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AMNIOGRAPHY

PRELIMINARY REPORT

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OBSTETRIC roentgenography has been limited almost entirely to a demonstration of the fetal bones and uterine contour. Occasionally, when the subcutaneous fat of the fetus is unusually thick, the outline of an extremity is obtained. The slight difference in density of fat and liquor amnii is sufficient to cast a shadow. This suggested an artificial increase in density of the amniotic fluid to give contrast to fetal soft parts and placenta. Amniography is proposed as a name for this procedure, differentiating it from uterography, the roentgenography of the non-pregnant uterus.

This contrast is obtained by the injection of a one to one solution of U.S.P. strontium iodide through the anterior abdominal wall. The actual concentration is about 0.75 gm. per c.c., as strontium iodide contains six molecules of water of crystallization. After anesthetizing the skin with novocaine, a small flexible lumbar puncture needle is passed into the amniotic cavity, usually below the umbilicus and near the midline. The puncture is made on the side with the fetal small parts. After obtaining fluid through the needle, the injection is made slowly with frequent withdrawals of amniotic fluid to dilute the solution. Following injection, it is advisable to wait half an hour to an hour before taking the films, to permit an even diffusion throughout the amniotic

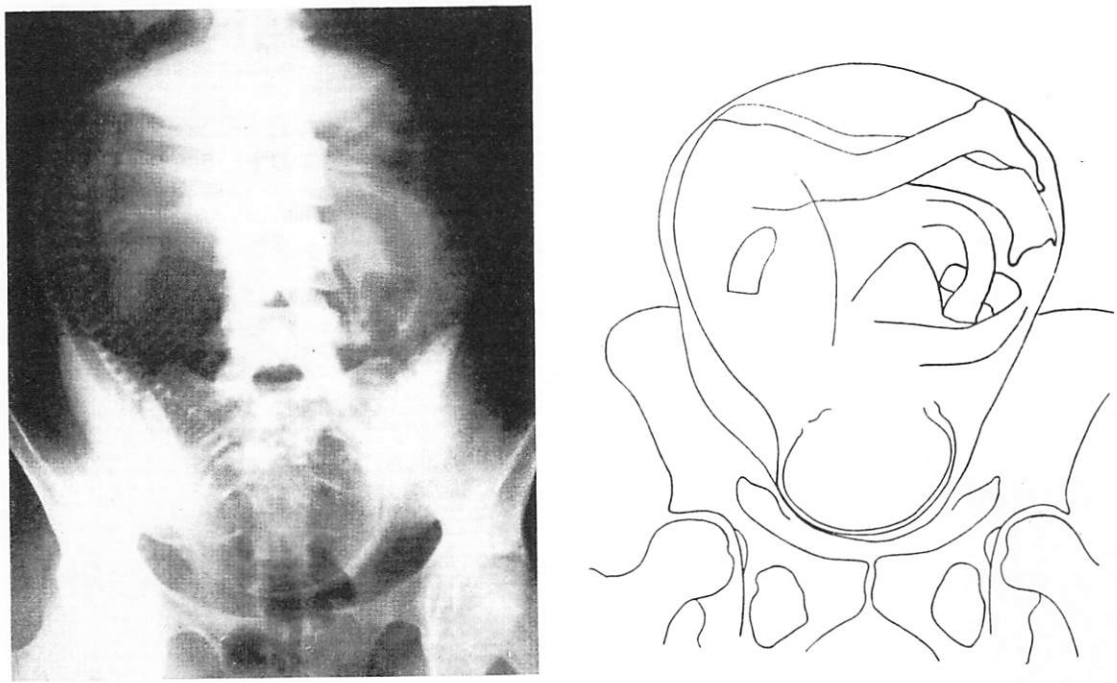

FIG. 1. Posteroanterior film and tracing showing the fetal small parts well outlined. Several loops of cord are visible. The breech shows no projecting shadow of scrotum, justifying a diagnosis of female fetus. The fetal stomach contains strontium iodide.

