

SUBJECT: RADIOISOTOPIC LOCALIZATION OF THE PLACENTA WITH INDIUM
(In ^{113m})

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BACKGROUND:

Symptoms associated with antepartum bleeding, especially during the third trimester of pregnancy often present a major problem in a differential diagnosis. Since placenta previa is one of the most common causes of hemorrhage in the last half of pregnancy, accurate localization of the placenta is of considerable importance both in the diagnosis and in the subsequent management of the obstetric patient.

Soft tissue x-ray placentography and arteriograms present a 90-95% accuracy of placental localization. By the use of radioisotopes the accuracy of localization increases to 95-98%.

All methods concerned with placental localization not only require a high degree of accuracy but demand a low radiation dose to both mother and fetus. In this regard it is proposed that a study be undertaken to determine the degree of accuracy and radiation distribution and dosage to mother and newborn with Indium. Indium (In ^{113m}) is an accepted A. B. C. radioisotope approved for radioisotope studies of liver, brain, and lung. It is used routinely in the radioisotope laboratory of this hospital. Indium has a short physical half-life of 1.7 hours, and because of its decay by isomeric transition, the radiation dose is greatly reduced compared to other scanning agents used in placental localization.

Indium is obtained from a parent SN ¹¹³ nuclide generator. This parent generator is used routinely in many radioisotope laboratories. One millicurie is then mixed with threefold volume of patients' plasma and this is re-injected

into the patient. After allowing Indium to mix in the body for 10 minutes, during which time it is believed to attach to the beta-globulin of transferrin, a photoscan of the abdomen is taken.

Indium has the advantage over other radioisotopes because of its rapid decay, higher photon output, yet a reduced amount of absorbed radiation from an initially smaller dose injected. Also, the distribution of Indium has the ability to be photographed by a scanner which allows an immediate visualization of the placental pool, rather than an impression obtained from interpretation of radioactive counts. Indium has the advantage over other photoscan radioisotopes such as Technetium 99m as the pertechnetate because of its shorter half-life, plus Indium does not emit a high rate of radioactivity from the bladder like Technetium which could lead to a confusing photoscan.

METHODS: FOR LOCALIZATION AND STUDY OF DISTRIBUTION

- A. All patients with third trimester vaginal bleeding as requested by WMO.
- B. "Control" localizations are requested for 1) repeat cesarean section near term 2) malpresentations at term, oblique or transverse lie. Patients in A & B category can have localization performed as an outpatient where indicated, by calling any of the above investigators for further scheduling.
- C. All patients will have a polaroid picture of the photoscan attached to outpatient or inpatient chart.

- D. To determine the accuracy of localization, all cesarean sections will have an accurate manual localization of the placenta recorded on the chart, as well as results from a "double setup" examination if not brought to cesarean section. Since the size of the uterus changes dramatically postpartum routine manual localization and removal of the placenta is not requested for vaginal deliveries.
- E. In order to study the distribution of radioactivity in the mother and fetus, a series of localizations will be performed just prior to planned cesarean section. The following samples will be taken at time of cesarean section -
1. Maternal blood samples via venepuncture.
 2. Amniotic fluid sample.
 3. Cord blood sample. (Careful not to contaminate with maternal blood).
 4. Gastric fluid from neonate.

All the above samples will be handed to a representative from the radioisotope laboratory.

In the Postpartum phase -

1. The 1st 24 hour maternal urine will be sent to Radioisotope Laboratory.
2. All soiled diapers with urine and/or meconium will be placed in plastic bag for 1st 24 hours and sent to the Radioisotope Laboratory.
3. At several different hours, with 1st 24 hours post-delivery, infants will be taken to the Radioisotope Laboratory for total body counting, with approval of WMO.