LOCKED TWINS

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Locking of twins is a very rare complication, said to occur about once in every 90,000 deliveries and in 1 of every 1,000 cases of multiple pregnancy. Various forms of locking are described, but some of these are more accurately referred to as 'collision' of twins, e.g. when both heads present and become jammed at the brim and/or in the cavity of the pelvis. Reviewing the literature, we have found references to and reports on 12 cases of this variety recorded to date. Locking or collision, where one foetus presents by the vertex and the other lies transversely, is even less common, only 4 cases having been reported. The rarest form of obstruction occurs where both present by the breech, and of this variety 3 cases are recorded in the literature. By far the commonest variety appears to be true 'chin-to-chin' locking, where the first foetus presents as a breech and its aftercoming head is held up by that of the 2nd twin having come to lie below it. Of this type of locking, we have been able to obtain details of 27 cases, and reference is made by McLintock[1] to a further 7, the details of which are unfortunately not available to us.

In studying the reports of cases of the latter variety of locking (breech and vertex), we were impressed by the striking similarity of the circumstances under which many of the authors, particularly amongst the earlier ones, were called to these labours. Only too often did they arrive to find the first baby born by the breech as far as the umbilicus and already lifeless. How they made the diagnosis of locking and, nothing daunted, variously set about the delivery, makes fascinating reading and, the truly remarkable salvage rates for the second twin, speak volumes for the dexterity of past generations of obstetricians. However, with improvement in antenatal care and the more universal availability thereof to expectant mothers, X-ray diagnosis of twin pregnancy and hospitalization for delivery under supervision of experienced resident obstetrical staff, it is evident from the more recent publications that locking, or the possibility thereof, is now more frequently diagnosed before the breech of the first baby has been born so far as to entail its irrevocable loss. Timely intervention by manipulation or Caesarean section has enabled several recent authors to report highly gratifying cases where both infants survived. We have been fortunate enough to have recently delivered locked twins alive by Caesarean section in a patient of our own, where the operation was carried out for indications quite unrelated to the locking. This complication, however, became apparent only during the abdominal delivery. Whereas our survey of the literature has made us humbly aware of the fact that this unique experience of having practically completed the ideal treatment of twin locking at the time of making the diagnosis, has not been the good fortune of any of the previous authors on the subject, we have thought fit to publish a report of our own case. Moreover, there were several features amongst the pre-operative clinical findings which, in retrospect, fit in rather strikingly with the ultimate finding of locking, and which (on close scruitiny of previous case records) have been proved not dissimilar from the findings therein reported at the stage where locking had not yet been diagnosed.

Eastman[2] remarks that the condition of locked twins has not been encountered once among 950 cases of twins in 75,000 deliveries at Johns Hopkins Hospital. If a man of his experience (not forgetting Smellie[1]) has never met with this complication, it is most unlikely that many readers of this communication will do so. However, should our observations stimulate enough interest to occasion the taking of a few more intrapartum X-rays to exclude locking, where the possibility suggests itself at an early and favourable stage, the publication of this paper will have been justified. Moreover, we hope that our review of the literature and list of references will be as useful to future authors as we have found that of Lawrence.[3]

Case Report

A primigravida, aged 21, was first seen at the 22nd week of her pregnancy. Both her own and her husband's mothers had had twins. She attended regularly for antenatal examinations, at monthly intervals until the 30th week, and thereafter fortnightly. Weight gain, blood pressure and urine were normal at all visits, and oedema absent. The uterus was found throughout to be very tense and rather tender; and at no time was it possible to make out the lie of the foetus. The progressive enlargement of the fundus was never in excess of what was expected for the dates, and foetal heart tones were heard on the right side below the umbilicus. All was well until the 36th week, when the patient had a small painless antepartum haemorrhage and her blood

pressure was noted to be 140/100 mm. Hg. A few days' rest in hospital on low salt diet brought her blood pressure down to its previous level of 120/80 mm. Hg where it remained until 3 days before she went into labour, when it was again recorded at 140/100 mm. Hg. On this day, also, a second foetal heart was heard in the left hypochondrium. It was still quite impossible to make out the lie of the twins or to feel any definite foetal parts, owing to the extraordinary tenseness and tenderness of the uterus. There had been no repetition of the small blood loss she had had some 4½ weeks previously. At no time was there albuminuria. She was put to bed.

