Letters to the Editor

Residual Splenic Function at 26 Years Following Radiation Therapy

TO THE EDITOR: Response of the normal spleen to radiation has been a topic subject to different interpretations. Over a short period of time, following inclusion in a therapeutic radiation portal, the normal spleen has been noted to maintain most of its volume as well as its ability to trap intravenously administered radiocolloid (*1*). However, a long-term effect of such treatment may be the loss of splenic function and atrophy of the organ (*2*). We report a case in which there was splenic functional ability 26 yr after radiation therapy delivered to a Wilms' tumor on the left side.

At another center, a white male, age 16 mo, was noted to have a large, firm, smooth-surfaced mass occupying most of the left abdomen. An i.v. pyelogram revealed a normal right urinary pathway without visualization of the left kidney. Urinalysis and hematologic exam did not demonstrate any abnormalities. At laparotomy, the tumor mass and left kidney were resected. Histologic examination revealed a Wilms' tumor on the left kidney, without evidence of secondary spread. On the day of surgery, the patient was started on radiation therapy. Anterior and posterior portals were used to treat the left hemiabdomen. The field size was 16 × 9 cm, using a 250 keV machine at 15 MA and target to skin distance of 50 cm. Added filters were 0.4 mm tin, 0.25 mm copper, and 1 mm aluminum. The beam had a copper half value layer of 2.7 mm. The skin to tumor distance was 6 cm, with a 74% depth dose. Twenty-one treatment sessions, over 27 days, delivered 3,034 rad at the tumor level. A review of the radiation portal showed that it covered the left hemiabdomen, the vertebral column plus transverse processes, and the splenic region. The patient was started on a course of i.v. actinomycin-D, to a total dose of 700 μg (70 μg/kg). There was accentuated erythema of the skin in the radiation portal, perhaps due to combined effects of chemotherapy and radiation therapy. He underwent four subsequent courses of i.v. actinomycin-D therapy. Chemotherapeutic agents have been reported to have a variable effect on the spleen, with some causing splenic hypofunction (*3*). We saw the patient 26 yr and 3 mo after his operation. He entered the hospital because of abdominal distress. A barium swallow showed a postbulbar ulcer, with some narrowing of the duodenum in that region. The patient had a slight scoliosis. Radiographs revealed platyspondyly (flattening of many vertebrae). The radiographs also showed that there was hypoplasia of the left ilium, of the transverse processes of the lumbar vertebrae, and of the lower left ribs. A technetium-99m sulfur colloid study showed the liver to be 16 cm in length and to have a rather oblong appearance. The spleen was distinctly noted on multiple views (Fig. 1). The splenic length was under 7 cm (normal = 10 ± 1.5 cm). Repeated blood smears did not reveal any Howell-Jolly bodies in circulating red blood cells.

FIGURE 1
This is obliqued left lateral view ([^{99m}Tc]sulfur colloid). Small spleen (under 7 cm in length) is to viewer's right

The spleen still had the ability to extract intravenously administered radiocolloid. It was also functional in terms of clearing Howell-Jolly bodies from circulating erythrocytes. The spleen was small (under 7 cm in length). There is growing evidence that only part of the spleen is needed for its functions (*4*). It is clear that the radiation was sufficient to result in severe disturbances of bone growth, but not sufficient to inactivate the spleen totally. This case may serve as a stimulus to further attempts to gather data as to the time course (and degree) of the response of the human spleen to external radiation.

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Krypton-81m Imaging of the Right Ventricle

TO THE EDITOR: We would like to make a mild protest, both to the authors and referees concerning "Krypton-81m of the Right Ventricle" by Horn et al. (*J Nucl Med* 26:33-36, 1985).

Two full papers were published on this subject in 1980 (*1*) and 1983 (*2*) and not referred to by the authors. The last article used an almost identical method to the one outlined on a larger number of normal subjects and patients (55 subjects compared to 15 normals and an unspecified number of abnormals) with an almost identical result being quoted for the normal range of ejection fraction of the right ventricle. It appears misleading to "report the development of a method" which has been explored by others.

Having made our protest, however, we agree with the point made that krypton-81m i.v. infusion is an excellent tracer for studying the right heart which could profitably be explored by other groups. Krypton-81m infusion, both intravenously and intra-arterially is a valuable and under utilized way of achieving excellent function images of regional flow which will reflect changes induced by physiologic alterations and interventions (*3*). It has been applied to regional pulmonary blood flow (*3*), regional cerebral blood flow (*4*), the myocardial blood flow (*5,6*) and has even been applied to skeletal blood flow (*7*). With the increasing use of krypton as an agent for ventilation in the USA, we would hope to see a greater use of these applications of the tracer as an indicator of regional perfusion.

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Krypton-81 Imaging of the Right Ventricle

TO THE EDITOR: We read with interest the paper by Horn et al. published in the *Journal of Nuclear Medicine*, Vol. 26, January (*1*). Having routinely used the krypton-81m (^{81m}Kr) for the right ventricular study the last few years (*2*), we agree that the steady-state ^{81m}Kr method is actually the best available approach for evaluating the right ventricular (RV) ejection fraction. This conclusion is undoubtedly also shared by other authors who have also been involved with this technique for many years (*3,4*).

There is, however, one methodological aspect of the Horn's paper which we feel needs further discussion. The calculation of the ejection fraction without background correction is only valid if the background activity is negligible. This is, however, not the case in the steady-state ^{81m}Kr right ventricular study as the lung activity included in the right ventricular regions of interest (ROIs) is quite important.

As stated by the authors, the activity in the lung during continuous infusion of ^{81m}Kr correlates closely with the technetium-99m (^{99m}Tc) macroaggregated albumin lung perfusion image. Therefore, by using the ^{99m}Tc lung perfusion image performed in exactly the same position as the ECG gated study, the ^{81m}Kr activity in the lung included in the RV ROIs can easily be calculated (*2*). In a series of 50 patients, we evaluated the importance of this activity and the results showed that the ratio of lung activity included in the RV ROI over the total activity in this region varied from 20 to 60% depending on the state of the lung perfusion in this area and also on the right ventricular ejection fraction. It is evident that a background activity of this magnitude can hardly be neglected as it will introduce an important, systematic, but variable underestimation of the calculated ejection fraction.

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