* 7/11	—	—	2	1	Breech: easy. Face forceps. Face flexed spont.
	69	39	11	6	6	2		9	1	5

The antero-posterior diameter in this group is not reduced below 17 cm., as then, even with the maximum reduction likely to be met with in the transverse, the type of pelvis becomes first a symmetrically contracted and

after that point a generally contracted flat. This group contains the greatest transverse contractions met with, excepting two cases where the antero-posterior was 15 or 16 cm., and thus brought the pelvis into the type of symmetrically contracted. This type of pelvis is difficult to account for; it is the male type. The women are not badly formed; although some are decidedly small, many are quite average in stature.

The most remarkable thing in this group is the incidence of difficult obstetrics. Fourteen vertex presentations had marked difficulty at the brim, while two that passed the brim resulted in dead infants. The incidence of low forceps is above the normal average, and was several times associated with more than normal moulding. Besides the vertex cases, two out of three breech cases presented abnormal difficulty, and there were two face presentations with small-sized infants in multiparae.

There were in all 20 difficult cases, or 29 per cent., and with the exception of one case difficulty occurred with an external conjugate of 18 cm. or greater. An important feature of this type of pelvis is that the case may present very little evidence of disproportion early in labour. The head, although not well into the brim of the pelvis, does not override in front.

Generally Contracted Flat Pelves.

The next table shows 70 cases of generally contracted flat pelves. The antero-posterior diameter is not shown greater than 18 cm., as then none of the diameters are

Generally Contracted Flat Pelvis.

External Conjugate.	No. of Cases.	Forceps.		Pubiotomy.	Caesarean Section.	Infant.		Maternal Mortality.	Other Presentations and Modes of Delivery.
		Low.	Upper or Middle Strait.			Average Weight (lb./oz.).	Born Dead or Died.*		
cm. 15	2	1	—	—	—	7/4	—	—	1 premature, 36 weeks; 4/5.
15½	—	—	—	—	—	—	—	—	—
16	5	4	—	—	—	8/0	—	—	Breech premature, 32 weeks; 3/15.
16½	1	1*	—	—	—	—	1	—	—
17	16	10	8/5 1 7/15	—	1 R. 7/14	6/11	1**	—	1 premature, 36 weeks; 5/7; version for brow; 7/6. Perforation 2**
17½	12	11	—	—	1 R. 8/6	7/1	—	—	—
18	31	30	4 7/12	—	—	7/0	—	—	—
—	70	56	6	—	2	—	2	—	6

* Perforation done for macerated hydrocephalic foetus in eclampsia and in case of prolapsed cord pulseless, followed by spontaneous delivery.

reduced to those of the foetal head; even the 18 cm. produces no effect on delivery. In this group of cases the pelvic capacity is always greater than for any given external conjugate in a round pelvis. The transverse diameter may be very little less than the normal with any degree of flattening, so that the pelvis nearly conforms with the simple flat and is better transversely than the symmetrically contracted. The incidence of difficulty in this group is not great. One large infant was delivered by low forceps with excessive moulding and died of intracranial haemorrhage; the necessity for low forceps is only average. Two cases were delivered by section—one had previously been delivered by section; in both the infant was above the average size. In a 3-para who had previously delivered herself normally a brow presentation was treated by version. In a primipara the cord prolapsed when the membranes ruptured and the os was only two fingers dilated; the foetus was dead, so the head was perforated and spontaneous delivery followed. This and the premature cases are inconclusive, and on the whole the cases with an 18 cm. conjugate may be excluded; so that the incidence of difficulty was 3 out of 32 cases, or 9.38 per cent., or, including the prolapse of cord case and three premature cases, the percentage is 19.5.

Simple Flat Pelves.

My fourth table contains 18 cases of simple flat pelves. The intercrural diameter was never less than 27½ cm., while the external conjugate was as low as 15½ cm. Two cases are included with 18½ and 19 cm. conjugates, which

Simple Flat Pelvis.