Labour commenced at 2 a.m. on 28 March 1958, the day after her calculated expected date of delivery. The membranes ruptured at the onset. During the next few hours, in the presence of good contractions, which soon occurred every 3 minutes, her blood pressure rose to 160/110 mm. Hg and ++ albumen appeared in the urine. She also developed bruises on her legs and arms, her nose commenced bleeding, and she vomited dark altered blood. Later, blood appeared in the urine as well.

Blood investigations, carried out at this stage, gave the following values: Haemoglobin 12·9 g.%, packed cell volume 37%, leucocytes 12,600 per c.mm. (neutrophils 78%, lymphocytes 15%, monocytes 7%); platelets 305,000 per c.mm. (normal in morphology), fibrinogen 400 mg.%, prothrombin time 20 seconds (normal 14), prothrombin index 70%, blood group B, Rh positive. The blood picture was, therefore, within normal limits, apart from the prothrombin values, which were not so abnormal as to be within the 'bleeding range', but which might suggest deficiency of prothrombin, factor V or factor VII. There was no time for carrying out the more intricate specific tests for these factors, and the above values were determined by the Quick method.

The uterus remained very tense and tender, and it was quite impossible to distinguish contractions, which the patient was seen to experience at 3-minute intervals. As before, it was impossible to outline foetal parts. The uterus reached to the xiphisternum and did not feel broad (as is usual in the presence of twins). Only 2 poles could be felt, at the fundus and pelvic brim respectively. Two foetal hearts were audible, in the right iliac fossa and left hypochondrium respectively, both markedly irregular at different rates. They were auscultated carefully for about 15 minutes; the former slowed to 70 beats per minute, then picked up to 108; whilst the other slowed to 90 per minute and picked up to 140.

Oxygen was administered to the patient and she was given an intramuscular injection of 10 mg. of synkavit. Vaginal examination was next carried out and revealed a smallish female breech in the pelvis in the RSP position, with the cervix well applied to it, thin, and 4 fingers dilated. Pelvic measurements were adequate.

The diagnosis was made of foetal distress in the first stage of twin labour, in the presence of moderately severe preeclamptic toxaemia and (possibly) concealed accidental haemorrhage, with an abnormal bleeding tendency. It was decided to carry out an immediate Caesarean section as the only hope of delivering both babies alive.

At operation, there was a small amount of free blood in the peritoneal cavity, and the uterus was cyanotic in appearance but not Couvelaire. After opening the lower segment, the breech of the first infant was dislodged with some difficulty from deep in the pelvis. The arms were delivered, and then it was found that the head would not come. With traction, the head of the second twin appeared in the incision, still within its amniotic sac. The sac was ruptured, and this infant delivered as a vertex from where it had been locked by its chin below that of the presenting twin. The latter was thereafter delivered with ease as a breech. The placenta, which was small for twins, was single with 2 amnii and 1 chorion. There was a small 2-inch square retroplacental clot and corresponding depression. The patient's ovaries and tubes were normal. The operation was completed in routine fashion. One was struck by the finding that there was very little bleeding from the uterus, but diffuse oozing from the subcutaneous fat, which could only be controlled by multiple figure-of-eight fat sutures.

The babies were uniovular mirror-image females, one having a double little toe on the right foot and the other an extra little toe on the left foot. A paediatric colleague was in attendance at the delivery, and found his charges in good condition, requiring no real resuscitation, and exhibiting no other congenital

