

Patient Positioning for Hepatic Scintiphotography

Sybil J. Swann, Camille L. Boyce, Gerald S. Johnston, Alfred E. Jones, and Virgil Hardin

National Institutes of Health, Bethesda, Maryland and Madigan General Hospital, Takoma, Washington

Indications for hepatic scintigraphy include among others, (A) determining the position size and configuration of the liver; (B) determining the presence of neoplastic involvement; (C) evaluating parenchymal disease; and (D) differentiating abnormal masses (1,2). Plasticity or pliability of the liver also serves as an indication of hepatic disease. This pliability has been determined to a degree by measuring liver image changes at the extremes of respiratory excursions (2-4). A method of assessing liver pliability, which is used routinely in the Nuclear Medicine Department, Clinical Center, National Institutes of Health, is described in this paper.

All liver studies were done with a 1.5-mCi dose of ^{99m}Tc -sulfur colloid. The gamma camera has

been used to image patients in both horizontal and vertical positions.

Results

Figure 1 shows a normal liver. In comparing the supine and upright views, note the variation in shape and apparent size of the liver because of its pliability. In the supine view the left lobe is small and triangular. We have become accustomed to seeing it as such in supine rectilinear scans (5). In the upright views in Figs. 1 and 3 the left lobe sags and tends to project forward. In addition, there is accentuation of the normal liver fissures. The heart shadow makes a larger indentation in the superior border of the liver on the upright view. The relation of the liver to the more tightly fixed, less pliable spleen also varies with position change.

Figure 2 shows a liver with complete loss of pliability. This series of images was obtained on a 62-year-old woman with breast carcinoma and extensive metastatic liver involvement. Here the upright, supine, and prone views show essentially no variability. Very little functioning left lobe is present.

Figure 3 demonstrates the tendency for defects caused by liver lesions to be accentuated in the upright position. This patient has a pancreatic islet cell tumor with a lesion in the region of the gallbladder fossa. The left lobe appears to have lost some of its plasticity.

In Figure 4 the appearance of the liver lesions varies between the upright and supine positions. The liver imaged was that of a 57-year-old woman with metastatic disease from breast carcinoma.

Discussion and Summary

The majority of our liver imaging experience has been obtained with the patient lying supine under the imaging head. The wide variations between the upright and recumbent liver scintiphoto appear-

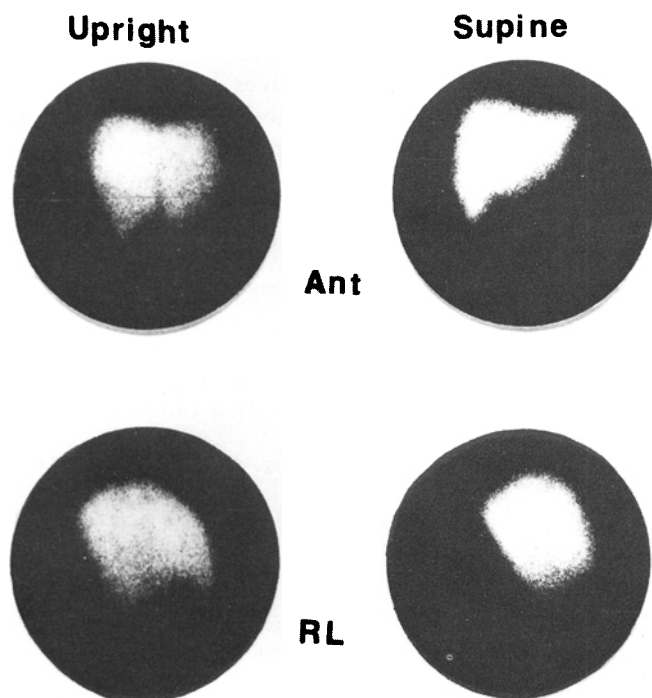


FIG. 1. Comparison of anterior and right lateral scintiphoto images obtained in upright and supine positions demonstrate considerable change in appearance which is attributed to normal liver pliability.

For reprints contact: S. J. Swann, Nuclear Medicine Dept., National Institutes of Health, Building 10, Room 1B53, Bethesda, Md., 20014.

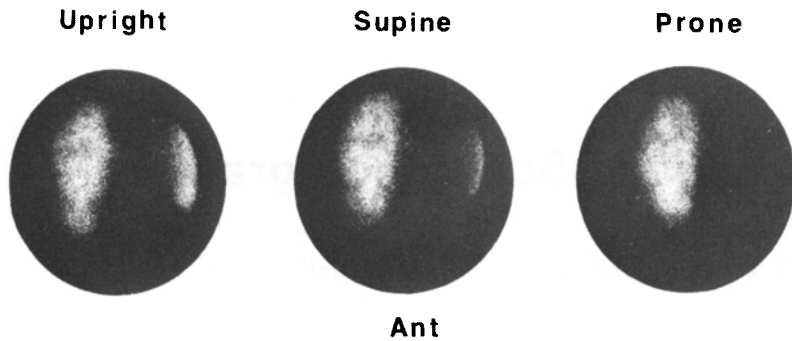


FIG. 2 Anterior liver scintiphoto images in upright, supine, and prone positions demonstrate loss of liver pliability in patient with breast carcinoma metastasis throughout liver.

