

# DEEP TRANSVERSE ARREST OF THE VERTEX

by

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## *Introduction*

Thanks to the safety of caesarean section, high forceps deliveries and cephalotripsies are wiped out from modern obstetrics. And, today, the only difficult delivery, that an obstetrician permits himself the liberty of, is one of deep transverse arrest. Naturally, deep transverse arrest has become one of the most fascinating problems in today's obstetrics and more and more attention is being paid to it.

Smellie was the first to recognise the condition and to realise the difficulties in its management. He was also the first to use the forceps as a rotator. Although, Montgomery used the term 'transverse malposition of the head', it was left to the German obstetricians to emphasize the importance of the condition, which by 1906 found a place in German text-books. The first English article on deep transverse arrest seems to be the one by Reed in 1902. DeLee introduced the term in his text-book in 1913. In British text-books the term appeared 23 years later (Parry Jones).

Manual rotation of the head prior

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to forceps extraction can be accredited to British obstetrics. Forceps rotation, though first described by Smellie, found its exponents among the continental school. In 1880, Scanzoni described his famous manoeuvre for cases of persistent occipitoposterior positions. In 1916, Christian Kielland presented his forceps which he had devised 10 years earlier. Lyman Guy Barton devised his forceps in 1924. In the years that followed, many new forceps have been devised and many new manoeuvres worked out to meet the challenge of deep transverse arrest.

## *What is Deep Transverse Arrest?*

Apart from an attempt by Parry Jones, it is difficult to find a definition of deep transverse arrest. It is surprising that a term so extensively used has not yet received a universally acceptable description. The adjective 'deep' is meant to indicate depth downwards from the pelvic brim. Coghlan used the term 'low' transverse arrest for the condition. However, Williams states that 'deep' presumably refers to depth inwards from the pelvic outlet at which arrest occurs. He further suggests that, as the arrest may take place at any level, the word seems to have little value and its use might be disconti-

nued. But, a head arrested at or in the brim in a transverse position is not tantamount to one arrested at the spines in the same position and differs radically from the latter in its management. Hence, the adjective 'deep' must be retained and should indicate depth downwards from the pelvic inlet. Or else it will be mandatory to describe the level of transverse arrest by other adjectives. In this series the adjective 'deep' is taken to mean arrest in lower mid-cavity deep down the brim. In other words, the biparietal diameter is at or just above, i.e. within  $\frac{1}{2}$  an inch of, the level of the ischial spines. Arrest at a higher level in the upper midcavity generally indicates positive disproportion in the midpelvis, usually necessitates a suprapubic delivery, and should not be confused with deep transverse arrest.

The word transverse does not need much clarification and indicates that the sagittal suture of the head lying more or less parallel to the bischial diameter of the pelvis.

Arrest signifies failure of progress of labour inspite of adequate uterine contractions. As long as, either descent or rotation is being achieved by uterine contractions the head cannot be said to have been arrested. It is to the mechanism of internal rotation that the word 'arrest' usually refers. Yet, mere lack of rotation does not signify an arrest if descent of the head is taking place. It is important to realise this, because, in a flat pelvis, the head must descend very low before rotation can occur. It need not be mentioned that internal rotation is universally accepted as a phenomenon of the second stage of labour.

In short, deep transverse arrest can be defined as a failure of both rotation and descent of the head from a transverse position at or just above the level of the spines, provided that the cervix is fully dilated and the uterine contractions are adequate. Adequate uterine contractions, for the purpose, should be taken as at least 2 hours of good pains in a primipara and 1 hour of good pains in a multipara. If the pains are very poor and uterine inertia alone is the cause of failure of progress of labour with the head in deep transverse position, the condition should be referred to as 'deep transverse standstill' and should be treated by intravenous pitocin drip.

In the present series, these criteria were strictly adhered to before labeling a case as deep transverse arrest. There were many cases where conditions like foetal distress, severe pre-eclampsia, etc., forced interference on a deep transverse head before it was arrested. These cases are excluded from the present series.