External Conjugate.	No. of Cases.	Forceps.		Pubiotomy.	Caesarean Section.	Infant.		Maternal Mortality.	Other Presentations and Modes of Delivery.
		Low.	Upper or Middle Strait.			Average Weight (lb./oz.).	Born Dead or Died.*		
cm. 15½	1	—	—	—	1 8/12	—	—	—	—
16	1	—	—	1 7/12	—	—	—	—	—
16½	—	—	—	—	—	—	—	—	—
17	2	2	—	—	—	8/12	—	—	—
17½	3	1	8/4 3 7/9	—	1 R. 7/14	7/15	—	—	—
18	9	6	—	—	—	6/15	—	—	—
18½	1	—	—	—	1 6/12	—	—	—	—
19	1	—	—	1 6/4	—	—	—	—	—
—	18	9	4	2	3	—	—	—	—

would indicate a negligible reduction in size, but in both the head failed to enter the brim after a reasonable trial of labour, and delivery was effected by pubiotomy or section. Both cases suggested rickets with splayed iliac crests. Excepting these cases difficulty was in proportion to the degree of antero-posterior contraction, associated to some extent with the size of the foetus. On the whole the infants tended to be larger than in the other tables. Excluding the two large measurements for which spontaneous deliveries are not included, this group shows abnormal difficulty in 3 out of 16 cases, or 18.75 per cent., and the application of low forceps compared with spontaneous delivery is higher than in any other group. The cause of this type of pelvis, excluding the rachitic ones, is difficult to suggest. The most important character in a simple flat pelvis is the pronounced forward projection of the head, or even obliquity over the brim of the pelvis, when it is not incompatible with pelvic delivery.

Rachitic Pelvis.

The following table is composed of cases from the preceding groups. Symmetrically contracted, 6 cases, 18.18 per cent. Small round (transversely contracted), 12 cases, 17.40 per cent. Generally contracted flat, 13 cases, 18.57 per cent. Simple flat, 2 cases, 10.10 per cent.

Rachitic Pelvis, Splayed Iliac Crests.

External Conjugate.	No. of Cases.	Forceps.		Pubiotomy.	Caesarean Section.	Infant.		Maternal Mortality.	Other Presentations and Modes of Delivery.
		Low.	Upper or Middle Strait.			Average Weight (lb./oz.).	Born Dead or Died.*		
cm. 16	4	4	—	—	—	7/9	—	—	—
16½	2	1	1* 8/5	—	—	7/12	1*	—	—
17	3	2	—	—	—	6/8	—	—	Version for brow, 7/6.
17½	5	5	—	—	—	6/12	—	—	—
18	14	11	1 8/12	Mid. 6/13	—	7/1	—	—	Arrested breech, 8/11.
18½	1	—	—	—	1 6/12	—	—	—	—
19	2	—	—	2 6/11	—	—	—	—	—
20	2	—	1 7/11	—	—	—	—	—	Face forceps, 5/15.
—	33	23	3	1	1	—	1	—	3

My last table is composed of 33 cases taken from the preceding four groups; they are cases that showed splaying of the iliac crests and suggesting a rachitic origin. Whether other cases showed rachitic evidence without this characteristic I am unable to say as I have no definite notes, but the number of cases would be very small. In the symmetrically contracted cases there were 6 splayed pelvises, or 18.18 per cent.; in the transversely contracted 12 cases, or 17.40 per cent.; in the generally contracted flat 13 cases, or 18.57 per cent.; and in the simple flat 10.10 per cent. There is a remarkably close percentage in three of the groups, which suggests that though rickets is a cause of contracted pelvis it is not the dominant cause of any special type. In the case of the simple flat pelvis the percentage of splayed crests is markedly lower than in the other groups, and rather conforms with the absence of other evidence of malnutrition which I think is observable in this group. The influence of this pelvic defect upon parturition is not pronounced; only 5 out of 33 cases presented abnormal difficulty, or 15.15 per cent. One large infant, delivered by low forceps through a small pelvis, died of intracranial haemorrhage, otherwise results were good and the incidence of low forceps little above the average, being dependent largely upon the size of the foetus.

