

THE VACUUM EXTRACTOR

by

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Introduction

From time immemorial, the accoucheurs have felt the need for a means of shortening the second stage of labour in order to minimise the risks to the baby or the mother. From the beginning of the 17th century until recently, the only instrument at their disposal for this purpose had been the obstetric forceps. The forceps is no doubt an invaluable and indispensable instrument in obstetric practice. It is now being used with increasing frequency (Jeffcoate, 1953) and some authors (De Lee, 1920) advocate its prophylactic use as a routine. But the forceps has its limitations and drawbacks. The forceps cannot be used before full dilatation of the cervix or with the foetal head at a higher station in the pelvis. Difficult high or midcavity forceps extractions are more dangerous than lower segment caesarean section and therefore, have now been abandoned in favour of the latter. The difficulties and disadvantages of frequent practice of caesarean sections on the other hand are well-known. Hence, an alternative device with wider applicability and greater safety has been sought for and desired by the obstetricians for a long time.

For a long time in the past, several workers tried to utilise the principles of

vacuum suction to apply traction on the foetal head. As early as in 1706, Younge used a cupping glass. In 1735, Pierre Amand and Andre Levret devised and used a bell-shaped instrument in which vacuum was created with a syringe. Seaman in 1796 and Simpson in 1849 tried new types of vacuum suction tractors. In 1890, McCahey introduced an air or atmospheric tractor made of elastic materials. In 1938, Torpin described a suction tractor made of rubber. Couzigou in 1947 first introduced metal suction caps. Koller (1950) was in favour of using rubber caps and less powerful but prolonged continuous traction. According to Finderle (1953), intermittent stronger traction for a shorter time was safer and more successful. Gaining from experiences of these workers and getting wiser, Malmstrom of Sweden at last devised in 1954 the modern vacuum extractor or the Ventuse and modified it further in 1957. The vacuum extractor claims the following advantages:

1. It is a simple and light instrument and causes less foetal and maternal injuries.
2. Its application is so easy that it can be safely used by doctors who are not experts or specialists.
3. The vacuum extractor can be used before full dilatation of the cervix when the forceps application is contraindicated.
4. It can be used with the foetal head at a higher station in the pelvic cavity

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Received for publication on 14-3-72.

when forceps application is too difficult and risky.

5. The vacuum extractor thus bridges the gap between forceps application and caesarean section and reduces the incidence of caesarean section to the minimum.

6. It can be used on the unrotated head and rotation takes place spontaneously during extraction.

7. The vacuum extractor can be used under local anaesthesia and even without anaesthesia.

8. The vacuum extractor stimulates good uterine contractions and promotes expulsive power.

9. The vacuum extraction has lower perinatal mortality.

10. With vacuum extraction, bladder complications are absent or minimum, maternal injuries and morbidity rate are lower.

If the advantages claimed by the vacuum extractor could be confirmed, it would be a most valuable addition to our obstetric armamentarium. Although it has been given a wide clinical trial in Europe and to a lesser extent in Australia and United States of America, the vacuum extractor has not been used extensively in our country. It was therefore, thought worthwhile to undertake a study to evaluate the results of vacuum extraction and to find out to what extent its claims for advantages over the forceps were justified. This is a report of our experience and observations on 100 consecutive cases of vacuum extractions as compared with 100 consecutive forceps applications performed in the Gauhati Medical College Hospital during the period from 1st February, 1969 to 31st July, 1971.

Incidence

There were, 6,667 deliveries during the same period and thus the incidence of vacuum extraction was only 1.5 per cent.

Age

The age distributions were fairly comparable in the two groups of patients. In the vacuum extraction group 50 patients (50.0%) and in the forceps application group 56 patients (56.0%) belonged to the age group 21 years to 30 years. 37 per cent of the women of the vacuum extraction group and 36 per cent of the forceps application group were between 16 to 20 years of age.

Parity

The parity status of the patients under study varied from 0 to 9 in both the groups. In the vacuum extraction group, 37.46 per cent of the cases were primigravidae and 62.54 per cent multiparas.