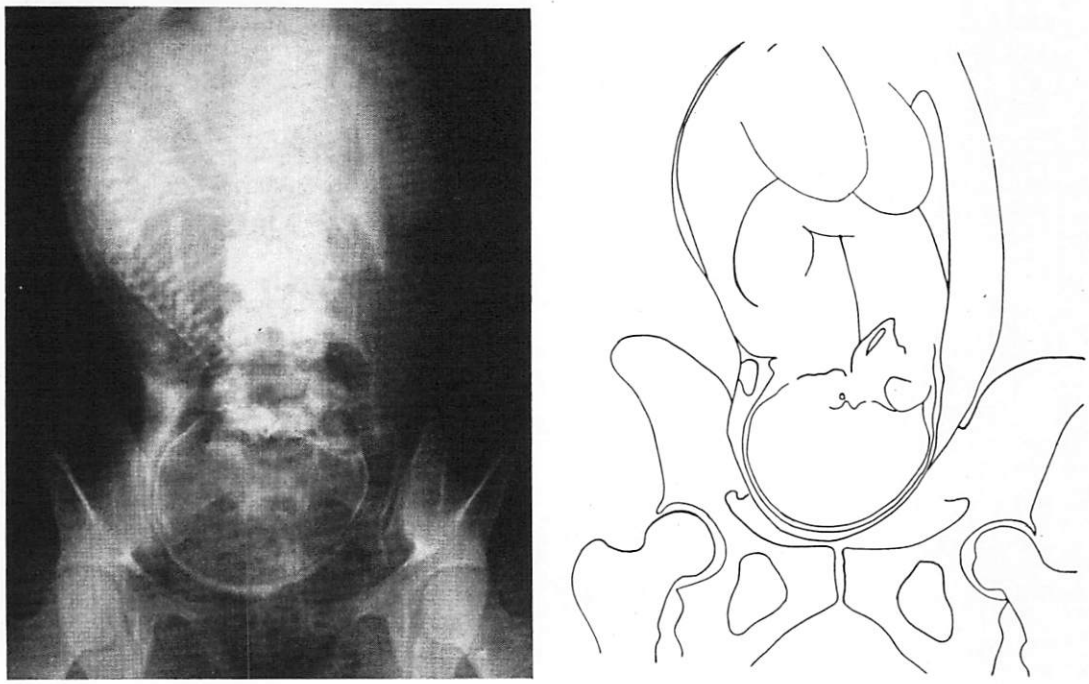

Fig. 2. Posteroanterior film and tracing showing a flattening of the left margin of the uterus, probably due to placenta. The cord is shown encircling the fetal neck.