TABLE I. RESUME OF CLINICAL FINDINGS

No.	Age	Parity	Maturity	Initial clinical findings	Eventual clinical findings	Management (1) 1st foetus. (2) 2nd foetus	Weights of infants: 1st lb.	1st oz.	2nd lb.	2nd oz.	Outcome to infants: 1st	2nd	Uniovular or Binovular	Reference
1	24	0	40	Called in 2nd stage.	Breech born as far as umbilicus. Dead. 2nd head felt below 1st.	Disengagement. (1) Extraction. (2) Version and extion.	4	0	3	12	SB	A	Not stated	Russell[5] (1938)
2	?	0	40	Called in 2nd stage—in labour 3 days. Tonic contraction of uterus.	Breech born as far as umbilicus. Dead. 2nd head felt below 1st.	(1) Decapitation. Extraction of trunk. (2) forceps.	Large		Large		SB	A	Binovular	MacDonald[6] (1912)
3	19	0	40	Called in 2nd stage. Neither foetal heart audible.	Breech born as far as shoulders. 2nd head locked below 1st.	Disengagement. (1) Extraction. (2) Version and extraction.	4	2	4	13	SB	SB	Uniovular	Bowles[6] (1938)
4	24	0	36	Called in 2nd stage.	Breech born to umbilicus. Dead. 2nd head locked below 1st.	(1) Decapitation. Extraction. (2) Forceps	?		4	9	SB	A	Binovular	Tonkes[7] (1952)
5	?	?	?	Called in 2nd stage.	Breech half born. Dead. 2nd head found to be below 1st.	Second foetus (2) delivered first with forceps, (1) then extracted.	?		?		SB	A	?	Broers[8] (1856)
6	?	?	?	Called in 2nd stage.	Breech born to umbilicus. Dead. 2nd head found below 1st.	(1) Decapitation. Extraction. (2) Forceps.	?		?		SB	A	?	Stenström[9] (1951)
7	33	4	?	Called in 2nd stage.	Body of 1st child outside vulva. Another head tightly in pelvis.	(1) Decapitation 'with brass pianoforte wire'. (2) Forceps, then forceps to 1st head.	Not stated		Not stated		SB	SB	Not stated	Bunting[10] (1875)
8	?	0	37	Presumably called in 2nd stage.	Findings presumably as in the foregoing cases.	(1) Decapitation. (2) Forceps.	4	10	5	2	SB	A	Not stated	Gehse[11] (1926)

