II. Detection of gastric cancer

A CASRAD probe of 2.5 mm diameter (CASRAD-G) was used in combination of a gastrofiberscope. The detector is inserted into a gastrofiberscope orifice designed for biopsy forceps.

About 20 hours after intravenous administration of ^{32}P sodium phosphate (300-400 μCi), the accumulation of ^{32}P in the tissue was measured by CASRAD probe. More than 50% increase in counting rate over control area was regarded as positive, less than 20% increase as negative and 20 to 50% increase as indefinitive.

Four out of 7 gastric cancers examined under direct vision were positive and other three were negative. However 7 out of 9 cases examined on resected specimen were positive. Some improvement in technique for the detection under direct vision is being performed.

A Variable Focus Zoom Collimator

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Collimators for isotope scanning now available have a fixed focus. This is to report on a zoom collimator having adjustable focus, made of layers of lead rings. The gap between each ring can be increased or decreased to extend or shorten the focal distance. The adjusting of focal distance is possible in the practically available range, without the significant loss of efficiency or sharpness of image. Penetration of unnecessary gamma-rays can be prevented by using a suitable thickness of lead layers for the gamma-ray used as the ordinary collimator. One touch adjustment of the focus would save the time of interchange.

Radiometric Assay of Radioactivity Especially the Nuclide Obtained from Radioisotope Cow

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Since the use of daughter-nuclide obtained from radioisotope cow, radiometric assay of radioactivity became important and indispensable. For the assay, methods by absolute counting of radioactivity, by calculation based on the gamma-ray dose rate or by comparing with standard source are included. Of these, we recommend the method of calculating the radioactivity based on the specific gamma-ray constant or rhm value for the use in general hospital because of its simplicity and accuracy. In this calculation, rhm value of each nuclide as well as spectrum characteristic and reliability of dosemeter must be taken into consideration. For the calculation of rhm value (D) detailed knowledge of decay scheme is needed. The rhm value can be calculated as $O=19.4\ (k_1\mu_1E_1+k_2\mu_2E_2+\cdots\cdots)$ [mR/hr.mCi at 100 cm], provided E is γ-ray energy, k is emission ratio of γ-ray and μ is energy mass absorption factor. For the calculation it is necessary to consider internal conversion factor and K-electron capture, but X-ray less than 100 keV must be excluded for calculation of rhm value. The rhm values of ^{113m}In and ^{99m}Tc were calculated to be 0.15 mR/hr·mCi at 100 cm and 0.078 mR/hr·mCi at 100 cm and 0.078 mR/hr·mCi at 100 cm. Ionization type of surveymeter is most suitable as a dosemeter because of its good quality characteristic, but other types of surveymeter such as GM type or scintillation type are not