#### *Incidence*

During a period of 2 years, from 1st January, 1958 to 31st December, 1959, I came across 24 cases of deep transverse arrest while managing 5,450 viable confinements at the Nowrosjee Wadia Maternity Hospital. This gives an incidence of 1:227 viable confinements. Williams gives an incidence of 54 cases in 2,958 labours, i.e. 1:54.8 labours. Continental authorities maintain that the condition arises in 1.5 per cent of all vertex presentations (Shaw).

The incidence of the condition will naturally depend upon the criteria

used to define the condition. Besides, it is obvious that a conservative obstetrician, who is reluctant to interfere unless it is compelling, will have a lesser incidence of the condition than one who prefers early interference.

Besides these 24 cases, I was extended the opportunity to manage 5 other cases of deep transverse arrest by my colleagues. Thus, 29 cases form the basis of this study.

### *Etiology*

The statement that deep transverse arrest represents arrest after partial rotation from an occipitoposterior position is a misconception handed down by generations of text-books. In fact, it is this misbelief that is responsible for the bad reputation forced on occipitoposterior positions. This is not to say that deep transverse arrest cannot result from an occipitoposterior position. But, certainly, occipitoposterior position is by no means an etiological factor of any importance in the causation of deep transverse arrest. In only 4 cases out of the 29 in my series was the occiput in posterior position to start with.

The standard teaching that the head must normally enter the brim in one of the oblique diameters has been rejected in recent years. Caldwell et al. (1934) have found on radiological evidence that in 60 per cent of cases the head enters the brim in a transverse position. Steel and Javert have confirmed these findings. It is now generally accepted that the head presents itself at the brim in a transverse position. In 25 cases in the present series the head

was in transverse position throughout labour.

Attention must, therefore, be focussed on finding out why in certain cases the occiput does not rotate forwards once the transverse head comes down on the pelvic floor. The essential components of internal rotation are: (1) good uterine contractions, (2) completely flexed (or extended) head, (3) efficient pelvic floor, and (4) absence of any bony obstruction to the rotation of the head. Adequate uterine force is the essence of internal rotation and, for that reason, of any component of the mechanism of labour. Again, it is uterine force coupled with the resistance offered to the head by the birth canal that leads to flexion of the head. Deflexion, in the face of good uterine force, may be due to an arm under the chin, a short cord, and, perhaps, an increased extensor tone of the neck muscles. A deficient perineum, either anatomically or functionally, may lead to failure of internal rotation. In some cases, the pelvic architecture is responsible for the failure of internal rotation. In certain cases of flat pelvis, or android-flat pelvis and of flat sacrum it is, usually, mechanically impossible for the head to rotate forwards until it is very low down in the pelvis, almost at the outlet. It must also be realised that in certain cases of outlet contraction the head may just be unable to reach the pelvic floor and hence fail to rotate.

In the present series, there were 19 or 65.5% primiparae and 10 or 34.5% multiparae. This is in conformity with the consensus of opinion that deep transverse arrest is most common in primiparae. Out of the

10 multiparae, 7 had all their previous deliveries normal, 1 had a prolonged labour resulting in stillbirth, 1 had a forceps delivery, and 1 had a deep transverse arrest in her only previous labour.

Out of the 29 cases, in 12 or 41.4% the occiput was on the right side while in 17 or 58.6% it was on the left side.

Nineteen or 65.5% of the cases were booked admissions while 10 or 34.5% were emergency admissions.

The average weight of the babies in the present series was 6 lb. 2 oz. The average weight of the babies born at our hospital is 5 lb. 14 oz. Size of the baby, thus, seems to play no role.

Lastly, deep transverse arrest is not reserved only for a flexed head. An extended head with a face presentation can likewise get arrested in deep transverse position.

