

# Vacuum Extraction and Symphysiotomy in Difficult Vaginal Delivery in a Developing Community

DONALD A. M. GEBBIE,\* M.B., CH.B., M.R.C.O.G.

*Brit. med. J.*, 1966, 2, 1490-1493

Most obstetric problems are universal. Nutritional, environmental, and geographical factors influence them to add local colour, emphasizing some of these problems and minimizing others. Their solution will not necessarily be similar throughout the world, but will vary according to the conditions prevailing within the community. The *Lancet* (1962) has drawn attention to some aspects of obstetric practice in the developing world, and Lister (1960), Rendle-Short (1960), and Trussell (1962) have shown how much the environment will affect the final outcome of pregnancy.

In Uganda the commonest obstetric difficulty is cephalopelvic disproportion. Rendle-Short (1960) has described uterine rupture as it occurs there, and the triennial reports from the Department of Obstetrics and Gynaecology, Mulago Hospital, emphasize the extent to which disproportion exists (Clinical Reports, 1956-8, 1959-61). The frequency of maternal and foetal death and the number of vesicovaginal fistulae seen in the gynaecology wards are all related to the prevalence of disproportion.

## Caesarean Section

The best method of dealing with disproportion in a sophisticated community is by caesarean section. In a developing country this operation has to be viewed in a different light. Tables I and II show some of the dangers inherent in performing caesarean section in Southern Uganda.

TABLE I.—Incidence of Uterine Rupture and of Maternal and Foetal Mortality in Pregnancy after Previous Caesarean Section, Mulago Hospital, 1956-64

Years	No. of Cases	Uterine Rupture	Maternal Mortality	Perinatal Mortality
1956-8	411	26 (6.3%)	5 (1.2%)	61 (14.8%)
1959-61	604	43 (7.1%)	10 (1.6%)	76 (12.6%)
1962-4	941	29 (3.1%)	6 (0.6%)	144 (15.3%)
Total	1,956	98 (5.0%)	21 (1.1%)	281 (14.4%)

TABLE II.—Maternal Mortality Associated with Uterine Rupture, Mulago Hospital, 1956-64

Years	No. of Cases	Maternal Mortality	Previous C.S.	Maternal Mortality Previous C.S.
1956-8	106	37 (34.9%)	26 (24.5%)	3 (8.1%)
1959-61	130	28 (21.5%)	43 (33.1%)	6 (21.4%)
1962-4	117	31 (26.4%)	29 (24.8%)	3 (9.7%)
Total	353	96 (27.2%)	98 (27.7%)	12 (12.5%)

It is seen that of the 1,956 patients who were admitted to Mulago Hospital during the years 1956-64 with one or more caesarean section scars 5% either had or were about to have uterine rupture. The perinatal mortality rate was high (14.4%), and there was an appreciable maternal mortality rate (1.1%). More significant, however, is the finding in this six-year period that 27.7% of the patients who were treated for uterine rupture had at least one uterine scar. The total number of patients

admitted annually to Mulago Hospital with previous caesarean section scars increases annually at such a rate that by 1975 there will be over 1,000 each year.

From such experience it is logical to conclude that caesarean section can be a dangerous operation in Uganda. It should be undertaken only after careful consideration, in circumstances in which it is essential. This applies particularly to the first operation. Any alternative warrants full investigation and consideration.

## Forceps Delivery

Accurate assessment of the degree of cephalo-pelvic disproportion is difficult in the antenatal period. This is equally so, on occasion, as late as the second stage of labour. Most Bantu women have a shallow pelvis. Because of this, combined with the moulding of the foetal skull, the caput on the vertex may present at the vulva before the head is fully engaged within the pelvic brim. Accordingly it may be impossible to differentiate between those cases in which forceps delivery will be straightforward and those in which there is going to be difficulty. A properly conducted trial of forceps in the operating-theatre, with facilities ready to perform caesarean section if required, was therefore often necessary. Sometimes the delivery turned out to be relatively simple when difficulty was predicted. On the other hand, there have been instances in which difficulties have arisen when an easy forceps delivery was forecast and undertaken in the labour suite, with resultant adverse effect upon the baby. Table III shows the results of forceps delivery in the six-year period 1956-61. All intrauterine deaths which had occurred before delivery was attempted have been excluded, as it is thought that the delivery of a dead baby is a separate issue which has been fully dealt with by Trussell (1963).

