VACUUM EXTRACTION IN UNROTATED VERTEX

by

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Since Malmström published his monograph, in the year 1957, extensive trial has been given to the vacuum extractor (ventouse) all over the world and the place of the instrument in obstetric practice has been more or less established. Controversy now exists, not about the apparatus itself, but regarding its field of application and its exact indications. For example, there is no unanimity of opinion about its value in unrotated vertex. Literature on this particular problem is meagre. Few papers on vacuum extraction show figures relating to the rotation of the head as well as the perinatal mortality in occipito-posterior and occipito-transverse positions of the vertex.

In this paper 50 cases of unrotated vertex, where Malmström's apparatus was used, have been studied in an attempt to ascertain its value in occipito-posterior and occipito-transverse positions of the vertex, specially in the second and late first stages of labour.

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Clinical material

There were 31 primiparae (62 per cent) and 19 multiparae (38 per cent) including 8 grand multiparae in this series. The ages varied from 18 to 42 years, being above 30 in 5 cases. The period of gestation was between 36 to 41 weeks in all but 3 cases, in 2 of which it was 42 weeks and in one 35 weeks. The highest birth-weight was 8 pounds, while the lowest was 3 pounds and 12 ounces. Five infants weighed 5 pounds and 8 ounces or less (10 per cent) at birth and 39 (78 per cent) more than 7 pounds. Six (12 per cent) infants weighed between 5 pounds and 9 ounces to 7 pounds. The duration of labour was above 24 hours in 13 cases (26 per cent) and 48 hours in 2 cases (4 per cent).

Position of the vertex

Prior to the application of the cup, the vertex was in the transverse position in 35 cases (70 per cent) and in the posterior oblique position in 15 cases (30 per cent).

Dilatation of the cervix

The cervix was fully dilated at the time of application of the instrument in 39 cases (78 per cent). In 4 cases a thin rim of the cervix was palpable below the greatest diameter of the head. In 7 more cases the cervix was three-fourths dilated.

Station of the head

The lowest bony point was judged to be at or above the level of the ischial spines in 32 cases (64 per cent) and below this level in 15 cases (30 per cent). Lowest point of the vertex was unsettled in relation to ischial spines in 3 cases (6 per cent) prior to application of the ventouse. The vertex did not press the perineum in any case so that these ventouse deliveries were comparable to either mid-forceps or high mid-forceps extraction. There was no floating head in this series.

Indications

Prolonged second stage was the sole indication in 12 cases though it was an associated factor in 6 more cases. Prolonged labour and uterine inertia with maternal distress occurred 11 and 9 times respectively, the cervix being not fully dilated in 5 cases of either group. Although the head was in transverse position in 35 cases, actual deep transverse arrest was noted in only 5 cases. The second stage was shortened in 7 patients for foetal distress and in one elderly primigravida with a long period of infertility. Amongst 5 cases of toxaemia of pregnancy, accidental haemorrhage was associated in one case with pre-eclamptic toxaemia. In none of these cases was there any suspicion of cephalo-pelvic disproportion.

TABLE I

Indications	Occipito-transverse	Occipito-posterior	Total
Prolonged 2nd stage	8	4	12
Prolonged labour	7	4	11
Uterine inertia with maternal distress ..	7	2	9
Foetal distress	4	3	7
Deep transverse arrest	5	0	5
Pre-eclamptic toxaemia	2	2	4
Eclampsia	1	0	1
Elderly primigravida	1	0	1
Total	35	15	50

Technique

The standard method as suggested by Malmström was employed. The patients were delivered in the lithotomy position without using general or regional anaesthesia. Mediolateral episiotomy under local infiltration anaesthesia, when the perineum was distended by the cup or the head, was done in 10 primiparae and one multipara. The largest cup of 60 mm. was used with the usual vacuum pressure of 0.8 kg/sq. cmm. Counter-pressure was used whenever thought necessary. No attempt was

made to rotate the cup and the head digitally, spontaneous rotation being allowed to occur. All deliveries were completed within 40 minutes.

Results

Perinatal mortality

There were one still-birth and 4 neonatal deaths within the first week of life. Thus the uncorrected perinatal mortality was 5 (10 per cent). Of these, the still-birth and 2 neonatal deaths were unavoidable (Table 2).

Morbidity

Excluding 2 cases of failure and 3 unavoidable infant deaths, asphyxia at birth occurred in 5 out of 45 cases (11.1 per cent). Of these, 3 infants survived. Chignon disappeared within 24 hours in all infants leaving behind superficial abrasions in those cases where the cup was detached during delivery. Cephalhaematoma was noted in one infant that survived.

There was no maternal mortality. The absence of gross maternal morbidity was a notable feature of this series in view of the fact that forceps deliveries in these cases would have been mid-forceps or high forceps deliveries in unrotated heads.