Indications

The indications for both vacuum extraction and forceps application were more or less the same. Uterine inertia and abnormal prolongation of labour was the indication for vacuum extraction in 53 cases (53.0%) and for forceps application in 46 cases (46.0%). For toxæmia of pregnancy, the vacuum extractor was used in 38 cases (38.0%) and forceps in 39 cases (39.0%). The vacuum extractor was used in four cases for foetal distress and in one case each of accidental haemorrhage, twin delivery, postmaturity, severe anaemia and previous caesarean section. The forceps were applied in eight cases of marked foetal distress, three cases of previous caesarean section, two cases of postmaturity and in one case each of accidental haemorrhage and pre-maturity.

Condition of Cervix at the time of Application of Vacuum Extractor

In twelve cases—one primigravida and eleven multiparas—the cervix was incompletely dilated at the time of applica-

tion of vacuum extractor. In one woman, the cervical dilatation was only one half and in eleven others, the cervix was $3/5$ th to $4/5$ th dilated when the vacuum extractor was applied.

Station of the Head

Just before applying the vacuum extractor, the foetal head was above the level of the ischeal spines (station—1 to -2) in seven cases, at the level of the ischeal spines in 36 cases, below the ischeal spines in 56 cases and in one case of twin delivery, the vacuum extractor was applied successfully on the floating head of the second baby.

In the forceps group, the foetal head was at or below the level of the ischeal spines in all the cases when the forceps was applied.

Position of the Head

At the time of application of the vacuum extractor, the position of the occiput was anterior in 63 cases, lateral or transverse in 35 cases and posterior in two cases.

In the forceps group, 29 patients required manual rotation for deep transverse arrest or occipito-posterior positions before forceps application and in one case, the forceps was applied on the head with occiput directly posterior and the baby was extracted as face to pubis.

Anaesthesia

Local infiltration anaesthesia with or without pudendal block with 0.5 per cent lignocaine hydrochloride was used in 74 cases of vacuum extraction and 25 cases required no anaesthesia. In one case of failed vacuum extractor, both local and general anaesthesia were used.

In the forceps group, 98 patients required pudendal block anaesthesia and two general anaesthesia.

Application-Delivery Interval

The time taken to deliver the foetus with the vacuum extractor when the cervix was fully dilated at the time of its application varied from 8 minutes to 15 minutes and from 20 minutes to 35 minutes when the cervix was incompletely dilated.

Results

Table I shows the success and failure rates in the vacuum extraction group as compared with that in the forceps group of patients. Out of 100 cases in the vacuum extraction group, 96 could be delivered successfully with the vacuum extractor although 16 required more than one attempt. In three cases, the deliveries had to be completed with forceps after bringing the head below the ischeal spines and completing the rotation with the vacuum extractor and they may be considered partially successful. Only one case of vacuum extraction was a complete failure when both the vacuum extractor and the forceps failed to deliver the baby and a lower segment caesarean section had to be performed.

In the forceps group of 100 patients, there was no failure. But in one case of failed vacuum extractor, the forceps also failed and a lower segment caesarean section had to be performed.

Complications of Third Stage of Labour

There was no complication of labour in the vacuum extraction group. In the forceps extraction group, one patient had postpartum haemorrhage which was controlled by usual measures.

Maternal Mortality and Morbidity

There was no maternal mortality in any of the two groups of patients. Only four patients in the vacuum extraction group

TABLE I

Showing Success Rates and Foetal Mortality in Vacuum Extraction and Forceps Application

Method of Delivery	No. of cases	Successful	Failed	Foetal Loss
		Attempts:		
Vacuum Extraction	100	1st—80	20	
		2nd— 9	11	
		3rd— 7	4	
		Total—96	4	1
Forceps Extraction	100	100		7
	+ 4	+ 3	1	
	(failed V. E.)	(failed V. E.)		(Corrected 5)

against ten in the forceps delivery groups had puerperal pyrexia.

Perinatal Mortality

While there was only one death amongst the babies delivered with vacuum extractors, the gross perinatal mortality in the forceps application group was as high as 7 per cent and the corrected perinatal mortality rate was 5 per cent as foetal heart sounds were inaudible in two cases before forceps application.

Foetal Injuries

Chignon or artificial caput succidaneum was present on the heads of all the babies of vacuum extraction group. Four babies showed ecchymosis on the head and one developed a cephalhaematoma. Chignon and ecchymosis disappeared in 24 to 48 hours and cephalhaematoma in 12 days. None developed skin abrasions or necrosis.