TABLE III.—Forceps Delivery, Mulago Hospital, 1956-62

Years	No. of Cases	Stillbirths	Neonatal Deaths	Perinatal Mortality	Forceps Rate
1956-8	424	66	43	25.7%	4.5%
1959-61	452	51	32	18.4%	4.4%

The perinatal mortality in those years was high, varying between 18 and 26%. Stillbirths outnumbered neonatal deaths.

## Forceps Delivery and Vacuum Extraction

The vacuum extractor was introduced to Mulago Hospital in 1962. Table IV gives the results of both forceps delivery and vacuum extraction in 1962 and 1963. There was a slight decrease in the overall perinatal mortality. In 1963, however, the vacuum extractor was being used with greater frequency, and it will be noticed that when delivery was successfully accomplished the perinatal mortality was low (4.4%). On the other hand, when vacuum extraction failed and forceps delivery succeeded the perinatal mortality was high (41.7%).

\* Lecturer in Obstetrics and Gynaecology, Makerere University College, Kampala, Uganda.

TABLE IV.—*Forceps Delivery and Vacuum Extraction, Mulago Hospital, 1962-3*

	Instrument	No. of Cases	Still-births	Neonatal Deaths	Perinatal Mortality
1962	Forceps .. ..	154	14	11	16.2%
	Vacuum extraction ..	41	3	2	12.2%
	Combined .. ..	6	1	1	33.3%
	Total .. ..	201	18	14	15.9%
1963	Forceps .. ..	160	14	9	14.4%
	Vacuum extraction ..	90	2	2	4.4%
	Combined .. ..	24	5	5	41.7%
	Total .. ..	274	21	16	13.5%

Assisted vaginal delivery rate: 1962, 6.2%; 1963, 4.3%.

It has been pointed out by Chalmers and Fothergill (1960) and by Willocks (1962), among others, that the vacuum extractor is of limited use in the presence of significant disproportion. Used alone this has certainly been the experience in Uganda. Dalley (1962) stated: "I could deliver safely any baby with the vacuum extractor that I could deliver alive by forceps."

The relatively low foetal mortality with the vacuum extractor alone in 1963, and the high foetal mortality in the same year after the use of forceps because of failure to deliver with the vacuum extractor, while not exactly confirming this statement, certainly supports it. Most of the failed vacuum extractions were due to the presence of a more than moderate degree of cephalo-pelvic disproportion, the extent of which had presumably not been fully recognized. Because of this it may follow that the vacuum extractor has two functions. The first would be to deliver babies, and the second would be as a trial instrument to detect moderate to severe disproportion. The latter may prove the more important in Africa.

Failure to deliver with the vacuum extractor means that an alternative procedure has to be adopted. It has been shown that application of forceps at this stage, even though it may be successful, carries with it a high perinatal mortality rate. With caesarean section, the other alternative, there is the potential danger in future pregnancies. Neither of these is thought to be an ideal alternative in Uganda. Thus it was decided to introduce symphysiotomy on these occasions.

**Vacuum Extraction and Symphysiotomy**

Since the latter half of 1964 symphysiotomy has been used with increasing frequency as the method of choice after failure to deliver with the vacuum extractor. Symphysiotomy was not a new operation at Mulago Hospital. It had been undertaken before with success, usually combined with forceps, but only in selected instances.