TABLE II

Perinatal Mortality

1.	S.B.	6 lbs. & 4 oz.	R.O.P.	Accidental haemorrhage with pre-eclamptic toxaemia.
2.	N.D.	6 lbs.	L.O.T.	Eclampsia and asphyxia at birth—2nd day.
3.	N.D.	5 lbs. & 4 oz.	L.O.T.	Severe pre-eclampsia with anaemia—1st day.
4.	N.D.	8 lbs.	R.O.P.	Asphyxia at birth with intracranial injury—3rd day.
5.	N.D.	7 lbs. & 8 oz.	R.O.T.	Prolonged labour with severe asphyxia at birth—2nd day.

Gross Perinatal Mortality: 5 (10%) Corrected Perinatal Mortality: 2 (4%)

One neonatal death was judged to be due to intracranial injury on clinical grounds. In the other neonatal death, there was an error of judgment. In this case the foetal heart rate varied between 160 to 170 per minute for the last 3 hours of the first stage and, because of the non-progressive nature of the suspected foetal distress, vacuum extraction was withheld till the cervix became just fully dilated. The margin of safety was, however, less than what was anticipated and there was severe asphyxia at birth. The infant expired after 38 hours.

Failures

Auto-rotation of vertex to direct anterior position occurred in all but 2 cases. In one case the vertex rotated from right occipito-posterior position to transverse position, after which no further rotation or descent was possible due to the cup getting detached repeatedly. The rotation

TABLE III

Comparative Results

Authors	O.P.	O.T.	Total	Rotation to O.S. O.P.	Rotation from O.T.	Total
Chalmers	105	92	197	29	2	31
Parapakham ..	66	115	181	20	1	21
Nyirijesy	9	21	30	1	nil	1
Present	15	35	50	nil	nil	nil

and delivery was completed by Kielland's forceps with satisfactory results. In the other, long axis-traction forceps was used to complete the delivery when the vertex failed to rotate beyond L.O.A. position, from the original position of L.O.T. In one more case the cup became detached after full auto-rotation from R.O.T. position and spontaneous delivery was allowed. Altogether, the cup was detached in about 30 per cent cases and in 2 the reapplication failed to accomplish both rotation and delivery.

Comment

Controversy exists regarding the advantages and disadvantages of vacuum extraction over forceps delivery. But for proper evaluation of comparative results, the cases where vacuum extractor can be applied should be divided into three major groups.

Those cases where the head is high and cervix is not fully dilated vacuum extraction, which has been advocated by many authors, if successful may avoid the alternative treatment by caesarean section. Forceps delivery is contraindicated in these types of cases.

The second group of cases consists of those where the biparietal diameter of the head is below the ischial spines and the head is pressing on the perineum, the termination of labour is possible by either low forceps delivery or vacuum extraction with perhaps equally good results.

The last group of cases forms those where the cervix is fully dilated with the head engaged but not pressing on the perineum; either vacuum extraction or mid-forceps delivery with or without manual rotation may be done. Caesarean section is also an alternative treatment in some of these cases. It is in this group, where the head may be unrotated or malrotated, that vacuum extraction has a possible role to play in avoiding difficult mid-forceps delivery or even caesarean section.

Although doubts have been expressed about the usefulness of vacuum extraction in unrotated vertex, as suggested by Malmström (1957), recent studies have shown that in these conditions the apparatus is not only safe for both the mother and the infant (Chalmers 1964, Grossbard and Cohn 1962, Hathout and Tannir 1963, Lancet 1963, Parpakham 1962, Sankari and Wagh 1964, Tricome *et al* 1961) but also helpful in avoiding caesarean section

in some cases (Grossbard and Cohn 1962, Wilaock 1962) and difficult mid-forceps delivery in others.

In these institutions, during the period of survey, vacuum extraction was used in selected cases in some of which the alternative treatment was not forceps delivery but delivery by abdominal section. Out of 50 cases, there were 15 cases of posterior position and 35 cases of transverse position of occiput. The cervix was three-fourths dilated in 7 cases and in 4 more cases a thin rim was palpable below the girdle of contact. In 32 cases the lower bony point of the vertex was either at or above the level of ischial spines. In none was the head pressing on the perineum nor was it floating above the brim. If forceps were applied in these cases, the delivery would have been either mid-forceps or high forceps delivery. Yet in this series maternal morbidity specially soft tissue injury of the birth canal, was significantly low.

Gross perinatal mortality of these series was high (10 per cent). But apart from unfavourable factors mentioned above, there were certain associated maternal diseases such as eclampsia, pre-eclamptic toxaemia either alone or with accidental haemorrhage or with severe anaemia. Therefore, all these deaths may not be attributed to vacuum extraction. Three out of five deaths were unavoidable. Therefore, corrected perinatal mortality was 4 per cent. In one case, vacuum extraction was believed to produce intracranial injury. It is notable that in all the seven cases of foetal distress the infant survived.