#### *Diagnosis*

The diagnosis of deep transverse position normally presents no difficulty especially if the patient is under observation throughout her labour. But when the patient is seen for the first time with the head long arrested in the pelvis, moulding and caput formation make it often difficult and sometimes impossible to define the sutures and fontanelles. The palpation of the ear and the feel of the external occipital protuberance have been advocated, but these need an examination under anaesthesia. Lastly, an intrapartum x-ray study, besides being of help in the diagnosis, is of great assistance in the correct management of the case.

#### *Prognosis*

Once there is a deep transverse arrest, spontaneous delivery should not be expected at all. If the diagnosis of the condition is based on sound and strict criteria, operative delivery is mandatory.

#### *Management*

Patience is the hallmark of a good obstetrician. Once the head has been in deep transverse position one must patiently wait and give the uterine forces an adequate trial. In a primipara nature should not be considered as having failed until there have been good contractions for at least 2 hours. In a multipara 1 hour is adequate. During this trying period one can help nature by encouraging flexion of the head by digital pressure over the sinciput during contractions. At the same time one can encourage forward rotation of the occiput by digital pressure over the posterior parietal bone. These two simple procedures are worth trying and although no dramatic results should be expected from them, they will show their worth in at least some of the cases. One other measure, advised by Shaw, is to place the patient on the side corresponding to the occiput. I have had no experience of this and would like to learn from those who have tried it. What is most important during this period is that the patient must be made to bear down to her best during pains. The importance of this cannot be over-emphasized. However, it must not be forgotten that if this period is trying for the obstetrician it is even more trying for the patient especially a primipara who is, often, already ex-

hausted by the long first stage of labour. Intravenous administration of glucose and fluids is, hence, much helpful to the patient. If there is uterine inertia, intravenous pitocin drip should be administered unless there exists some contraindication. To my mind, the use of pitocin drip during labour is becoming something like a beautiful woman, half of the obstetricians always wanting to flirt with, while the rest always keeping shy of. Whatever it may be, pitocin drip during labour is invaluable if used judiciously. In the present series, there were 5 cases of uterine inertia, in all of whom pitocin drip was administered before they were stamped as deep transverse arrest. In no case did pitocin drip cause any harm.

Once there is deep transverse arrest spontaneous vaginal delivery is out of question. Artificial aid consists in rotating the occiput forward and extracting the head by forceps. The time-honoured manual rotation of the head is the most widely used procedure in the management of deep transverse arrest. In spite of all the meticulous instructions given in the text-books, in practice the procedure merely consists of grasping the head with the hand and rotating the occiput anteriorly. It is commonly believed that unless the anterior shoulder is simultaneously rotated forward per abdomen, rotation of the head results in the twisting of the neck. Scott and Gadd have disproved this contention by radiological studies. They found that when the head was rotated by Kielland's forceps the shoulders rotated spontaneously without any abdominal manipulation. However, there is no

denying that rotation of the head is made much easier if the shoulders are simultaneously rotated per abdomen. The inevitable lifting up of the head that accompanies manual rotation is its greatest drawback and usually necessitates a rather high forceps operation. Another drawback of the manual rotation is a tendency for the head to rotate backwards while the forceps blades are being applied. An over-correction of the head is advocated to counter this. Holding on to the anteriorly rotated shoulder per abdomen, pressure on the fundus to push down the head, and preventing backward rotation of the head by applying Willett's forceps to the scalp are some of the other measures suggested.

In the present series, manual rotation and forceps extraction was resorted to in 16 cases. Rotation was easy in all these cases except 1 in which it was difficult but could be accomplished. Proper cephalic application could not be achieved in 3 cases and this resulted in difficult extraction in 1 case and in facial palsy in 1 case. The facial palsy completely recovered in 7 days. The forceps extraction was easily accomplished in 10 cases but was difficult in 3 cases, and on 3 occasions the head could not be extracted after manual rotation, in spite of accurate cephalic application of the forceps. In all these cases there was foetal distress at the time of operative interference and the foetal heart sounds disappeared during the failed attempts at forceps extraction. These 3 cases were ultimately delivered by craniotomy. This emphasises the necessity of intrapartum x-ray studies in all cases of deep transverse arrest.