9	?	0	33	Presumably called in 2nd stage.	Presumably as in foregoing cases.	(1) Decapitation. (2) Forceps.	4	0	4	0	SB	A	Binovular	Whitfield[12] (1937)
10	19	1	40	Admitted end of 1st stage. Large abdomen. Identification foetal parts or hearts difficult.	2nd head discovered in pelvis after arms of 1st delivered. Hearts stopped.	Perforation of 2nd head. Traction on (1). Perforation and extraction. Extraction (2).	5	6	5	0	SB	SB	Binovular	Gordon[13] (1956)
11	25	4	36	Abdomen tense. No small parts palpable.	Descent ceased at scapulae. Arms extracted. Another head felt.	(1) Decapitation. Extraction. (2) Forceps.	5	4	5	12	SB	SB	Binovular	Geggie[14] (1947)
12	31	2	36	Difficult to make out lie; ? breech, ?? twins. Tense. P.V. breech. Induction for toxaemia.	Breech born as far as shoulders. Dead. 2nd head felt below 1st.	(1) Decapitation. Extraction of trunk. (2) Spontaneous vertex.	4	4½	4	5	SB	A	Binovular	Te Groen[15] (1938)
13	33	0	39	Antenatally uterus large. Difficult to make out lie. X-ray ordered. Failed to attend.	Breech born to umbilicus. Arms. Traction failed. Cord stopped.	Disengagement. (1) Extraction. (2) Forceps.	Not stated		5	1	SB	A	Uniovular	Spence[16] (1937)
14	34	0	36	Tense uterus. Foetal parts indefinite. X-ray confirmed twins. Induction for toxaemia.	Became shocked in labour. Foetal hearts stopped. Locking at delivery.	Disengagement. (1) Extraction (2) Forceps.	4	1½	4	11	SB	SB	Binovular	Wright[17] (1942)
15	21	0	38	Tense abdomen. Foetal parts difficult to palpate. P.V. small breech. X-ray twins. Toxaemia.	Cord stopped with birth of umbilicus. Traction failed. Locking found.	(1) Evisceration and decapitation Extraction. (2) Forceps	4	10	2	13	SB	SB	Binovular	Wright[18] (1942)
16	19	0	39	? Vertex, not engaged at clinic. X-ray asked. Went into labour. Footling at full dilatation.	No advance. General anaesthesia. Prolapsed nonpulsating cord. Locking.	Disengagement. (1) Extraction. (2) Forceps.	4	0	5	3	SB	A	Binovular	Moore[19] (1933)
17	36	0	36	Twins confirmed by X-ray. Called in 2nd stage.	Breech born to axillae. Dead. Head in iliac fossa. Another engaged.	Disengagement. (1) Extraction. (2) Spontaneous vertex.	3	0	3	0	SB	A	Uniovular	Love[20] (1944)
18	16	0	32	Admitted in labour. Head thought to be entering brim. Two feet felt at full dilatation.	Traction. Advance ceased at level of umbilicus. Arms delivered. Locking found.	(1) Decapitation. Extraction. (2) Forceps.	3	9	3	6	SB	NND	Uniovular	Nicolson[21] (1942)
19	25	0	39	Difficult to palpate. Thought to be oblique. Labour before X-ray. At ½-dilatation, foot felt.	Breech born to umbilicus. Extraction failed. 2nd head found below 1st.	(1) Decapitation. (2) Forceps.	4	12	3	4	SB	A	Uniovular	Hunter[22] (1928)
20	23	0	38	Twins diagnosed by X-ray at 16 weeks. Locking and constriction ring diagnosed at end of 1st stage.	Hips born. No advance. Anaesthesia. Locking and ring confirmed. Cord stopped.	Fillets to (1). Caesarean Section. Decapitation of (1) still necessary.	Not stated		5	0	SB	A	Uniovular	Williamson[23] (1953)
21	36	2	?	Breech diagnosed vaginally in labour, then twins felt abdominally. X-ray confirmed, showed locking possible.	No advance 2nd stage. X-ray: locking. No attempt at extraction.	(1) Displaced upwards. Disengaged. Extracted. (2) Version and extraction.	4	9	8	3½	A	A	Binovular	Friedman[24] (1953)
22	23	1	40	Called in 2nd stage (sister had seen 2 small feet and loop of cord).	Attempt at extraction. Progress ceased at umbilicus. 2nd head then felt.	Disengagement. (1) Extraction. (2) Spontaneous vertex.	4	10	5	3	A	A	Uniovular	Greig[25] (1946)
23	30	1	39	Large abdomen. No definite foetal parts palpable. Two foetal hearts heard.	No advance 2nd stage. Leg and 2nd head, still in its membranes, felt.	Disengagement. (1) Extraction. (2) Version and extraction.	5	3	4	4	A	A	Uniovular	Bradlow[26] (1944)
24	24	2	37	Twins diagnosed at 27 weeks, confirmed by X-ray at 32 weeks. First stage ¾ hour only.	Trunk of 1st delivered, and head then found locked above that of 2nd.	Forceps to 2nd head, and both heads delivered together.	4	0	4	12	A	A	Uniovular	Kimball, Rand[27] (1950)
25	?	?	?	Presumably called in 2nd stage.	Not described by reviewer.	Breech pushed up. Caesarean Section.	?		?		A	A	?	Peters[28] (1937)
26	?	?	?	Not known.	Footling. Cord and vertex.	Caesarean Section.	?		?		A	A	?	Stenström[29] (1951)
27	31	0	41	Easy palpation early in labour. Breech and vertex.	No advance. X-ray showed locking.	Caesarean Section. Crushed chest, (1), by head (2).	6	4	5	8	NND	A	Binovular	Lattuada[30] (1951)
28	21	0	40	Uterus tense. Difficult to determine lie. Only 2 poles palpable, but 2 foetal hearts heard.	Toxaemia. Accidental haemorrhage. Foetal distress in 1st stage.	Locking found at Caesarean Section (2) delivered 1st, then (1).	4	12	5	9	A	A	Uniovular	Hofmeyr, Roux[31] (1958)

A = alive SB = stillborn NND = neonatal death

abnormalities. The birth weight of the infant that had presented first was 4 lb. 12 oz. and that of the other 5 lb. 9 oz. As the mother's right breast had been destroyed by burns in infancy, lactation was suppressed and the twins were artificially fed. They made good progress and when discharged on the 22nd day, weighed 6 lb. and 6 lb. 10 oz. respectively.

