

Sequential subtraction scintigraphy with ^{99m}Tc -RBC for the early detection of gastrointestinal bleeding

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To improve the early detectability of gastrointestinal (GI) bleeding, we have developed a new subtraction scintigraphic technique using *in vivo* labeled ^{99m}Tc red blood cells (RBC). Use of this new sequential subtraction method every 5 min makes it possible to detect early the bleeding site and calculate the bleeding rate. In phantom experiments, focal activity was detected on subtraction images at pump rates of more than 0.20 ml/min at any urethane thickness, but was negative on conventional scintigrams. The calculated pump rate by the subtraction method correlated well with the actual syringe pump rate ($y = 1.07x - 0.02$, $r = 0.99$, $p < 0.01$) in the case of an 8-cm urethane board as an abdominal wall. Twenty-four of 50 patients with suspected GI bleeding were confirmed to be positive within 24 hr. The subtraction method showed 15 true positive and 2 false positive cases within 60 min. On the other hand, the conventional scintigraphic method showed only 7 true positive and 1 false positive cases. Sensitivity of the subtraction method was 62.5%, which was significantly higher ($p < 0.05$) than that of the conventional scintigraphic method (29.2%).

These results suggest that sequential subtraction scintigraphy with ^{99m}Tc -RBC is an effective method for the early detection of GI bleeding and shortening the examination time as compared with conventional scintigraphy.

Key words: gastrointestinal bleeding, bleeding rate ^{99m}Tc -RBC, subtraction scintigraphy