**Results of all Operative Vaginal Deliveries from July 1964 to February 1966**

In the 20-month period from July 1964 to February 1966 there were 828 attempts at operative vaginal delivery on living

TABLE V.—*Final Method of Delivery in 828 Patients for Whom Vaginal Delivery was Planned. Mulago Hospital, July 1964 to February 1966*

Vacuum extraction alone .. ..	670	} 778
" " and symphysiotomy .. ..	108	
" " forceps .. ..	8	
" " forceps, and symphysiotomy ..	7	
" " symphysiotomy, and caesarean section ..	1	
" " and caesarean section .. ..	5	} 21
Forceps alone .. ..	22	
" " and symphysiotomy .. ..	4	} 29
" " caesarean section .. ..	3	

babies. Fifteen operators of varying skill and experience were involved. The final method of delivery is given in Table V.

The initial instrument of choice was the vacuum extractor in 799 cases (96.5%) and forceps in 29 cases (3.5%). Out of

the 799 cases in which the vacuum extractor was first used 670 (83.8%) babies were successfully delivered with no other aid. When vacuum extraction was performed, either alone or with symphysiotomy, as it was on 786 occasions, 778 (98.9%) babies were successfully delivered.

The 13 cases in which the vacuum extractor failed and either forceps or caesarean section was necessary are accounted for either by the operator's reluctance to undertake symphysiotomy or by the initial poor selection of the cases. These included two brow presentations, and on two occasions the cervix was barely half dilated when the cup was applied. In the seven instances in which forceps had to be employed after failure to deliver with the vacuum extractor and symphysiotomy it is likely that inadequate symphysial separation had occurred. Caesarean section had to be undertaken on one occasion after symphysiotomy. The pelvic contraction in this case was at the outlet. This is surprising in that modern teaching, if it mentions symphysiotomy at all, regards outlet disproportion to be the only indication.

**Perinatal Mortality**

The perinatal mortality figures are given in Table VI.

TABLE VI.—*Perinatal Mortality in Operative Vaginal Delivery, Mulago Hospital, July 1964 to February 1966*

	No. of Cases	Still-births	Neonatal Deaths	Perinatal Mortality
Vacuum extractor alone ..	670	4	31	5.2%
" " extraction and symphysiotomy .. ..	108	2	14	14.8%
Vacuum extraction and other methods .. ..	21	2	5	33.3%
Total .. ..	799	8	50	7.2%
Forceps .. ..	29	3	3	20.7%

Operative vaginal delivery rate: 4.9%.

In the 799 cases in which the vacuum extractor was the initial choice the perinatal mortality rate was 7.2% (58 deaths). When extraction was successful by itself the mortality was lower (5.2%). With the addition of symphysiotomy the perinatal mortality rose to 14.8%, but when forceps or caesarean section was the alternative, one-third of the babies died. The higher mortality in the latter groups is explained by the fact that these were the patients with the greatest amount of disproportion, who had been in labour longest, and in whom there had been severe head moulding and intrapartum anoxia.

Apart from the significant reduction in the perinatal mortality rate compared with previous years, the other significant finding is that the number of stillbirths has been reduced. There were 6 (0.8%) in the group of 778 infants delivered by vacuum extraction. Of these, two had congenital abnormalities inconsistent with life, and the indication for delivery in another two was the presence of a prolapsed cord which was barely pulsating before operation.

It is claimed that with the technique of vacuum extraction, followed if necessary by symphysiotomy, babies can be delivered in a condition comparable to that which existed immediately before delivery, provided that the instrument is used with care.

Ugandan parents are reluctant to permit post-mortem examinations on their dead children. Few were done in this series, and the results bear little significance to the cause of death as a whole. At least 10 babies died in the neonatal period from conditions which bore no relation to the fact that vacuum extraction had been undertaken. The vacuum extractor was directly to blame for at least three neonatal deaths. All of these babies had haemorrhage into the scalp, and it is possible that this type of haemorrhage contributed to several other deaths.

### Foetal Morbidity

In order to describe the state of a baby at birth throughout Uganda a simple classification is necessary. This is done by assigning each baby the letter A, B, C, or D at birth. A class A baby is one who cries immediately and maintains this favourable state. Class B babies are those who require simple attention before a satisfactory cry is heard. Class C babies are limp at birth but respond satisfactorily within 10 minutes, whereas class D babies die within a short time, require intubation, or do not show spontaneous respiration within 10 minutes. There is of course an individual interpretation, but on the whole the classification is satisfactory and may be used with ease by the midwife who works alone.