The mother's vaginal loss was minimal, but she did not stop bleeding from her nose and gums and she vomited small amounts of altered blood until the evening. When her haemoglobin was found to have dropped to 10 g.% when estimated again the next day, 2 pints of blood were administered. Not unexpectedly, she developed a small wound-haematoma, which became infected but cleared up satisfactorily after probing. Her recovery was otherwise uncomplicated, and she went home on the 15th day to prepare for the reception of her twins.

REVIEW OF THE LITERATURE AND DISCUSSION

A review of the literature will be confined to the variety of true or chin-to-chin locking. As has already been pointed out, many of the authors first saw the cases when the breech of the presenting foetus had already been born. Where clinical findings at an earlier stage are available, we have been impressed by the similarity to those in our patient, and have attempted a review in table form to illustrate some of these points (Table I).

From the table, it will be seen that 7 of the authors,[4-10] and presumably a further 2,[11,12] were unfortunate enough to be called in at the stage when the first twin had already been half born and its heart had stopped. Of these 9 cases, parity is unknown to us in 2, of the others all except 1 were primigravidae. In 7 of these cases, the 2nd infant was saved by the dexterity of the attendants as outlined in the summary of how each individual case was managed.

In only 2 cases, those of Greig[25] and Kimball and Rand,[27] where the authors were busy effecting delivery and the trunk of the first twin had been born when locking was discovered, were both born alive. Greig was called in the 2nd stage for a breech presentation complicated by prolapse of the cord; in Kimball and Rand's case twins had been diagnosed antenatally, and the first stage had only taken ¾ hour. Both these patients had had babies before. The other 2 patients, who had both infants delivered alive vaginally,[24,26] were also multigravidae and both were known to be carrying twins. In these 2 cases the diagnosis of locking was made before any attempt at extraction, and such manipulation was consequently avoided until disengagement had been effected.

Of the 4 cases where both infants were delivered alive by Caesarean section,[28-31] parity is unknown to us in 2; but Lattuada's case[30] and our own were primigravidae and were known beforehand to have been expecting twins.

Of the 11 cases remaining to be discussed,[13-23] 8 were primigravidae and 3 multiparae. All lost the first twin, and 4 lost both. Seven of the 2nd infants were born alive thanks to the management, but 1 died neonatally. All of these 11 patients were first seen at some stage when both infants were still alive and before expulsion of the trunk of the eventually doomed first twin had commenced. In only 4, all primigravidae, was the diagnosis confirmed, and radiological examination had been necessary to arrive at it. In 8 of these 11 cases it had been noted that abdominal palpation and identification of the foetal parts or the lie was difficult, and the uterus was unusually tense in 4. These findings appear very similar to those which puzzled us in our own patient.

We suggest that (1) the possibility of twins be investigated radiologically in all cases where palpatory findings are obscure after the 32nd week, and (2) that the possibility of locking be borne in mind particularly where a twin pregnancy is known to be present (by the presence of 2 foetal hearts or radiological confirmation) but where 2 babies cannot definitely be outlined. This applies particularly in cases like our own, where the uterus felt unusually tense throughout the latter months of pregnancy, and where only 2 poles (the breeches, as it turned out) were palpable, one at the fundus and one at the pelvic brim. Where such conditions apply in a case of twins, an intrapartum X-ray, such as that carried out by Lattuada, might reveal locking or the possibility thereof.

In a multiparous patient, as in those 4 successfully delivered vaginally without loss of either infant,[24-27] a satisfactory outcome by this route might be anticipated, provided that there should be no attempt at extraction before disengagement.

In the primigravida, Caesarean section is strongly advised.

SUMMARY

A case is reported of locking twins, discovered at Caesarean section carried out for foetal distress in the presence of concealed accidental haemorrhage in a primigravida with pre-eclamptic toxaemia and an unexplained bleeding tendency which manifested itself during the first stage of labour.

The literature is reviewed and discussed with special reference to possibly helpful clinical signs which might raise the suspicion of twin locking.

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