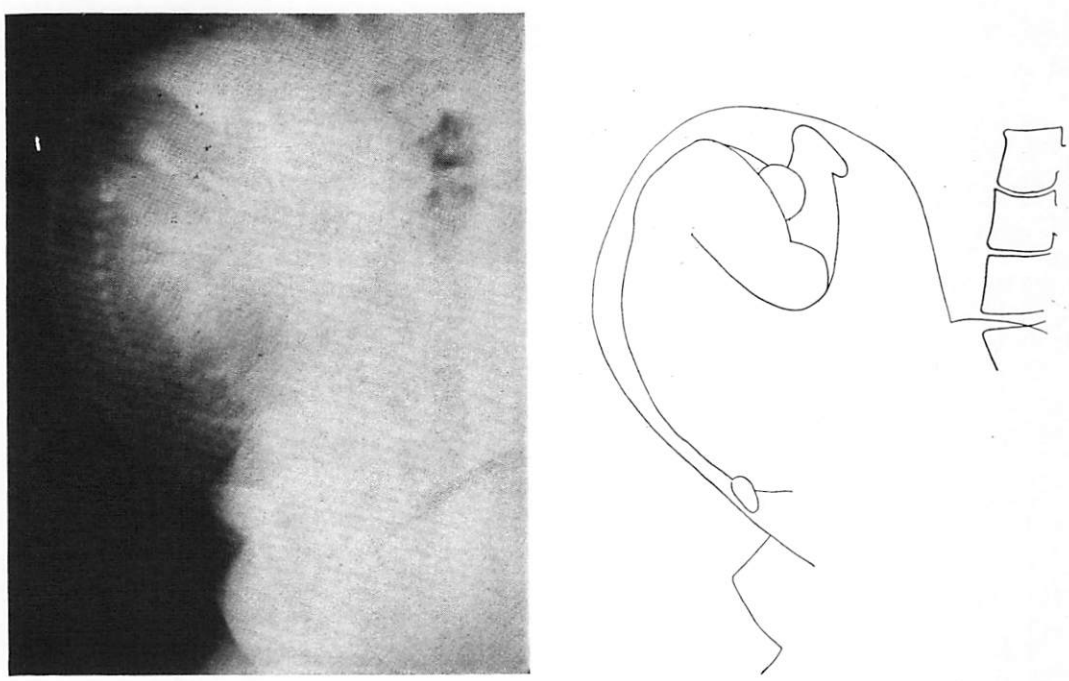

Fig. 3. Lateral film and tracing showing the breech well outlined. A rounded projection from this was interpreted as scrotum justifying a diagnosis of male fetus. The cord is shown about the fetal neck.

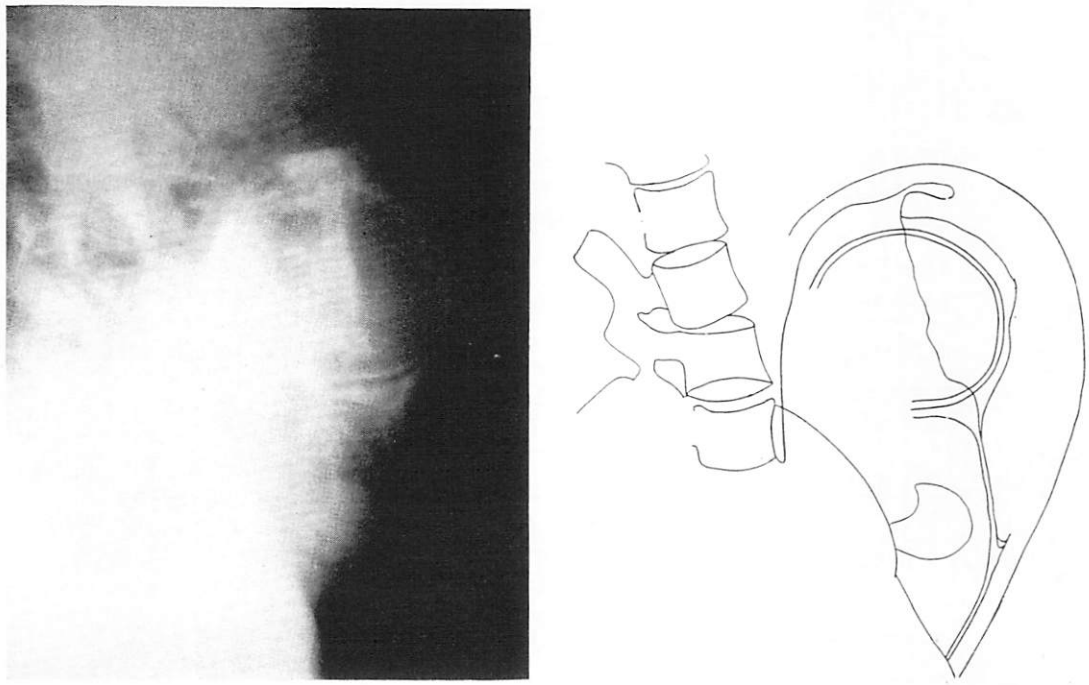

Fig. 4. Lateral film and tracing showing the placenta occupying the anterior portion of the fundus. The fetal stomach contains strontium iodide.