Table VII shows that 656 out of the 799 babies (82.1%) were in fairly good or good condition at birth. Apart from three neonatal deaths occurring in this group, all other neonatal deaths took place among the class C or D babies.

TABLE VII.—Condition at Birth of Babies on Whom Vacuum Extraction was Attempted

	Number	Percentage
Class A .. .. .	457	57.2
„ B .. .. .	199	24.9
„ C .. .. .	90	11.2
„ D .. .. .	26	3.3
Unclassified .. .. .	19	2.4
Stillbirths .. .. .	8	1.0
Total .. .. .	799	100.0

Some degree of external injury was frequent. Of 100 consecutive babies closely studied 23 had breakage of scalp continuity. This was mostly of minor degree and had no effect upon subsequent progress. In six, however, ulceration took place, and three had recognizable haemorrhage into the scalp. This can appear in two distinct forms. In the first type there is a boggy fluctuant area over the site of the initial chignon that is easily recognized. The second form is quite different and not so obvious. It appears as a confluent area over the whole scalp. The baby's head will increase in size, but unless accurate measurements are made and repeated this may escape observation.

Neonatal jaundice was found in four cases; in three of them it was associated with scalp haematoma. On each occasion the jaundice was transient and had disappeared by the sixth day. Jaundice is almost certainly related to the reabsorption of pigment from haematoma formation.

The amount of external trauma associated with vacuum extraction has been variously reported, from the almost 100% of Agüero and Alvarez (1962) to the negligible amounts of Polvani *et al.* (1963). In an area where prolonged labour resulting from disproportion is often found scalp trauma from the suction cup will occur more often than in an area where disproportion is rare. In Uganda scalp injury (and even fracture of the skull) is seen after normal delivery when there has been a prolonged second stage of labour. This is due to the excessive amount of oedema fluid and extravasated blood which is found inside the large caput succedaneum. Stasis within and pressure from without lead to devitalization and eventual necrosis. Application of a suction cup on top of this can lead only to a worsening of the oedema and the necrosis, and even to sloughing of a large area of the scalp. The use of prolonged and repeated applications to minimize this is unjustifiable.

### Maternal Mortality

Two mothers died. The first of these deaths took place four hours after the easy extraction of a third triplet. There was no postpartum haemorrhage. In the absence of necropsy no comment can be made. The other death took place 22 days

after the caesarean section which followed a failed extraction. Post-mortem examination revealed peritonitis and a large sub-phrenic abscess.

### Maternal Morbidity

The stretching of the lower uterine segment to the point of rupture, the devitalization of the vaginal tissues which leads to pressure necrosis and fistula formation, and the pressure of the foetal head upon the sacral-nerve roots which leads to drop foot and lower-limb paresis are all features of prolonged and obstructed labour. Such maternal morbidity is by no means uncommon in Uganda and may be encountered after spontaneous delivery, even of a living child. It would seem unlikely that vacuum extraction will contribute much to this type of morbidity, but delivery after symphysiotomy could be its cause. It is more certain, however, that if fistula formation and ambulation difficulty are inevitable symphysiotomy will worsen them. On the other hand, performed early enough, symphysiotomy will prevent such morbidity. In the analysis of maternal morbidity in the present series it has been impossible to distinguish whether the preceding prolonged labour or the operative intervention was chiefly responsible.

Six vesicovaginal fistulae occurred, four of which followed symphysiotomy. In four cases the fistulae were first noticed several days after delivery, suggesting that prolonged labour was the causative factor, particularly as the second stage of labour had been in progress for at least five hours on each occasion. Forceps had been used in the other two, and the fistulae were recognized immediately after delivery. This confirms the finding of Seedat and Crichton (1962) that application of forceps after symphysiotomy can be dangerous.