Taking the whole series of 190 contracted pelvis cases, 38, or 20 per cent., presented abnormal difficulty, or this was avoided by prematurity, requiring Caesarean section in 10 cases, pubiotomy in 8 cases, forceps to impacted head in 7 cases, and perforation after prolapse of cord in 1 case. Eight of these infants were born dead or died, 1 was delivered by section, 4 by pubiotomy, 2 by forceps, and 1 perforated. There was no evident cause of death in the infant delivered by section as the operation was done early. I shall refer to the forceps and pubiotomy cases later. Twenty-three cases, or 12.1 per cent., were terminated by low forceps; in only two cases was labour protracted, but in several others, as well as after spontaneous delivery, moulding was more than normal. One infant was delivered dead after a hard rapid labour and prolonged second stage, one died an hour after birth, and one on the second day, cause of death unknown. The incidence of forceps deliveries for all cases in the hospital during the year is 7.63 per cent., and for primiparae alone 16.66 per cent. The majority of the low forceps cases in contracted pelvis were primiparae, so that the incidence in contracted pelvis is not greater than normal.

Other Types of Contracted Pelvis.

Besides the types of contracted pelvis with which I have dealt there are a great number of others, each of which is very rare, and taken together do not occur in more than 1 or 2 per cent. of all cases of contracted pelvis in obstetrics; these cases may be grouped as irregularly distorted pelvises. In two years I have done Caesarean section on 1 case of assimilation pelvis, 1 case of spinal curvature with ankylosis of one hip, 1 case with fracture of the pelvis and marked exostosis, and 1 case of synostotic pelvis. In another hospital in two years, out of 261 cases of contracted pelvis there were two cases of obliquity due to hip disease, one kyphotic pelvis, and one round pelvis associated with hip disease. On the other hand, I have had cases of severe lumbar curvature and hip disease who have shown no contraction and have delivered themselves easily. Such cases are the common illustrations of contracted pelvis in museums and textbooks. This has the effect of impressing the student with the idea that such cases mainly constitute contracted pelvis, whereas they only provide a few cases, and it gives a very false value to the term "contracted pelvis" and its influence upon delivery.

There is one more type of contraction to which I wish to refer.

Contracted Outlet.

It is only to be expected that with reduction in the brim of the pelvis there should be reduction in the outlet. My experience is that if the brim will allow the head to pass there will be no greater difficulty at the outlet. In my four years in the Rotunda Hospital I have never had difficulty in extracting a head that had advanced to the

outlet. I believe the cases of reputed difficulty due to the outlet are in reality cases of disproportion at the brim and all through the pelvis, which are not noticed until the head hangs up in the pelvis, and the difficulty in delivery is due to the distortion during the forcing of the head to the outlet, and consequent interference with the mechanism. I never take measurements of the outlet, and therefore have to go to another hospital for figures. I find out of 261 cases of contracted pelvis 65 reported as contracted outlet not included in other groups; 41 of these cases ended in spontaneous delivery and 19 were terminated with forceps; 4 are not accounted for. Only one was treated by section—a primipara not in labour. I found no case treated by section on account of demonstrated difficulty at the outlet in previous confinements. With the exception of rare types of distorted pelvis I consider contraction of the outlet, independent of other contraction of the pelvis, of little clinical importance.

THE FOETAL HEAD.

The second element in the production of disproportion is the size of the foetal head. The estimation of this before birth is practically impossible. There is a large range in the size of heads as well as in the weight of infants, and this variation occurs in contracted pelvises as much as in normal cases.

There does appear to be a tendency for women with contracted pelvises to produce small infants, but not always enough to balance the contraction of the pelvis or to discount the larger heads. In a normal case the head presents two diameters of $3\frac{3}{4}$ in. to pass the brim, and there is ample space in all directions, so that heads considerably above the average size can pass. In contracted pelvis there is less margin between the head and the pelvic brim and less scope for variation in size. As a result of the diminished margin of space, the head is unable to fit down into the brim and so the principal indication of disproportion is produced—a head high and free above the pelvis. It is not the bony pelvis that keeps the head high, but the interposed soft tissues, and these can be displaced only by labour; but when this has occurred the head frequently enters and passes the brim easily.