Incidentally, craniotomy was resorted to in 1 other case of deep transverse arrest where the foetus had died during the first stage of labour due to cord presentation.

The number of special forceps devised for rotation of the head in cases of deep transverse arrest or persistent occipitoposterior position is an eloquent testimony to the shortcomings of manual rotation. Kielland's forceps, Barton's forceps, Leff's forceps, Mann's forceps, Laufe's forceps, and Miseso's forceps are but some of the efforts to provide a better substitute for manual rotation. Besides this, ordinary long forceps has long been used to rotate the head and Smith has advocated Piper's forceps for the same purpose.

It is not my purpose, today, to discuss the relative merits of the countless number of ingenuous gadgets and manoeuvres developed for treating deep transverse arrest. I shall, however, comment on Kielland's forceps and Leff's forceps. The former because it is the most commonly used forceps for rotation and the latter because my small experience with it has been very encouraging.

Kielland's forceps has always been controversial. Its advocates and opponents have been almost equally vociferous. The classical method of application of the forceps, no doubt, has been responsible for its lukewarm reception. It is little known, however, that the so-called 'wandering', 'gliding', or 'migratory' method of its application was described by Kielland himself when he presented his forceps in 1916. He advocated this latter method for use when the head was lower in the birth canal or when the cervix and lower uterine

segment were tightly applied to the foetal skull. Recently, Chalfant has advocated 'direct' application of the anterior blade. In general, Kielland's forceps is an excellent rotator and an efficient tractor but it is cumbersome to apply. The sentiments at our hospital have been much against the use of Kielland's forceps and in this series only 1 case was delivered by its use. There was, however, no difficulty in its use in this case. Nevertheless, there are 2 other cases in the series in which Kielland's forceps application was attempted unsuccessfully. Manual rotation of the head was successfully resorted to in both of these cases. I have used only the wandering method of application of the anterior blade. It is aptly said that it is not the forceps but the man behind it that matters. Inexperience with Kielland's forceps was responsible for the failures. It is rather unfortunate that with the advent of Leff's forceps our attention has been completely diverted away from Kielland's forceps.

Leff's forceps is admirably suited for rotating the head. Its blades are very narrow and 35-40 mm. shorter than standard forceps. One feature of the forceps, that has escaped attention, is that the blades are partially solid and hence better suited for rotation of the head. Both the application of the blades and the rotation of the head are easy. In this series it was used on 7 occasions with perfect satisfaction. I have always applied the anterior blade by wandering method. After applying the forceps the head must be disimpacted a little before rotation is carried out. It is a fundamental principle that rotation cannot be

performed at the level of arrest, neither by nature nor by brute force. After a successful rotation, left blade of Neville's forceps is applied over the left blade of the Leff's forceps before the latter blade is removed. Now the right blade of Neville's forceps is applied over the right blade of Leff's forceps and then the latter removed. This procedure prevents the backward rotation of the head while the new forceps is being applied.

As shown by Caldwell et al. (1938), in certain types of pelvis, viz. flat pelvis and android-flat pelvis, the head is best rotated in the outlet under the subpubic arch. Barton's forceps is ideally suitable for bringing the head down to such a low level in transverse position and then effecting rotation. As an alternative, traction by an ordinary forceps after a pelvic application to the transverse head can be used with caution. This may be used with safety when the head is very low and was employed without regrets in 1 case in the series. However, this is dangerous to the baby and should be avoided as far as possible.

In some cases deep transverse arrest is due to outlet contraction. Symphysiotomy may be suitable in a few of these cases. However, most obstetricians, today, would resort to caesarean section under the circumstances. In this series, caesarean section was resorted to in 3 cases. In two cases prospects of vaginal delivery through the narrow outlet were considered dim and caesarean section was elected as the treatment of choice. In one other case the head could not be manually rotated in the cavity and it was thought that if the

head were to be rotated manually one would have to undertake a high forceps delivery of the floating head. Hence, the attempt was given up and caesarean section performed.

