of 1968. According to this investigation, one thirds of 1401 reported cases were less than 40 years old, and ½ of these were less than 30 years old. Concerning the frequencies of RI examinations, renography (R) with ^{131}I-Na-iodo-hippurate was 65%, placentography with ^{131}I-HSA or ^{99m}Tc-HSA 1%, radiotubation (T), the examination of passage of uterine tube with ^{32}P or ^{131}I 6.7% and uterine cancer examination (C) with ^{32}P was about 27% of the total cases.

Exposure dose of gonads and fetus due to these above mentioned examinations were calculated, adopting several estimated numericals about Japanese female and some assumptions about dynamics of RI used there. Radiation doses estimated were as follows; (P) with ^{131}I-HSA (5 μCi) or ^{99m}Tc-HSA (1000 μCi) was similar with those reported previously by other authors, (R) with ^{131}I-Na-iodo-hippurate (40 μCi), 2.6 mrad to each ovary and about 1.5 mrad to the fetus in average, if it was performed in the gravid.

For radiotubation we used ^{99m}Tc or ^{113m}In instead of ^{32}P or ^{131}I, reported by the other author, and radiation dose of each ovary was estimated about 25 mrad by ^{99m}Tc04 (100 μCi) and 3 mrad by $^{113m}In(OH)_3$, when bilateral uterine tubes were passable. Each ovarian dose in radiolymphography (L) by subcutaneous injection of ^{198}Au-colloid (each 100 μCi) in the bilateral dorsi of foot was estimated as 40 mrad. As (L) is performed mainly in the patients with uterine cancer, genetical risk due to this examination would be neglected. Radiation dose due to RI examination in these fields would be decreased according to the progress of methods and instruments of examination and suitable choice of more adequate radiopharmaceuticals, especially short-lived and without β-radiation.

Radiation Dose to the Gonads and the Fetus Due to Diagnostic Uses of Radioisotopes in Gynecological Field

— Radiation Dose to the Gonads due to Radiotubation and Applications of Radioisotopes in Functional Test of Kidneys —

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The great advantage of radioisotopes in medical uses has been well known. However, much concern of radiation effects to the gonads and the fetus in gynecological uses of radioisotopes should be considered.

After intravenous administrations of ^{32}P (4 μCi/kg) and ^{131}I (3 μCi/kg) to the patients of uterine myoma before their operations, the radiation doses to the uterus, the salpinx and the ovary have been estimated from the measurements of their residual radioactivities in these organs and discussed on comparison with medical exposure of X-ray and the recommendations of the ICRP.

The following results were obtained.

1. The effective half-life of ^{32}P in the uterus, the salpinx and the ovary was estimated about 18 hours, respectively, and the residual radioactivity in the salpinx was somewhat higher than those in the uterus and the ovary.

The effective half-life of ^{131}I in the uterus, the salpinx and the ovary was estimated about 8.5 hours, respectively, and the residual radioactivity in the uterus was somewhat hihger than those in the ovary and the salpinx.

2. In the case of ^{32}P, the estimated radiation doses from the residual radioactivities in the uterus, the ovary and the salpinx were 244 mrad/g of tissue, 244 mrad/g of tissue and 328 mrad/g of tissue, respectively.

In the case of ^{131}I, the sums of estimated β and γ radiation doses from the residual radioactivities in the uterus, the ovary nad

the salpinx were 8.6 mrad/g of tissue, 5.3 mrad/g of tissue and 5.3 mrad/g of tissue, respectively.

3. At the present time, radiation dose to the gonads due to diagnostic uses of radioisotopes in gynecological field makes less contribution to the genetically significant dose than medical exposure of X-ray and even in the case of ^{32}P, the estimated dose is not considerably higher than the recommendatory value of the ICRP for woman to be able to conceive.

Symposium V. Radioimmunoassay

(Chairman) M. Fukase, Univ. of Kyoto

Prenciples and Problems of Radioimmunoassay

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Radioimmunoassay is an ingenious method for microassay of the substances which have antigenicity. This method is based on the high degree of specificity of antigen-antibody reaction and sensitivity of the measurement of radioactive substances and now is mainly used for the assay of peptide hormones.

The general principles of radioimmunoassay are as follows. Labeled hormone binds to its specific antibody to form a labeled antigen-antibody complex. Unlabeled hormone in plasma or other solutions competes with labeled hormone for antibody and thereby inhibit the binding of labeled hormone. Consequently the ratio of antibody-bound (B) to free (F) labeled hormone, denoted B/F, is diminished as the concentration of unlabeled hormone is increased. The concentration of hormone in an unknown sample is obtained by comparing the inhibition observed with that produced by standard solutions containing known amounts of added hormone ("standard hormone"). This is done by plotting B/F versus hormone concentration in known standards and, from the curve so obtained, finding the hormone conecntration that corresponds to the B/F ratio observed in the unknown sample.

For this method the following conditions are required.

1) Hormone to be assayed is obtainable in pure form and antibody for it available.

2) It is possible to radio-label the hormone and antigenicity is not altered by labeling.

3) Standard hormone and hormone in the sample behave similarly in antigen-antibody reaction.

4) Substances other than the hormone to be assayed has no influence on the antigen-antibody reaction.

As methodological problem, it is necessary to eliminate the radioactivity of other substances such as damaged hormone and inorganic iodine, and to make the separation of B and F complete.

This method is based on the immunological property within the chemical structure of the hormone. Therefore in case when immunological property and biological property are based on different portions in the chemical structure, disagreement can exsist between the value by radioimmunoassay and bioassay.

However such disagreement are rather exceptional and in most cases the value ob-