DEGREE OF CONTRACTION.

Although in my earlier remarks I have pointed out the failure of defining treatment by degrees of contraction, I

*Degree of Contraction, showing Cases, Treatment, and Result.
Premature Deliveries included under Others.*

	No. of Cases.	Spontaneous.	Low Forceps.	Upper Forceps.	Pubiotomy.	Caesarean Section.	Other.	Percentage Difficult.
Minor Degree. C.V. greater than 9 cm.; transverse than 10.75; E.C. 18½; I.C. 26.	?	?	1	0	3	2	1	?
Medium Degree. C.V. 9 cm. or greater than 8; transverse not less than 10.75; E.C. 18-16½; I.C. 25½.	157	114	20	5	4	4	10	14.65
Major Degree. C.V. 8 cm.; transverse 10.75; E.C. 16½; I.C. 25½.	26	17	2	2	1	4	0	31.61

think there is some advantage in grouping cases for teaching the prognosis of pelvic delivery. Contracted pelvis may be divided into minor, medium, and major degrees. For this purpose I take the antero-posterior diameter as a basis and govern it by its relation to the average foetal head and the transverse diameter of the pelvis. The average foetal head may be taken as having diameters of 9.5, capable of reduction by moderate moulding to 9 cm.

Minor Degree.—This degree includes those cases in which the conjugate is better than 9 cm. and the transverse better than 10.75 cm. In this degree, with the maximum of contraction in both directions, the antero-posterior space is not incompatible with the passage of the average biparietal diameter. This degree of contraction may be represented in external measurements by an external conjugate of 18½ cm. and an intercrystal of 26 cm. The

prognosis for pelvic delivery is very good and improves as either diameter increases above the minimum. In my tables only seven cases of this degree are included, in which some trouble occurred; two of these were markedly rachitic, and in four others the foetus was considerably above the average size.

Medium Degree.—The medium degree includes all cases with the conjugate reduced to 9 cm., but not less than 8 cm., and a transverse reduced below normal but not less than 10.75 cm. These measurements are represented by an external conjugate of 18 cm. but not less than 16½ cm., and an intercrural reduced to 25½ cm. When the conjugate is reduced to 9 cm. it precludes the passage of an average biparietal diameter, but the average bitemporal diameter is about 8.25 cm., and capable of slight reduction. The prognosis in this degree depends upon to what extent the bitemporal can be substituted for the biparietal, and this depends upon the transverse diameter. When the transverse is normal, the maximum exchange can occur, the pelvis is simple flat in type, and the prognosis is good even with the conjugate reduced to 8 cm. On the other hand, with the transverse reduced to 10.75 cm. no change from the biparietal can occur, and its passage depends upon moulding, which has reached its limit of safety at 9 cm. The pelvis is transversely contracted in type, and the prognosis, although good, is not better than the simple flat with an 8 cm. conjugate. As both diameters are gradually reduced the prognosis gradually gets worse. Of my cases 157 come into this degree, and 23, or 14.6 per cent., had difficulty greater than low forceps or were premature.

Major Degree.—The major degree of contraction is when the conjugate is reduced to 8 cm. No improvement is obtained even with a normal transverse, as the space is not compatible with the average bitemporal diameter. The prognosis is bad for pelvic delivery. Twenty-six cases come into this degree, and 9, or 34.6 per cent., were difficult.

In all three degrees of contraction the prognosis is improved by a reduction of the foetal head below the normal average, while increase in the size of the head makes the prognosis worse.

CARCINOMA OF THE COLON.*

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CARCINOMA of the colon is a disease which is both common and insidious, which is absolutely certain to end the patient's life if not properly treated, but which may take several years to do so; it is probably one of the most favourable forms of malignant disease which is found anywhere in the body, for it is slow-growing, remains long confined to the bowel wall, does not spread rapidly to the neighbouring glands, and only tends to form metastases rather late in its course. Unfortunately its symptoms are insidious and equivocal, and it is owing to this that its treatment is often delayed, so that the results are at present sometimes not so satisfactory as they might be. It is well known that one of the main symptoms of malignant disease of the large bowel is obstruction, more or less acute, and perhaps it is fortunate that in many cases this onset of obstruction occurs early in the disease and calls attention to the need of operation, though it would really be greatly preferable for operation to be performed if possible before the obstruction sets in.

