

The  
Value of Roentgenology  
In Obstetrics

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# THE VALUE OF ROENTGENOLOGY IN OBSTETRICS\*

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THE science of roentgenology, as applied to obstetrics, has gradually come to assume a place of importance as an aid in the interpretation of the various phases of pregnancy and its complications. It should be used only in certain conditions as they arise in conjunction with the clinical findings. It is not recommended as a routine measure or as a means of evading the examination of a patient. The modern methods of roentgenology, necessitating only a few seconds exposure for the taking of the plates, have done away with any fear of ill effects to either the mother or the foetus.

Multiple pregnancy furnishes one of the important uses of the X-ray. It is of value during pregnancy in making a positive diagnosis between two small foetuses or one large one. Near term the presentations and positions of the two foetuses may be definitely diagnosed and treated accordingly.

The differential diagnosis of early pregnancy from fibroid and ovarian tumors and in obese individuals from pseudocyesis furnishes another important use of radiography. Petersen<sup>1</sup> found from a study of twenty-two roentgenograms of pregnant patients ranging from a two to six months period of gestation that one-half of these showed positive X-ray findings during the fourth month and that beyond the fifth month all were positive.

At term or during labor the X-ray is an aid in completing a doubtful diagnosis of certain of the less frequent presentations, such as breech, shoulder, face and brow presentations and in determining various types of deflexion and military attitudes of the foetus.

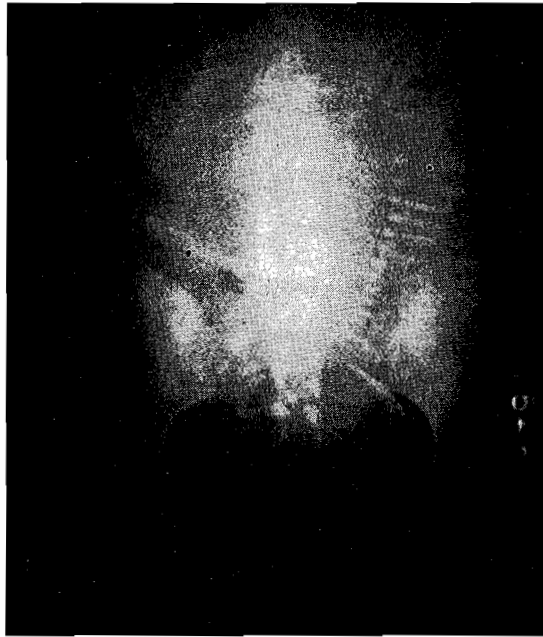
Death of the foetus characterized by overlapping of the cranial bones and

shrinkage of the size of the head, as observed first by Spalding<sup>2</sup> in 1922, can be determined in utero by the X-ray plate. The findings of death of the foetus should be correlated with the associated clinical findings, as later pointed out by Stein and Arens<sup>3</sup>, who found that foetuses could be dead as long as four days and not show any overlapping of the cranial bones.

