

## CONTRACTION OF THE MID-PELVIC PLANE AND ITS CLINICAL SIGNIFICANCE

BY

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What I may say in regard to pelvimetry can only be a reiteration of the observations of our pioneer in this field, Dr. Herbert Thoms and our associates, Dr. Shumacher and Dr. Wyatt. At present two of your men are studying with us—Dr. Shirodkar of Bombay and Dr. Kishore of Agra. They will soon return, possibly with answers to some of our as yet unsolved problems.

If you will permit it, I should like to make a few general remarks of a philosophical nature before launching into statistics. From what I look, heard this morning, it would seem that our data would not be applicable to your situation in India. There seem to be different findings in pelvic measurement even in various parts of your country. We feel that X-ray pelvimetry has a definite place in the management of labour. However, it represents only one part of the work-up and must be correlated with good clinical judgment when applied to a particular patient.

In my state of Connecticut we have reduced the maternal mortality rate to less than one per thousand births. This, I am proud to say, is

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the lowest in our nation and probably in the world. This, we feel, is due to several factors:

*Pre-natal care*—which is largely the application of preventive medicine in an attempt to alleviate disease before it reaches a disastrous stage. Haemorrhage supercedes toxemia and infection as a cause of casualties. Inhalation anaesthesia plays a prominent role. Matched blood from blood banks is quickly available in event of hemorrhage. Antibiotics combat infection. Pregnancy is avoided in patients whose general condition will not withstand additional strain of pregnancy, and when pregnancy occurs, it is often terminated early in such cases.

X-ray pelvimetry is applied preventive medicine. With it we can evaluate the possibilities of labour in advance and outline proper care. Our results with cesarean section have lead us to substitute this form of delivery in the interest of infant and mother early in cases where measurements by X-ray methods indicate the possibility of a traumatizing mid-forceps delivery.

The determination of certain pelvic diameters and the consideration of pelvic morphology are definitely useful in estimating the pelvic capacity in its relation to childbirth. Infor-

mation may be secured roentgenologically and views made from the superior and lateral aspects of the pelvis will enable the observer to study pelvic morphology readily and to determine with essential accuracy the important measurements.

There are three portions of the pelvis which are important in such a pelvimetric survey; these are the pelvic inlet, the mid-pelvic plane and the pelvic outlet, the diminution of area of any or all of these portions may exist with interference with labor. It is, however, the diminution in size of the mid-plane which offers for us the greatest difficulties in the management of labor which we shall discuss at this time.

When we use the term "midplane of the pelvis" we are considering a plane which extends posteriorly from the lower posterior surface of the symphysis through the level of the ischial spines to the lower anterior surface of the sacrum. The midplane anteroposterior diameter will have its posterior end point near the junction of the fourth and fifth sacral segments dependent upon the variation of the position and the shape of the sacrum in its relation to the pelvis as a whole. The midplane transverse diameter is the shortest distance between the ischial spines. The midplane posterior sagittal diameter is that segment of the anteroposterior diameter which lies posterior to its intersection by the transverse diameter.

All of the pelvis in this series were measured roentgenologically by the Thoms and Wilson technique. In this procedure two films are used, one showing the pelvic inlet from its

superior aspect, in which the bispinous or transverse diameter of the midplane may be measured using the correction scale on the edge of the film. The other view is taken laterally and in this the midplane anteroposterior and posterior sagittal diameters may be measured. As has been previously emphasized on many occasions, these and the other important pelvic measurements can be obtained accurately only by roentgenometry and such procedure should be part of the prenatal program of every primigravid woman.

An experience of nearly twenty years of such routine has convinced us that only in this way may minor changes in midpelvic relationships be discovered, changes which may have major significance.

For purposes of classification we divide the usual pelvic variations into three groups:—

1. Dolichopellic: Pelvis in which the length of the anteroposterior diameter of the inlet exceeds the transverse diameter of the inlet.

2. Mesatipellic: Pelvis in which the anteroposterior diameter of the inlet is less than the transverse by no more than 1.0 cm.

3. Brachypellic: Pelvis in which the anteroposterior diameter of the inlet is from 1.0 to 3.0 cm. less than the transverse diameter.

The incidence of the pelvic types studied in a larger group (1,100 women) was 19, 46 and 32 per cent respectively.