In this paper I intend to deal only with cases of carcinoma of the true colon, and do not include the rectum, for two reasons: first, because the diagnosis of the rectal cases is very much more easy and straightforward; and secondly, because, the rectum being an extraperitoneal organ, the operative treatment of carcinoma, when it occurs there, is rather different.

Malignant disease of the large bowel is, of course, most

commonly seen in the pelvic colon and caecum, but we meet with it not infrequently in the splenic flexure and the transverse and descending colons, while it is least commonly found at the hepatic flexure. Microscopically it is usually of a true columnar type, but to the naked eye it appears in three very distinct forms, and I wish to lay especial stress on these three naked-eye types, for they have an important influence in both diagnosis and treatment. The first type, or Type A, is the annular or ring carcinoma, which is the commonest form and gives the well known appearance of a string tied round the bowel; this is more common on the left side of the colon than the right, and it naturally tends to produce obstructive symptoms earlier than do the other forms. The second form, or Type B, is the proliferating or fungating type, which grows into the bowel lumen and forms a large tumour and a palpable swelling. This is commoner in the right side of the colon than the left, and is of comparatively slow growth. The third type, or Type C, is the hard, craggy ulcer, which grows down into the bowel wall and infiltrates it widely. This is, fortunately, rare in the colon, though common in the rectum, and I say fortunately because it is the most malignant of the three types, most prone to cause metastases, and also to give rise to the fewest and least noticeable symptoms. The relative malignancy of these types is also of importance in the question of operative technique, as we shall see later, for it may greatly influence the extent and scope of the operation to be performed in any individual case: Type C is the most malignant, Type B the least malignant, and Type A is of an intermediate degree of malignancy.

Course and Diagnosis.

In the diagnosis of this condition there are several features on which I should like to lay especial stress. Most of these cases which a surgeon sees are either in a state of acute obstruction, or else come complaining of constipation and chronic obstruction, or of a tumour in the abdomen.

Now all these conditions must be regarded as late developments in the case, comparable in a way to the development of peritonitis in a case of acute appendicitis, or of coma in a case of cerebral tumour. Earlier diagnosis is admittedly difficult and may even be speculative, but it is most important that it should be made if possible, and there are usually certain symptoms which may give rise to a sufficiently strong suspicion to justify an exploratory operation. These are, in the first place, colicky pains and uncomfortable sensations after meals, diffused more or less through the abdomen, and often accompanied by loud borborygmi and gurglings. Sometimes a patient will state that these borborygmi and pains seem to pass up towards some particular spot in the abdomen and then disappear, and he will perhaps suggest that it feels as if there were a blockage at this point well before any really definite symptoms of obstruction are present. Secondly, there is nearly always a history of a certain amount of irregularity in the action of the intestines, either diarrhoea or constipation; and the right and left hand sides of the colon appear to behave very differently in this respect, for whereas in the case of a growth in the left side of the colon there is nearly always more or less marked constipation, in the right side of the colon a growth very rarely causes constipation, but more frequently diarrhoea and loose motions. It is well known that a growth at the extreme end of the colon and in the rectum will cause prolonged diarrhoea, but this is really a spurious diarrhoea and not quite comparable with that due to a carcinoma in the caecum and ascending colon; it serves to call attention, however, to the fact that every case of diarrhoea in an adult which persists for more than ten days and does not promptly react to medical treatment urgently demands examination to see if there is a malignant growth, either in the lower end or the upper part of the colon. The constipation, which in other cases is so marked a symptom, often gives the clue to the whole condition, and the sudden commencement of difficulty in getting the bowels to act in a middle-aged patient who has previously been perfectly regular in this respect is a most suspicious symptom.

* Extracts from a paper read to the Shrewsbury Division of the British Medical Association.