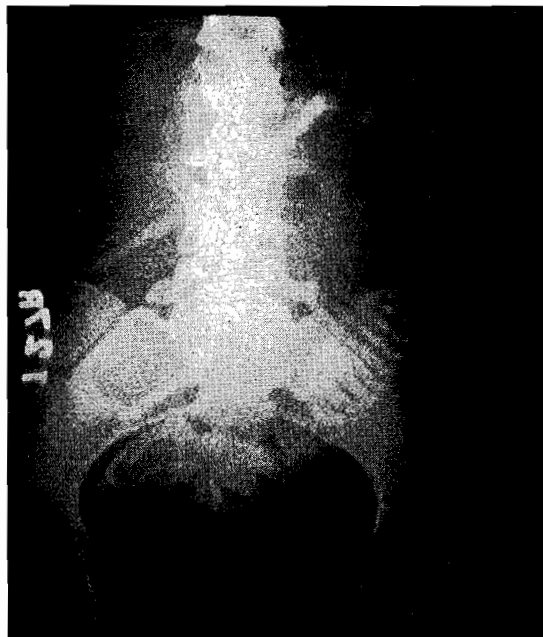
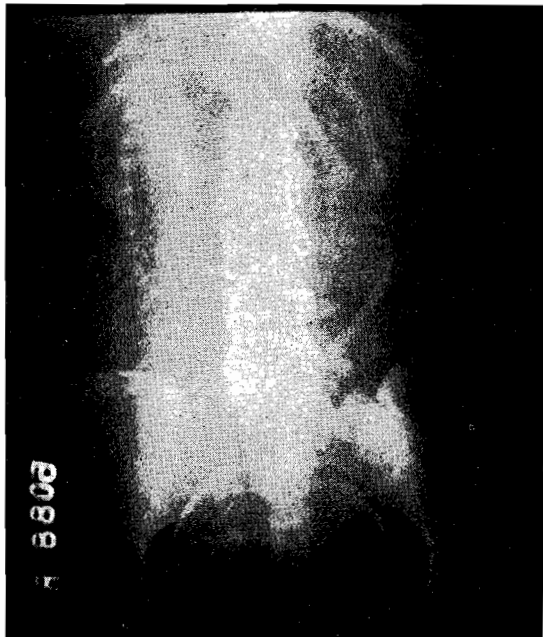
In the management of certain difficult cases of occiput posterior position the X-ray may be of value. I<sup>4</sup> recently reported a series of 200 consecutive primary occiput posterior positions from the obstetrical service of the Minneapolis General Hospital. In this series 76.5 per cent rotated spontaneously and became easy spontaneous or low forceps deliveries. In the remaining group, constituting 23.5 per cent of the series, there developed either a persistent occiput posterior or a transverse arrest in mid-pelvis necessitating operative interference, in which an occasional roentgenogram became of value. In several cases in this series X-ray plates were taken in order to make absolutely positive the diagnosis of an occiput posterior and to help solve the individual obstetrical problem presented by each case. A group of plates so taken are shown in Figures 1-7. These plates are not only of value as an aid in the care of the patient but also are useful in furthering the obstetrical training of the medical student and interne, as by this type of demonstration they may clearly visualize the position of the foetus in relation to the mother.

Anencephalus can be definitely diagnosed before the onset of labor by the X-ray and the patient and family prepared for the outcome. The characteristic findings are a complete absence of

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Figures 1-2.—Anterior-posterior and lateral views of a right occiput posterior position in a primipara taken during labor. The occiput is deeply engaged and posterior. Termination by low forceps following spontaneous anterior rotation. Note the posterior and nearly parallel relationship of the foetal spine to the maternal spine in the lateral view; the foetal extremities are seen in the anterior portion of the mother's abdomen.



Figures 3-4.—An anterior-posterior comparison of the position and configuration of the engaged occiput to the pelvis occurring during labor, in a right occiput posterior position (Fig. 3) and a left occiput anterior position (Fig. 4).

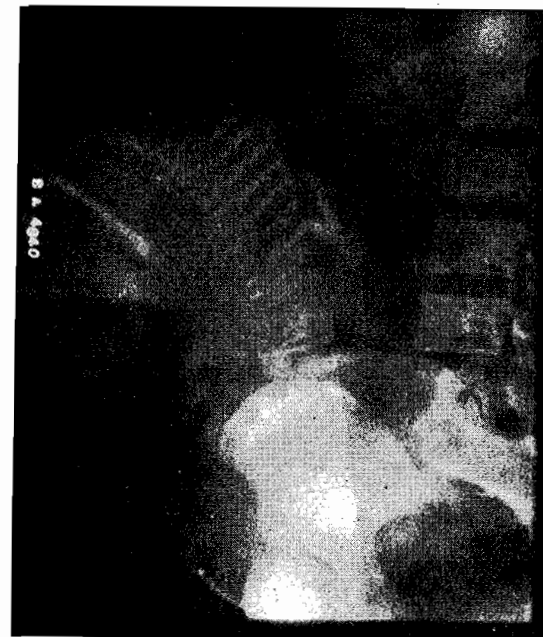


Figure 5.—Lateral view of a right occiput posterior position occurring in a multipara. Termination by spontaneous rotation and delivery. Note the pendulous condition of the abdomen with the foetal extremities plainly visualized in the anterior portion of the mother's abdomen, the back posterior and almost parallel with the mother's spine and the occiput at the pelvic inlet.