In considering midplane constriction we are concerned with the relative shortening of two dimensions, the midplane transverse and the midplane anteroposterior diameters.

In our experience shortening of one or both of these diameters is not uncommon and, when it exists, a knowledge of its extent is of considerable prognostic importance. When such contraction exists and the pelvic inlet diameters remain within average limits, the fetal head usually shows good engagement and labor proceeds normally until such a time as the head attempts to pass the midpelvic plane. It is at this level that the greatest difficulty in midforceps delivery is usually encountered.

In this study, we have chosen to regard as the chief index to midplane contraction the shortened transverse or interspinous diameter and, for this purpose, we have designated all transverse diameters of less than 10 cm. as being evidence of midplane constriction. We have divided these transversely contracted midplanes into two groups: Group A (range 9.9 cm. to 9.6 cm.). Group B (range less than 9.6 cm.). We consider midplane anteroposterior shortening to be present in: dolichopellic-type pelvis showing this diameter to be less than 12.00 cm.; mesatipellic-type pelvis showing this diameter to be less than 11.75 cm.; brachypellic-type pelvis showing this diameter to be less than 11.50 cm.

#### *Comments.*

In surveying this group of patients with contracted pelvic mid-plane we are impressed with the correlation of findings. The entire group shows a high percentage of operative deliveries associated with transverse midplane contraction: Group A, 37.8 per cent, and Group B, 55.9 per cent.

When such contraction is associated with midplane anteroposterior shortening, the operative deliveries rise to 63.5 per cent. The obvious conclusion is that, when midplane contraction is discovered, suitable measures must be considered for dealing with the situation. The increase in Cesarean section from 4.2 per cent to 16.3 per cent in recent years in this type of case shows that we are considering this type of delivery as preferable to difficult forceps deliveries and, by the same token, the incidence of midforceps has been markedly decreased on our hospital service. The delivery by Cesarean section of breech presentations at term with associated midplane contraction is the procedure of choice as far as we are concerned.

The association of dolichopellic and mesatipellic types with relative midplane transverse constriction is of interest developmentally because of the apparent association of these forms with environmental conditions during the growth period, which has been discussed elsewhere. It should be remembered, however, that both of these types are also characterized by relatively increased anteroposterior room throughout the pelvis, so that adequate compensation is usually present.

It is interesting to consider the incidence of midplane contraction as it occurs in this clinic. In order to arrive at this figure we have studied the pelvis measurements in 1,009 consecutive primigravid patients. Of these, 350 or 34.7 per cent revealed contraction according to our criteria in one or both midplane diameters. Two hundred eighty-seven of

this 350 have been delivered of full term infants on the teaching ward service of the hospital. One hundred sixty-seven of the 287 have shown midplane transverse contraction with or without anteroposterior shortening, whereas contraction of both anteroposterior and transverse diameter occurred in but forty instances.

Various formulary methods have been advocated for evaluating the adequacy of the midpelvis. Until further studies have resulted in more agreement on the subject, we prefer to continue using the simple criteria shown above, namely classifying pelvis into two groups, A and B, dependent upon the degree of midplane transverse contraction with added consideration of the presence or absence of anteroposterior shortening. The adequacy of this method of evaluation may be seen in some measure by a foetal mortality of one in 350 cases. There was no maternal mortality.

To recapitulate, when the midplane transverse diameter is less than 10.0 cm. without other midplane shortening, we may expect operative delivery in 43.5 per cent. When this

shortening is combined with anteroposterior shortening, this incidence is 53.9 per cent, and when such transverse shortening becomes more marked, as in Group B, the incidence of this combination rises to 63.5 per cent.

#### *Conclusions.*

1. Accumulated evidence from this and other studies shows that even moderate constriction at the midpelvis must be viewed with care in every labor.

2. Such midplane constriction can only be discovered and measured accurately by roentgen techniques.

3. This being so, roentgen pelvimetry of every primigravida should become a routine procedure. In these days of periodic mass x-ray screening for other diagnostic purposes, it does not seem too much to ask that attention be directed to giving every woman in her first pregnancy the benefits of pelvic roentgenometry. It should be pointed out that one such examination in a woman's lifetime is usually sufficient.

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