One uterine rupture occurred. Though the patient had been booked for delivery in hospital she arrived in obstructed labour. The cervix had been fully dilated for some hours before admission. A symphysiotomy was performed and the baby was delivered by vacuum extraction. When the patient collapsed four hours later it was evident that a haemoperitoneum was present; consequently an immediate laparotomy was undertaken. No connexion could be found between the small complete tear on the right antero-lateral aspect of the uterus and the symphysiotomy wound. The tear was sutured and mother and baby survived.

Walking difficulties are not often found after symphysiotomy. Lasbrey (1963) was able to follow up 87 out of the first 100 cases that he undertook. Twenty-five of these were seen three to four years after delivery. He reported favourably. Though over one-half of the patients complained of backache and pelvic pain, this was no worse than a matched group of patients in whom symphysiotomy had not been performed.

It has been the practice to confine each patient to bed for four days. An indwelling catheter is kept in the bladder for three days. It is doubtful whether catheterization is absolutely essential unless there has been preoperative haematuria. The top of the patient's thighs are strapped together with an elastic bandage over a cotton bandage, and the patient's knees are loosely tied together. Ambulation is encouraged on the fourth day. Most of the patients require a wheeled walking-aid for the first 24 hours, but this is soon discarded. Short, shuffling steps or walking on a broad base is recommended, and sometimes help from a physiotherapist is appreciated.

Of the first 100 cases of symphysiotomy in this series 78 were discharged on the tenth postoperative day, and a further 14 went home on the fourteenth day. All of these patients had pelvic stability, as tested by standing on either leg, climbing stairs, and kneeling. There were three cases in which confident walking was delayed beyond four weeks. One woman left hospital on the thirtieth day, requiring two walking-sticks. Three months later her only complaint was some pubic pain after several hours on the dance floor. Another patient's

walking difficulty was restored after a prolapsed intravertebral disc was diagnosed and treated. The third case deserves full comment, as it illustrates many of the tragic features that occur in childbirth in Uganda today.

A 14-year-old primigravida was admitted as an emergency case after more than 60 hours in labour and at least eight hours in the second stage. Her height was 4 ft. 7 in. (140 cm.). She was dehydrated, febrile, and exhausted. The vulva was oedematous and a large caput succedaneum presented at the vaginal introitus, though the head was still palpable above the pubis. The uterus had ceased to show rhythmic contraction, and the bladder arose almost to the umbilicus. A foetal heart could just be heard, beating slowly and irregularly. Immediate delivery was undertaken by vacuum extraction and symphysiotomy after the bladder had been emptied of 800 ml. of urine. The child, weighing 7 lb. 4 oz. (3,290 g.), was stillborn. Delivery was followed by a large quantity of meconium-stained pus. The patient survived the vesicovaginal fistula, the drop foot, and the puerperal sepsis which followed.

All these features would have followed whichever type of delivery had been undertaken at that time. Symphysiotomy probably increased the size of the fistula and worsened the extent of the ambulation difficulty, but the alternative methods of delivery, caesarean section or craniotomy of the (living) child, might have had even more dire consequences.

### Technique

Since the introduction of the modern vacuum extractor by Malmström (1954, 1957) many others have described their experience with the instrument, and its use is now widespread. Any popularity that it may have in Britain was pioneered by Chalmers and Fothergill (1960), and Chalmers (1964) has fully evaluated the technique. Each operator will introduce his own variations. Though the basic technique which is used in Uganda is similar to that described elsewhere, there are several points that require stressing for those who practise in an area where disproportion is common.

1. The largest possible suction cup should be used.
2. The suction cup should be applied for no longer than 20 minutes, and for even less time in some cases. This will mean about eight minutes to achieve the required suction and about 10 minutes for traction. Delay either in the descent of the foetal head or in delivery almost invariably means that major disproportion is present.
3. Repeated application of the suction cup causes trauma to the foetal scalp. The necessity to apply the cup more than once means that there has been misapplication, or that traction has been too strong, or that there is some fault in the apparatus.
4. There is so little delayed labour from incoordinate uterine action in most developing countries that the vacuum extractor is of little use when cervical dilatation is prolonged. A good rule is to apply the cup to the foetal head when the cervix is still present only if the 60-ml. cup can be inserted through the cervix in primigravidae or the 50-ml. cup in multiparae.
5. Oedematous foetal scalps are easily detached from the underlying structures. When the suction cup is applied in these circumstances, frequent check should be made to ensure that the foetal head is in fact descending and not the scalp alone.