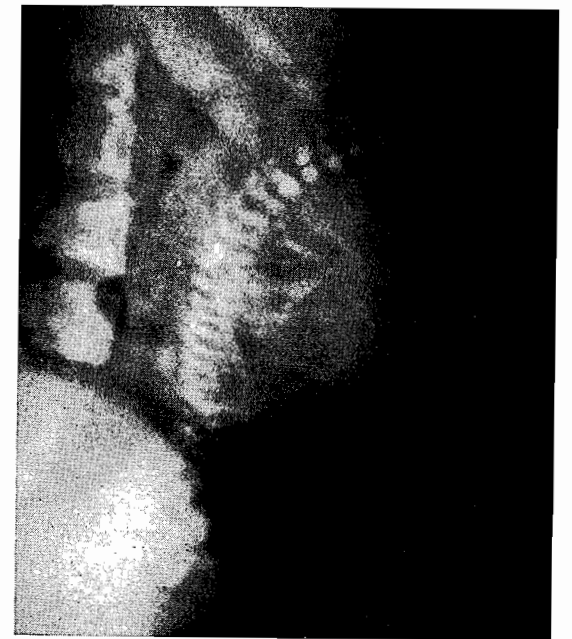


Figure 6.—Lateral view of a right occiput posterior position occurring in a secundigravida. Delivery by podalic version and breech extraction following failure of the head to pass beyond the pelvic inlet. Note the typical position of the foetal spine in relation to the maternal spine as seen in posterior positions.



Figure 7.—Lateral view of a left breech presentation in a secundigravida with a contracted pelvis of a moderate degree. Note the hyperextension of the foetal spine in the cervical region, the deflexion of the occiput, and the parallel attitude of the foetal and maternal spines. Termination by Caesarian section.

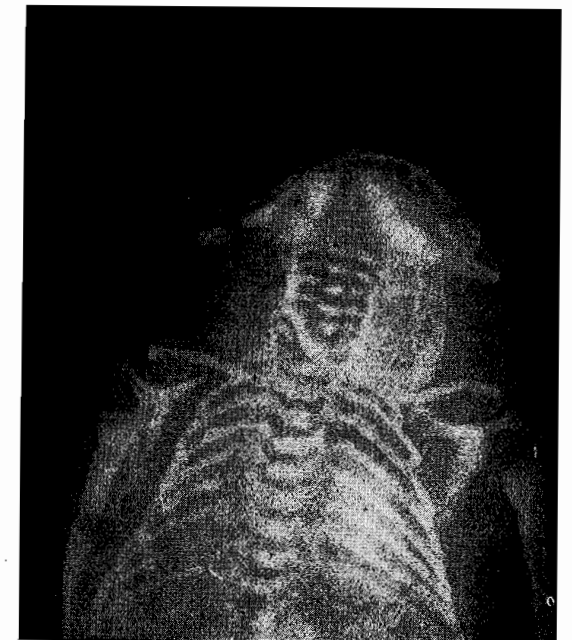


Figure 9.—Direct X-ray visualization of an anencephalic stillborn monster after delivery, showing the marked distortion of the bony contour of the head and the absence of the cranial vault.

the cranial vault with a marked distortion of the bony contour of the head. Case<sup>5</sup> in 1917 was the first to definitely diagnose anencephalus before delivery by the X-ray. Spangler<sup>6</sup> in 1924 reported two cases; Doub<sup>7</sup> in 1925 reported four cases; Case and Cooper<sup>8</sup> three cases in 1926, and since that time an increasing number have been reported. I<sup>9</sup> reported in 1928 two cases of anencephalus and one of exencephalus successfully diagnosed before delivery by the X-ray out of eleven monsters occurring in a series of 5911 obstetrical deliveries at the Minneapolis General Hospital in the five year period from January 1923 to January 1928. Falls<sup>10</sup> in 1928 reported cases of anencephalus, dicephalus and hydrocephalus diagnosed before delivery by the X-ray.

