

STUDY OF SACRUM AND POSTERIOR SAGITTAL DIAMETER IN CASES OF OCCIPITO-POSTERIOR POSITION IN RELATION TO MIDFORCEPS DELIVERY *

by

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In 50 cases of occipito-posterior position of vertex, where assistance of forceps was necessary due to arrest in the midcavity, X-ray pelvimetry was done in the puerperium. Particular attention was paid to the curvature and depth of sacrum and accurate measurement of the posterior sagittal diameter of the midcavity.

(The occipito-posterior position was confirmed by doing vaginal examination in the late first stage of labour and the designation was given only when the posterior fontanelle was behind the transverse diameter of the pelvis).

Method of Pelvimetry

Lateral view of the pelvis was taken in all these cases. A line was drawn from the sacral promontory to the tip of the fifth sacral vertebra and maximum depth of the sacrum was found out by drawing series of perpendiculars upon this line. In this series of cases the study of the sacral curvature reveals three types in relation to the outcome of labour. They are the following:

Well-curved sacrum	— Where the maximum depth was 2.5 cm. or above.
Moderately curved sacrum	— Where the maximum depth was between 2 and 2.5 cm.
Flat sacrum	— Where the maximum depth was below 2 cm.

*Paper read at the 11th All-India Obstetric and Gynaecological Congress at Calcutta in January 1961.

Evaluation of the findings

While it was found that the depth of the sacral curvature plays an important role in deciding the manner of rotation of the head, it was also observed that the sacral accommodation was to an extent dependent on the available length of the posterior sagittal diameter. It is however true that a well-curved sacrum is attended with a longer posterior sagittal diameter than a flat or even a moderately curved sacrum. The outcome of labour in each type of case, with individual measurement, is being shown in the following table: (see next page).

- A. *Well-curved sacrum with the depth of 2.5 cm. or above associated with adequate posterior sagittal diameter measuring above 8 cm.*

There were 8 cases available in this group. Early examination revealed that the head was deflexed and presented by occipito-posterior position. When the second stage was well established and the biparietal diameter came to the level of interischial spinous diameter complete rotation of the occiput took place and delivery with the assistance of forceps was necessary because of prolonged labour and uterine inertia.

- B. *Well-curved sacrum associated with inadequate posterior sagittal diameter measuring less than*

Measurement in detail of the Sacral Depth and Posterior Sagittal Diameter with the outcome of Labour.

Group	Depth of sacrum	Post. sagittal	No. of cases	Outcome of labour
A.	2.8 cm.	8.5 cm.	2	Spontaneous rotation of occiput.
	2.7 cm.	8.1 cm.	3	
	2.5 cm.	8.5 cm.	3	
B.	2.9 cm.	7.5 cm.	5	Rotation of occiput to the sacral hollow.
	2.8 cm.	7.9 cm.	3	
	2.5 cm.	7 cm.	2	
C.	2.3 cm.	8.5 cm.	9	Rotation of the occiput up to the anterior oblique diameter.
	2.2 cm.	8.1 cm.	5	
D.	2.3 cm.	7.6 cm.	6	Head was arrested with the occiput in the obliquely posterior position.
	2.1 cm.	7 cm.	3	
	2 cm.	7.5 cm.	2	
E.	1.9 cm.	7 cm.	4	Transverse arrest of the head.
	1.4 cm.	7.7 cm.	2	
	1.5 cm.	7.45 cm.	1	

8 cm. due to the position of the ischial spines:

In this group the depth of sacrum was good and the posterior sagittal diameter was less than 8 cm. Ten cases were available in this group. In these cases the occiput rotated backwards and persistent occipitoposterior position occurred. Forceps were applied on the head, and face to pubis delivery was performed.

C. Moderately curved sacrum associated with adequate posterior sagittal diameter:

In this group of 14 cases where the head was in the occipitoposterior position, the rotation of the head took place and the occiput came anteriorly up to the anterior oblique diameter of the pelvis. In 8 cases the head was rotated through the rest of the circle manually and forceps delivery was performed; in the remaining 6

cases the forceps with axis traction were applied on the obliquely placed head and when traction was given on the axis traction handle the head rotated and delivery took place in the directly anterior position.