When the vacuum extractor has been applied correctly and traction has been in progress for no longer than 10 minutes, then if there is no descent of the head it is unlikely that there

will be further progress. Disproportion is almost certainly present and symphysiotomy should be considered.

The technique of symphysiotomy that is used in a Mulago Hospital is essentially the one so well described by Seedat and Crichton (1962) and Crichton and Seedat (1963). It has proved so successful that only minor modifications have been necessary to suit the conditions met with in Uganda. Local anaesthesia is used exclusively, and complete division of the joint is preferred to partial division and subsequent abduction of the thighs.

### Summary and Conclusions

A method of dealing with the problem of assisted vaginal delivery in a developing country is presented. An attempt is made to evaluate the place of the vacuum extractor, either alone or with symphysiotomy, against a background which no longer exists in more advanced and more sophisticated communities. The dangers to the mother and child of the more traditional methods of operative delivery, caesarean section and forceps, are shown. By the use of the present method forceps delivery may be eliminated altogether if desired, and sometimes caesarean section may be prevented.

It is now widely appreciated that symphysiotomy has a definite place in obstetric practice in Africa, but it is thought that the addition of the vacuum extractor is an advance and a refinement which simplifies the whole problem of difficult vaginal delivery.

Some of the differences inherent in the use of the vacuum extractor in Africa, compared with its use in other continents, are mentioned, as it is believed that these differences are important and have been arrived at only after many instances of unnecessary scalp injury.

It is hoped that the experience gained at Mulago Hospital will encourage the wider use of this method in areas with similar obstetric problems.

I wish to thank Professor R. R. Trussell and all my colleagues in Mulago Hospital for their encouragement, criticism, and help, and for allowing me the free use of the case notes of patients under their care. In particular I am indebted to the junior medical staff, the future obstetricians of East Africa, for their almost complete conversion to the described technique, and to the nursing staff for their sympathetic nursing of the cases of symphysiotomy.

### REFERENCES

- Agüero, O., and Alvarez, H. (1962). *Obstet. and Gynec.*, **19**, 212.  
 Chalmers, J. A. (1964). *Brit. med. J.*, **1**, 1216.  
 — and Fothergill, R. J. (1960). *Ibid.*, **1**, 1684.  
 Clinical Report (1956–8, 1959–61). Department of Obstetrics and Gynaecology, Makerere University College Medical School, Kampala, Uganda.  
 Crichton, D., and Seedat, E. K. (1963). *S. Afr. med. J.*, **37**, 227.  
 Dalley, G. (1962). *Lancet*, **1**, 692.  
*Lancet*, 1962, **1**, 575.  
 Lasbrey, A. H. (1963). *S. Afr. med. J.*, **37**, 231.  
 Lister, U. G. (1960). *J. Obstet. Gynaec. Brit. Cwlth.*, **67**, 188.  
 Malmström, T. (1954). *Acta obstet. gynec. scand.*, **33**, Suppl. No. 4.  
 — (1957). *Ibid.*, **36**, Suppl. No. 3.  
 Polvani, F., di Fransesco, G., and Mondina, R. (1963). *Ann. Ostet. Gynec.*, **85**, 799.  
 Rendle-Short, C. W. (1960). *Amer. J. Obstet. Gynec.*, **79**, 1114.  
 Seedat, E. K., and Crichton, D. (1962). *Lancet*, **1**, 554.  
 Trussell, R. R. (1962). *Clin. Obstet. Gynec.*, **5**, 1076.  
 — (1963). *Queen's med. Mag.*, **55**, 15.  
 Willocks, J. (1962). *J. Obstet. Gynaec. Brit. Cwlth.*, **69**, 26.