

VACUUM EXTRACTOR

by

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In 1706 when obstetric forceps was still a dark secret James Yonge tried to deliver a baby with a cupping glass applied to the head. This was the first record of vacuum extractor. James Young Sympson, in 1848, successfully delivered a baby with a vacuum extractor made up of a leather cup. The modern versatile instrument of Malmström (1955) has an easy manoeuvrability and safety. The following results are a preliminary evaluation of deliveries with the vacuum extractor.

Instrument

The Malmström vacuum extractor consists of two parts, (I) the suction cups of 30, 40 and 50 mm. diameters, with a traction chain running in rubber tube and anchored to the traction bar, (II) the suction pump consists of a hand exhaust pump, connected to a vacuum bottle fitted with a mano-

meter. This vacuum bottle is connected through a rubber tube to the traction bar.

Method of application and delivery

The largest vacuum cup is introduced into the vagina like a pessary and applied to the leading part of the vertex, preferably over the posterior fontanelle. A negative pressure is created to a level of 0.8 KG/Sq. cm slowly, over a period of 6 minutes. Four more minutes are allowed to form a caput and adhesions to the cup. Traction is applied to the traction bar at right angles to the cup and in the axis of the pelvis, concomitantly with uterine contractions.

Material and Method

The vacuum extractor was tried for all cases where forceps was indicated. The choice of forceps and vacuum extractor was left to the operator. This study extended from April 1965 to June 1966. During this period there were 2,595 deliveries, out of which 487 ended in operative deliveries. There were 138 forceps deliveries, 200 vacuum extractions and 102 caesarean sections.

Indications

The indications are divided into 3 groups.

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TABLE I

(i) Maternal		
Prophylactic, P.E.T. and eclampsia, anaemia etc.	31	
(ii) Obstetrical		
Uterine inertia and malpositions	105	
(iii) Foetal distress	62	
(iv) Associated complication post-caesarean labour	2	
Total	200	

Maternal indications were more or less prophylactic and consisted of 31 cases. The instrumental intervention aims at accelerating the delivery. Obstetrical indications consisted of prolonged labour due to inertia. It may be associated with malpositions or mild degree of contracted pelvis.

The position of the foetus, at the time of the application, was occipito-anterior in 139 cases, occipito-transverse in 49 cases and occipito-posterior in 12 cases. In occipito-transverse and posterior positions a good occipital application of the vacuum extractor led to increased flexion, followed by spontaneous forward rotation of the occiput. Most often this was assisted by pressure with the fingers or half hand over the occiput.

Foetal distress was a common indication and these were delivered under local anaesthesia. The average Apgar score was 8. The two cases of post-caesarean deliveries were assisted with a vacuum extractor to avoid strain on the scar of the uterus.

In 94% of the cases the delivery was conducted either under pudendal block or perineal infiltration and in 5% of the cases with no anaesthesia.

The head should be engaged, like

in a forceps application. The application was mid- in 13 cases, low-mid in 146 cases and low or outlet in 41 cases. In high-mid application the indication was mainly foetal or maternal, and the idea was to cut short the duration of labour. The higher the station of the head, the longer the time and the greater the difficulty of extraction.

Vacuum extraction in relation to the degree of dilatation of cervix

It is practically impossible to deliver the baby through an undilated cervix without increasing the morbidity of the mother. There were 7 cases with more than 8 cm. dilatation. In all these cases the head was engaged, the uterus was inert and the foetus was in distress. These cases were delivered under local anaesthesia. There was a primipara in labour for 36 hours and the liquor had been draining for the past 24 hours. She developed intrapartum sepsis. As caesarean section was risky to the mother, she was treated conservatively with 3 pitocin drips. At the end of 2½ days' labour the cervix dilated up 2 to 4 cm. and the mother was exhausted. The head was at +2 station. Suction cup of 30 cm. diameter was applied for 15 minutes. The cup slipped, but dilatation proceeded to 6 cm. and made the subsequent cervicotomy and forceps operation easier.

Vacuum extractor failures

The causes of failure were leakage of air or failure of traction in the axis of the pelvis concurrent with uterine contractions, or due to bony dystocia, or inexperience. Since

many operators have participated, the failures were initially high, 14% in the first 100 cases and 7% in the second 100 cases.

Causes of failure

TABLE II

1. Leakage of air into apparatus (defect in the apparatus) ..	4
2. Small cup No. 4 applied ..	2
3. Hastiness and faulty technique ..	5
4. Midcavity dystocia ..	5
5. High station of the head ..	3
6. Delayed first stage of labour (completed with cervicotomy and forceps)	1
7. Left occipito-posterior	1
Total	21

Maternal and foetal morbidity and mortality

Vacuum extraction carried no risk to the mother. There was slight morbidity to the foetus by way of scalp lesions, cephalhaematomas and intracranial haemorrhages and disturbances of central nervous system. The artificial caput "chignon", was rather formidable at first but it disappeared in a few hours.

Foetal morbidity

There were eight foetal deaths. The babies in cases of eclampsia and accidental haemorrhage were dead or severely moribund at the time of application. So the corrected foetal mortality was two, (1%). Postnatal asphyxia was evaluated in relation to the indications for the vacuum extraction. The average apgar score was in cases of foetal distress 8, and obstetrical indication 9.