D. Moderately curved sacrum associated with inadequate posterior sagittal diameter:

In 11 cases of this group the head was arrested in the posterior oblique diameter of the pelvis. Manual rotation was successful in 9 patients and forceps extraction was done. Out of the remaining two patients, in one manual rotation could be done up to the transverse diameter of the pelvis and the rest of rotation was completed by Kielland's forceps and delivery by the same was carried out. In the remaining one case the occiput could not be rotated anteriorly because disimpaction from the station of arrest was not possible. Face to

pubis delivery was done by applying forceps with axis traction.

E. *Flat sacrum associated with inadequate posterior sagittal diameter:*

Seven cases were available in this group. In this series the head rotated only up to the transverse diameter and arrest in this diameter occurred. In spite of allowing sufficient time in the second stage spontaneous rotation did not take place. Manual rotation and delivery by forceps with axis traction had to be done in 5 patients and in the remaining two cases Kielland's forceps were used for rotation and extraction.

According to the old school of thought, founded by Berger, Solayre De Renhae and Naegele, the head usually presents at the brim in the oblique diameter. Now-a-days it is realised that the head usually enters the pelvis with the sagittal suture in or nearly in the transverse diameter of the pelvis. In cases of occipito-posterior position of vertex the occiput lies behind the transverse diameter; but with the progress of labour in nearly 80% of cases the occiput comes down to the level of ischial spines, meets the resistance of the pelvic floor and spontaneously rotates to the anterior position. In the remaining 20% of cases the occiput does not rotate or rotates incompletely. This non-rotation or incomplete rotation of the occiput brings about arrest of labour in occipito-posterior position and dystocia commences.

With this idea in view the author studied the two distinct entities of the pelvis e.g., sacral depth and posterior sagittal diameter. Various permuta-

tions and combinations were found out and the outcome of labour has been shown.

From the data it is seen that well curved sacrum with adequate posterior sagittal diameter is the most favourable pelvis where spontaneous rotation of head is the rule. This type of pelvis was available in only 16% cases of occipito-posterior position. pelvic configuration by superoinferior radiological pelvimetry of the brim showed the pelvis to be either of gynaecoid (pure) or gynaecoid with anthropoid tendencies.

Well-curved sacrum may be associated with shorter posterior sagittal diameter. In this type of pelvis the long arm of the foetal head is not accommodated in the narrow posterior sagittal diameter and the small area that is the occiput avails of this diameter, rotates backwards and accommodates in the hollow of the sacrum. 20% cases were of this type in this series.

Moderately curved sacrum with adequate posterior sagittal diameter does not prevent rotation of the head but due to the shallowness of the sacrum the posterior pole of the foetal head is prevented from accommodating in the hollow of the sacrum and the head gets arrested with the occiput in the anterior oblique position. Twenty-six per cent of cases belonged to this group.

When the shallowness of the sacrum is not compensated by adequate posterior sagittal diameter spontaneous rotation of the head does not occur because neither pole of the foetal head can avail of the depth of the sacrum or posterior sagittal diameter; as a result arrest of labour

occurs in the posterior oblique position of the occiput.

Bad sacrum with deficient posterior sagittal diameter brings about an absolute shortening of the antero-posterior diameter of the pelvis. In this group of cases, the arrest takes place in the transverse diameter as there is no available space in the antero-posterior or oblique diameter of the pelvis.

From these cases it is seen that the dystocia in a case of occipito-posterior position is due to non-rotation of the occiput; and the rotation is influenced by various factors which may be anywhere in the passage, power and passenger. Leaving aside other factors it is seen that the depth of sacrum and posterior sagittal diameter influence the rotation of the occiput not to a small extent. It may be rightly concluded that the outcome of labour can be predicted with surety in a reasonable percentage of cases when the sacral depth and posterior sagittal diameter are known to the obstetri-

cian, provided other factors behave normally. Roth (1953) states, "If the sacral curve is determined by roentgen study, and the location of the tip of the sacrum with reference to the ischial spines is determined clinically, one can readily visualise the location of the sacrum in its entire course. This is particularly important as the sacrum is occasionally either angulated anteriorly or inclined posteriorly, influencing greatly the space available in the posterior segment. This sacral curve often, therefore, has a determinant role in intrapelvic rotation, either as a part of spontaneous labour or in operative obstetrics. Knowledge of the sacral curve is important in making prenatal predictions of the probable mechanism of descent in labour. With a thorough knowledge of any individual pelvis, plus these principles, one readily and accurately predicts the most likely mechanism of labour and the best possible solution to possible positional dystocia, should that arise in labour".