The direct measurement of the anterior-posterior and transverse diameter of the pelvic inlet in contracted pelves

furnishes the last important use of the X-ray. The diagonal conjugate can be fairly accurately measured by means of direct palpation but the transverse diameter can be only poorly measured by external pelvimetry. Thoms<sup>11, 12</sup> since 1922 has done the most work in this field and recently has presented a simplified and exact technique for the measurement of the anterior-posterior and transverse diameter of the pelvic inlet by means of the X-ray.

#### Summary

The roentgenogram is a valuable aid in the following obstetrical conditions:

1. Multiple pregnancy.
2. Early pregnancy.
3. Complicated presentations of the foetus.
4. Death of the foetus in utero.
5. Occiput posterior positions.
6. Anencephalus and associated monsters.
7. Mensuration of the pelvic inlet.

It should be used only when definitely indicated and the interpretation correlated with the clinical findings.

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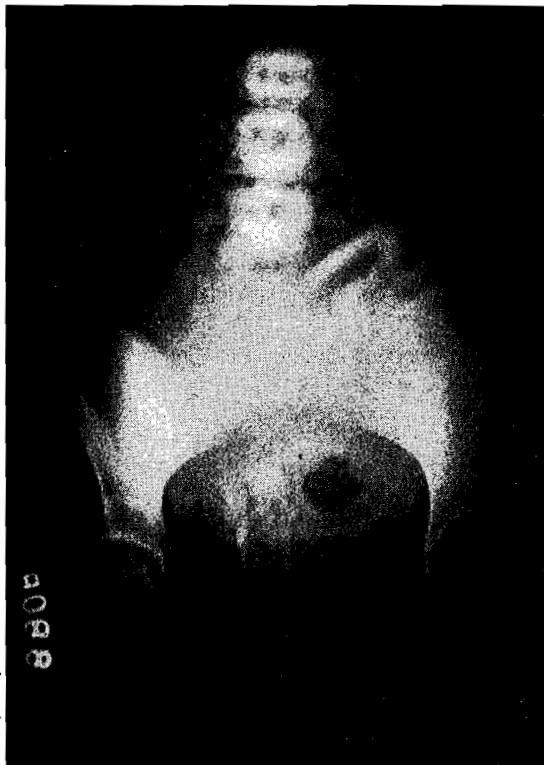


Figure 8.—Anencephalus. Diagnosis before delivery by the X-ray. Stillborn monster delivered spontaneously—face anterior presentation. Note the complete absence of the cranial bones; the foetal spine is seen in the maternal pelvis.

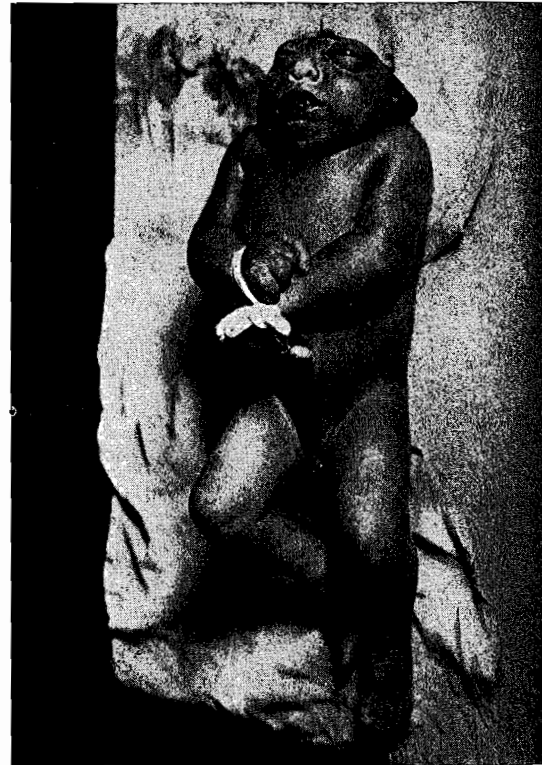


Figure 10.—Anencephalus. Typical frog-faced features with absence of the encephalon and cranial vault. Note the excessive development of the upper extremities (Nanagas, 13) and the otherwise normal trunk and lower extremities.