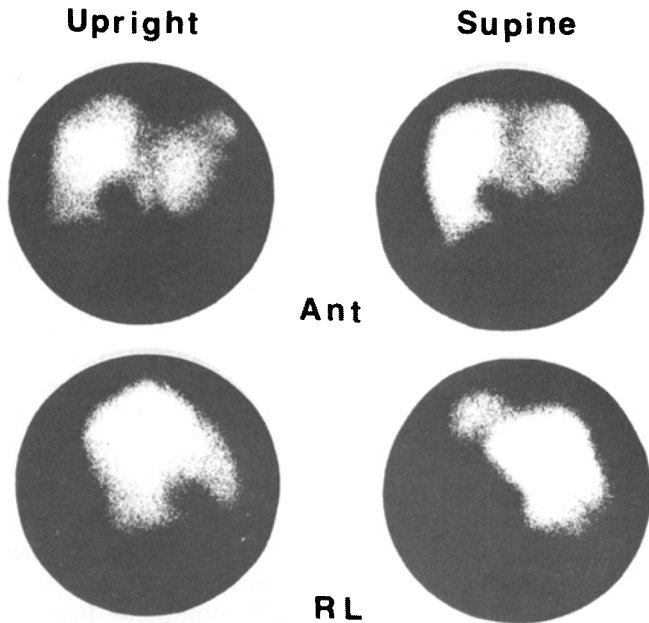


FIG. 3 Anterior and right lateral scintiphotos of patient with pancreatic islet cell tumor. Upright position accentuates lesion in gallbladder-fossa area. Variations in appearance between upright and supine images show that considerable normal liver pliability is retained.

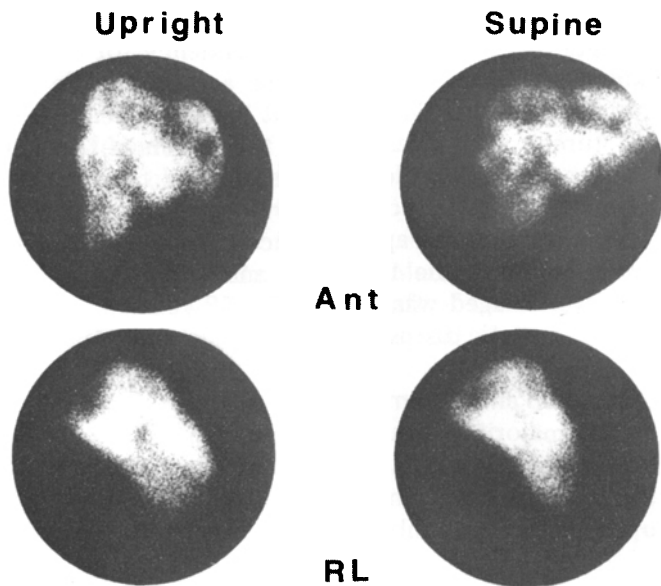


FIG. 4 Anterior and right lateral liver scintiphoto images demonstrate how lesions may vary in appearance between upright and supine positions in patient with metastatic breast carcinoma.

ances which are sometimes seen have caused some confusion. However, these variations have been used to obtain additional information about the patient's liver status.

The importance of positioning the patient properly for liver imaging has been demonstrated in the examples presented here. The liver image is often variable within the same patient when scintiphotos are performed both in the upright and supine position. The left lobe of the liver appears more pliable with a tendency to sag and thus give a spurious impression of hepatomegaly when the patient assumes the upright position. Scintigraphy in the anterior projections in both the upright and supine positions should routinely be acquired to assess pliability of the liver.

Loss of pliability in diseased livers tends to give them the appearance of the normal liver in the upright position with loss of variability in this appearance when the patient is supine. Liver disease involving fibrosis, widespread infiltration, or congestion converts the liver into a firm, less pliable organ which is reflected in the decrease in variability in scintiphoto appearance with alteration of the patient position. Hepatic pliability or plasticity can be readily demonstrated by comparing the upright and supine scintiphoto pairs.

References

1. McAfee JG, Ause RG, Wagner HN: Diagnostic value of scintillation scanning of the liver. *Arch Intern Med* 116: 95-110, 1965
2. Gottschalk A: Liver scanning. *JAMA* 200: 150-153, 1967
3. Oppenheim BE, Hoffer PB, Gottschalk A: The use of inspiration expiration scintiphotographs to determine the intrinsic or extrinsic nature of liver defects. *J Nucl Med* 13: 554-556, 1972
4. Tranzler JT, Vollert JM, Harper PV, et al: The diagnostic value of hepatic pliability as assessed from inspiration and expiration views on the gamma camera. *Radiology* 97: 323-326, 1970
5. Johnson PM: *Clinical Scintillation Scanning*. Freeman LM and Johnson PM, eds, New York, Harper and Row, 1969, pp 260-303