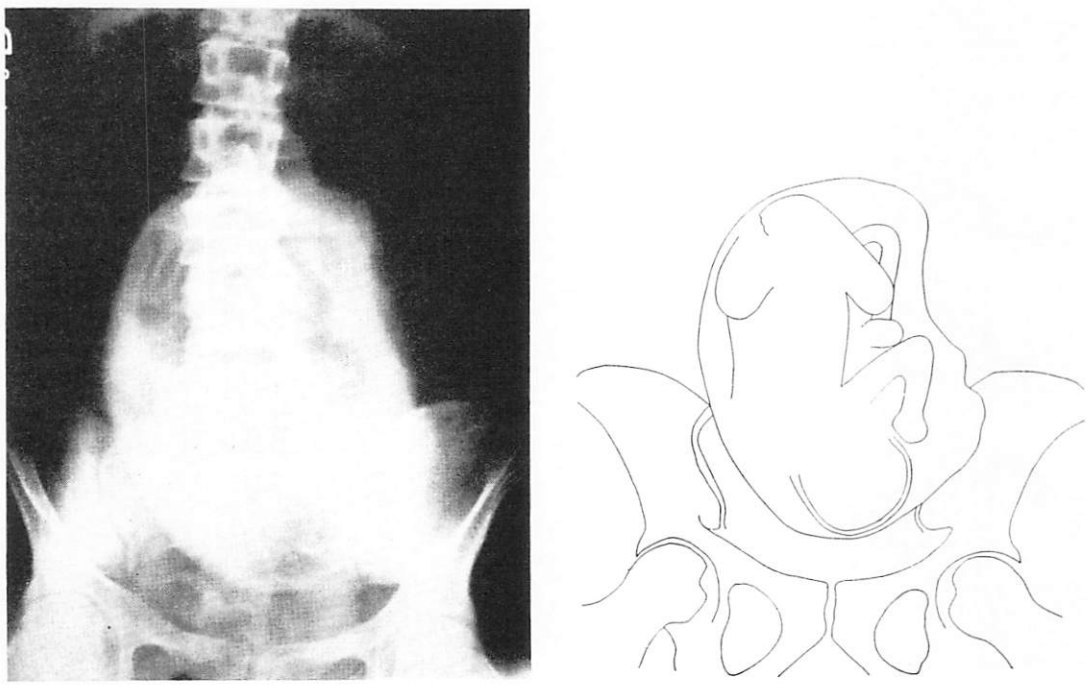

Fig. 5. Posteroanterior film and tracing showing a distinct outline of fetal small parts. The placenta extends backward to the left side of the uterus producing an irregularity in the amniotic contour.

cavity. During this time the patient changes position frequently to assist in the mixing. The exposures are made on a Potter-Bucky diaphragm, using a high milliamperage and relatively low voltage to insure a maximum contrast.

The correct amount of solution to inject is difficult to estimate. It varies with the quantity of liquor amnii present and this is almost impossible to determine in advance. If too much solution is injected, the whole interior of the uterus will become opaque and the object of the examination will be defeated. From 7.5 to 15 c.c. of the solution have been used. The larger amounts caused too much opacity and probably 9 or 10 c.c. will be sufficient for the average case in the latter months of pregnancy.

In the 21 cases injected there have been no injurious or toxic effects to the mother or fetus in normal pregnancies. In a case of placenta praevia, at the sixth month, the fetus was expelled about thirty hours after injection. The cord was pulsating and the fetus made a few feeble attempts at respiration. The placenta showed a partial separation. It was located low on the anterior wall and may have been perforated in the injection. The pulsating cord excluded any toxic effect to the fetus.

These films have shown the location of the placenta in the majority of cases. The placenta appeared as a filling defect or a flattened area, best seen when caught in profile. Probably the failures to show the placenta were due to the fact that it was not projected in profile on the usual posteroanterior and lateral views. Under these circumstances oblique views are of help. The cord, encircling the fetal neck has been shown twice. Sex has been determined four times, three males and one female. A true lateral view of the breech is necessary for this, and this happens rather rarely.

A shadow in the region of the left costal margin of the fetus has been present on a large percentage of films. This has been interpreted as strontium solution in the fetal stomach, indicating that the swallowing of amniotic fluid must be of frequent occurrence.

The rate of absorption of strontium iodide was surprisingly rapid. Films taken four or five hours after injection showed an appreciable decrease in the density of the shadow. The fetal contours were lost at about twenty-four hours, showing that most of the salt had been absorbed by this time.*

SUMMARY

A method is described for visualizing fetal soft parts, localizing the placenta, and occasionally determining sex. It may be of value in the diagnosis of placenta praevia and determining the exact relation of the placenta to the cervical canal.

* We wish to acknowledge our indebtedness to Drs. Joe De Pree, A. M. Campbell, and J. D. Hastie for assistance and encouragement in this work.