Discussion

Incidence and acceptability

The vacuum extractor is gaining popularity day by day and is being used with increasing frequency in many parts of the world. In some institutions the vacuum extractor has already surpassed the forceps in its popularity. In Brat's (1965) series, the incidence of vacuum extraction was 6.55 per cent while that of the forceps application was only 0.37 per cent. In the present series, however, the incidence of vacuum extraction was quite low—only 1.5 per cent against 8.5 per cent of the forceps applications. This is because we wanted to go slow with this new device until sufficient personal experience was gained. Besides, some of us, so familiar with the forceps and so accustomed to its use have developed some special fondness or liking for the forceps which has faithfully served the mankind for centuries.

Applicability

Wider applicability is the main important advantage of the vacuum extractor over the obstetric forceps. When foetal or maternal conditions call for hastening the delivery, the forceps can not be applied unless the cervix is fully dilated and the foetal head is low in the pelvis. All such cases have so long been delivered with lower segment caesarean sections. A number of authors namely Malmstrom (1957), Snoeck (1960) and Chalmers and Fothergill (1960) have successfully used vacuum extractors in the first stage before full dilatation of cervix. Greenhill (1961) on the other hand is not in favour of pulling out the foetal head through the undilated cervix. In the present series of 100 vacuum extractions, there were 12 cases of incomplete dilatation of cervix, 8 cases with foetal heads in the mid cavity or higher at the time of application of the vacuum extractor. The vacuum extractor failed to complete the delivery in four of these cases but only one required a lower segment caesarean section, and the other three could be delivered with the forceps after completing the dilatation of cervix and bringing down the foetal head at a lower level with the help of the vacuum extractor. Without the vacuum extractor, all these cases would have required caesarean sections. This study goes in favour of the claim that at least in some selected cases, the vacuum extractor can bridge the gap between forceps extraction and caesarean section and reduce the incidence of caesarean section to a bare minimum. In fact, the incidence of caesarean section has already recorded an appreciable fall in many institutions where vacuum extractor has been taken up in routine practice.

Foetal Loss

Most obstetricians observed a lower pe-

rinatal mortality with the vacuum extractor. Bergman and Malmstrom (1961) reported a perinatal mortality rate of 1.5 per cent in the vacuum extraction group against 4.1 per cent in the forceps application group. Lange (1961) observed a perinatal mortality of 3.8 per cent amongst 480 vacuum extraction cases against 6.6 per cent in 376 cases of forceps extraction. According to Lasbrey *et al*, (1964) and Samadder (1967), the perinatal mortality in forceps applications was twice or thrice as high as in the vacuum extraction group. In the present series of vacuum extraction, the perinatal mortality was only one per cent against 5 per cent (corrected) in the forceps group.

However, in all fairness it must be admitted that the forceps were used in preference to the vacuum extractor in cases where a quicker delivery was indicated for more serious maternal complications and more marked foetal distress. Many of the foetal deaths in such cases may not be attributable to the forceps but to the conditions for which the forceps was applied.

Conclusion

The present study substantiates the claim that the vacuum extractor has certain advantages over the forceps and in some selected cases, it can bridge the gap so far existed between forceps extractions and caesarean sections. With the rise in the vacuum extraction rate, the incidence of both forceps application and caesarean section is likely to fall. But it is doubtful if vacuum extractor could ever totally replace the obstetric forceps. For, the failure rate in vacuum extractor is much higher and the forceps is sometimes successful where vacuum extractor fails. Besides, the forceps will be preferred to vacuum extractor in urgent cases where a quicker delivery is required.

Summary

This is a report of our experience and observations on 100 consecutive cases of vacuum extraction as compared with 100 consecutive cases of forceps applications performed in the Gauhati Medical College Hospital, Gauhati. The vacuum extraction group included 12 cases of incompletely dilated cervix, 8 cases with foetal head high in the cavity or at the brim and 37 cases of unrotated heads.

Ninety-six of these cases could be successfully delivered with vacuum extractor. Three of the four failed cases were delivered with the forceps and one required a lower segment caesarean section. The perinatal mortality was one per cent. In the forceps group, there was no failure but in one case of failed vacuum extractor, the forceps also failed and the corrected perinatal mortality was 5 per cent.

In our experience, the vacuum extractor is a valuable addition to our obstetric armamentarium and its more frequent use is likely to lower the incidence of caesarean section.

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