### *Results*

There was no maternal mortality in the series. Puerperal sepsis developed in 2 cases. Cervical tear resulted in 2 cases, in both following manual rotation and forceps extraction. Lateral vaginal tear resulted in 2 cases, both delivered by manual rotation and forceps extraction.

There were 6 stillbirths in the series. In 1 case, the foetus had died during the first stage due to cord presentation. In 2 instances, the patients were admitted as emergency cases with prolonged arrested labour and moribund foetus, the foetal heart sounds being very slow and irregular. In neither of these 2 cases was the foetus considered worth a caesarean section. Excluding these 3 cases, the corrected foetal loss was 3 stillbirths, i.e. 10.35%. All the latter 3 cases were cases of foetal death resulting during failed forceps extraction after manual rotation of the head. In retrospect, these cases should better have been dealt with by caesarean section. Intra-natal x-ray study would have been a valuable aid in the management of these cases.

### *Conclusions*

Deep transverse arrest is an open problem and there is a wide opportunity for the obstetrician's judgment and skill. Vaginal delivery cannot be a matter of routine practice but should be decided upon only

after a careful consideration of the pelvis. For, a few cases, especially those with outlet contraction, will necessitate an abdominal delivery. Knowledge of the pelvis one is dealing with is an indispensable aid even when effecting vaginal delivery. Manual rotation of the head has its shortcomings and should not be advocated too lightly. The number of forceps devised for rotating the head is increasing every year and one has a wide range of selection. My experience with Leff's forceps has been entirely satisfactory. But this does not mean that other forceps are not equally good or, may be, even better. Lastly, in spite of the prolific number of manoeuvres and forceps, so ingeniously developed and devised, the last word in the management of deep transverse arrest is yet to come.

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#### *References*

1. Caldwell W. E., Moloy H. C. and D'Esopo D. A.: *Am. J. Obst. Gyn.*; 28, 824, 1934.
2. Caldwell W. E., Moloy H. C. and D'Esopo D. A.: *Am. J. Obst. Gyn.*; 36, 928, 1938.
3. Chalfant G. O.: *Obst. Gyn.*; 8, 308, 1956.
4. Coghlan M. J.: *Med. J. Aust.*; 1, 52, 1927 (Quoted from Parry Jones).
5. Kielland C.: Quoted from Chalfant and from Shaw.
6. Laufe L. E.: *Obst. Gyn.*; 7, 91, 1956.
7. Leff M.: *Am. J. Obst. Gyn.*; 70, 208, 1955.
8. Mann J.: *J. Obst. Gyn. Brit. Emp.*; 64, 351, 1957.
9. Miseo A.: *Obst. Gyn.*; 8, 487, 1956.
10. Montgomery: *Dublin Med. Surg. J.*; 6, 1835 (Quoted from Parry Jones).
11. Parry Jones E.: *J. Obst. Gyn. Brit. Emp.*; 59, 377, 1952.
12. Reed C. B.: *Ann.-Gyn. Pediat.*; 15, 402, 1902 (Quoted from Parry Jones).
13. Scott J. S. and Gadd R. L.: *Brit. Med. J.*; 1, 971, 1957.
14. Shaw W.: *The Practitioner*; 131, 685, 1933.
15. Smellie W.: 'Treatise on the Theory and Practice of Midwifery', edited by McClintok, New Sydenham Society, 1877, p. 183 (Quoted from Shaw).
16. Smith E. C.: *Am. J. Obst. Gyn.*; 73, 947, 1957.
17. Steel K. B. and Javert C. T.: *Surg. Gyn. Obst.*; 75, 477, 1942.
18. Williams B.: *Brit. Med. J.*; 1, 865, 1953.