Discussion

The vacuum extractor is simple in manoeuvrability. The morbidity to the mother in experienced hands is practically nil. The indications for vacuum extractor are exactly the same as those for forceps. In a few cases it has got a greater advantage over forceps and can be used in undilated cervix and when the head is a little higher. Because of the ease of application, there is a liberal use of prophylactic application (Malmström). In the early days of the introduction of the vacuum extractor, it was liberally used for the treatment of uterine

TABLE III

1. Scalp lesions:	(a) Chignon:	Maximum duration:	24 hours.
		Minimum duration:	45 minutes.
		Average duration:	6 hours.
	(b) Abrasions of the Scalp .. ..	.. ..	2
2. Cephalhaematoma .. ..	.. ..	.. ..	5
3. C.N.S. disturbances and Intracranial haemorrhages .. ..	.. ..	.. ..	1
4. Foetal deaths	{ Eclampsia .. ..	.. ..	4
	{ Accidental haemorrhage .. ..	.. ..	1
	{ Intracranial damage .. ..	.. ..	1
	{ Deeply asphyxiated .. ..	.. ..	1
	{ Dead born .. ..	.. ..	1
	Total .. ..	.. ..	8
	Corrected foetal mortality .. ..	.. ..	2

inertia in the first stage of labour. Because of this it carried more morbidity and mortality to the foetus. The place of vacuum extractor in the management of uterine inertia is limited. Uterine inertia in the first stage of labour is to be managed conservatively with sedation and pitocin and if this fails, by caesarean section. The few exceptions are those when the cervix is nearing 8 cm. dilatation. In these the duration of traction is less and success high with minimal damage to the baby. Chalmers and Fothergill (1960) were of the same opinion.

Vacuum extractor is advantageous in occipito-posterior and transverse arrest. The manipulations are minimal. In the presence of bony dystocia, large babies and high station of the head, the failures are high. Hammersteen and Gromotke (1962) had higher failure rates; on the other hand Hathout and Tannir (1963) favour vacuum extractor for management of occipito-transverse and posterior arrests.

In our series where pelvic morphology and adequacy was good the success rate was high. Rotation can be assisted with fingers or half hand over the occiput rather than on the knob over the cup. Most often finger pressure assists spontaneous autorotation. Vacuum extractor helps in increasing the flexion when the cup is applied over the occiput.

In foetal distress vacuum extraction is controversial. With forceps under general anaesthesia, the baby can be delivered early, but it carries the disadvantage of the baby being subjected to anoxia resulting from anaesthesia. Under local anaesthesia

vacuum extractor avoids this danger. In our experience with vacuum extraction in cases of foetal distress the babies, soon after the delivery, cried lustily and the average apgar score was 8.

The incidence of foetal morbidity by way of scalp lesions, cephalhaematoma and intracranial haemorrhages is quite variable. These depend upon the amount of vacuum used, and the duration of traction. If the vacuum extraction is limited to within 30 minutes the effects on the baby are minimal.

The artificial caput 'chignon' in this series disappeared in a few hours and the average duration was 6 hours. Minor abrasions were seen in 2 cases, cephalhaematoma in 5 cases, C.N.S. disturbances due to intracranial haemorrhage were seen in one case. There is much dispute about the rise of intracranial tension with vacuum extractor versus forceps. Malmström (1957), Boer (1961). Heiss (1962) made a study of EEG recordings of newborn. Abnormal EEG recordings were found in 5.5% of normal deliveries, in 27% of breech and caesarean sections, in 44.6% of forceps deliveries and in 58.9% of vacuum extractor series. Heiss suggests that the indications for vacuum extraction must be strict. Hottroff (1963) studied the babies born with vacuum extractor at 2 years of age. Twenty-two out of hundred had abnormal tracings and eight had a convulsive pattern. There are a larger number in the babies born with vacuum extractor with foetal indications than with maternal indications. No definite conclusions are drawn on the incidence and extent of intracranial

injury on the babies born with vacuum extractors, but they sound a caution. They feel that vacuum extractor should be used for strict obstetrical conditions. Malmström followed the babies born with vacuum extractor and found them normal.

In the study of Bergman *et al* (1962) and Lange (1961) the foetal mortality was 1.9% and 3.8% respectively and less than the mortality due to forceps. In our series, the corrected foetal mortality was 1%.

Another great advantage with vacuum extractor is that the operation can be completed under local anaesthesia and in 99% cases, this was done either under pudendal block, local infiltration or even without anaesthesia. The pain was less as there was very little stretching of the vaginal wall and this avoided many general anaesthetic complications such as aspirations, maternal asphyxia and foetal anoxia.

Vacuum extractor has come to stay in the obstetrical armamentarium. Vacuum extractor and forceps are not competitors but are complementary to each other. Vacuum extractor is easier to apply and produces less morbidity to mother and foetus. It has got few distinct advantages over forceps in a few limited conditions as detailed above.

Summary and Conclusions

1. The history, application and advantages of vacuum extractor are given.

2. The indications were maternal, including prophylactic in 15%, obstetrical in 52%, foetal distress in 31% and post-caesarean labours 1%.

3. Maternal and foetal morbidity were practically nil. The corrected foetal mortality was 1%. Postnatal asphyxia as scored by the apgar method was nil.

4. In occipito-transverse and occipito-posterior positions the results with vacuum extractor were gratifying.

5. In a small number of cases the vacuum extractor was applied with 8 cm. dilatation of cervix and the results were satisfactory.

6. In vacuum extractor failures, subsequent forceps application was easy, due to further dilatation of cervix and descent of the head.

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