Comparative results of 153 consecutive cases of mid-forceps delivery have been studied. The perinatal mortality in these forceps deliveries was 19 (12.4 per cent) — 6 cases of still-birth and 13 of neonatal deaths.

The impression gained during this study is that vacuum extractor is an invaluable addition to modern obstetrical armamentarium. It is safe for both mother and infant in well selected cases. It is also possible to avoid caesarean section as well as difficult mid-forceps delivery in some cases.

Many authors have allowed auto-rotation in all or most of their cases in preference to aided rotation. But it is interesting to note the variation in the incidence of face to pubis delivery following auto-rotation from unrotated head. In this study the remarkable feature was that anterior rotation occurred in all but 2 cases of failure.

Chalmers (1964) attributed face-to-pubis delivery in his cases to the topography of the pelvis and the head concerned. It is reasonable to believe that the same factors should operate in transverse positions of vertex as well, to produce similar effect. But in this series where separate figures for these two positions are given, a very low incidence of posterior auto-rotation from transverse position is noted (Chalmers 1964, Parapakham 1962, Nyirigesy 1964) as shown in Table III. Further, if auto-rotation mimics spontaneous rotation of natural vaginal delivery, a much lower incidence of face-to-pubis delivery in occipito-posterior cases is to be expected.

In occipito-posterior vertex, the occiput is placed in the posterior quardrant of the L-shaped birth

canal. It is difficult to conceive the cup being applied eccentrically near the occiput when the head is high, specially when the cervix is not fully dilated. Even if the cup is so applied, traction at the right angle to the cup will not be possible because of the forward curvature of the lower birth canal. In most cases therefore, the cup has to be applied over the vertex in between the two fontanelles, not eccentrically, and the traction is unlikely to promote in all cases the desirable flexion that facilitates anterior rotation. If however, the cup becomes detached after some descent has occurred, re-application is likely to result in placing the cup nearer the occiput. This tends to promote flexion and therefore anterior rotation. This might be one of the factors in the anterior rotation in almost all cases of this series where the rate of detachment of the cup was as high as 30 per cent.

Asphyxia neonatorum was noted in 26 per cent of cases. Superficial scalp injury occurred in 60 per cent of cases and cephalhaematoma in one case with no ultimate ill-effect. Detachment of the cup occurred more than once in half the cases. Failure of rotation from transverse position occurred in one case where delivery was accomplished by Kielland's forceps and the infant was discharged healthy. In one more case, though anterior rotation was successful, repeated detachment of the cup lead us to complete the delivery with axis-traction forceps with good results.

Summary

1. Fifty cases of vacuum extraction in unrotated vertex presentations have been studied.

2. There were 31 (62 per cent) primigravidae and 19 (38 per cent) multigravidae in this series.

3. There were 35 (70 per cent) cases of transverse position and 15 (30 per cent) cases of posterior position of the occiput prior to application of ventouse.

4. The cervix was fully dilated in 39 (78 per cent) cases. Cervical rim was present in 4 (8 per cent) cases. In 7 (14 per cent) cases cervix was three-fourths dilated prior to application of vacuum extractor.

5. The station of lowest bony point of head was at or above the level of ischial spines in 32 (64 per cent) cases and below the spines in 15 (30 per cent) cases during the application of the ventouse.

6. Prolonged second stage was the indication in 12 cases (24 per cent). Prolonged labour and uterine inertia with or without maternal distress were the indications in 20 cases (40 per cent). Deep transverse arrest was noted in 5 cases (10 per cent). In 7 (14 per cent) cases foetal distress was the indication.

7. Successful rotation and delivery was done in 48 cases, and in 2 cases of failure delivery was completed by Kielland's forceps in one and axis-traction forceps in the other.

8. There was no case of maternal mortality in this series and morbidity was significantly low.

9. The gross perinatal mortality was 5 (10 per cent) but 3 deaths out of 5 were unavoidable. The corrected perinatal mortality was 2 (4 per cent) in this series.

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References

1. Chalmers, J. A.: Brit. Med. J. **1**: 1965, 1964.
2. Grossbard, P. & Cohn, S.: Obst. & Gynec. **19**: 207, 1962.
3. Hathout, Hassan M. and Tannir Ali, D.: J. Obst. & Gynec. Brit. Comm. **70**: 101, 1963.
4. Lancet, Moshe: Brit. Med. J. **1**: 165, 1963.
5. Malstrom, T.: Acta Obst. & Gynec. Scand. **36**: 3, 1957.
6. Nyirijesy, I.: Am. J. Obst. & Gynec. **89**: 568, 1964.
7. Parapakham, Saroj: Am. J. Obst. & Gynec. **84**: 941, 1962.
8. Sankari, Krishna and Wagh, Snehalata: J. Obst. & Gynec. Indian. **14**: 725, 1964.
9. Tricome, Vincent: Am. J. Obst. & Gynec. **81**: 681, 1961.
10. Willock, J.: Am. J. Obst. & Gynec. **86**: 558, 1963.