

# Additional SPECT/CT in Determination of Gastrointestinal Bleeding Site in Scintigraphy

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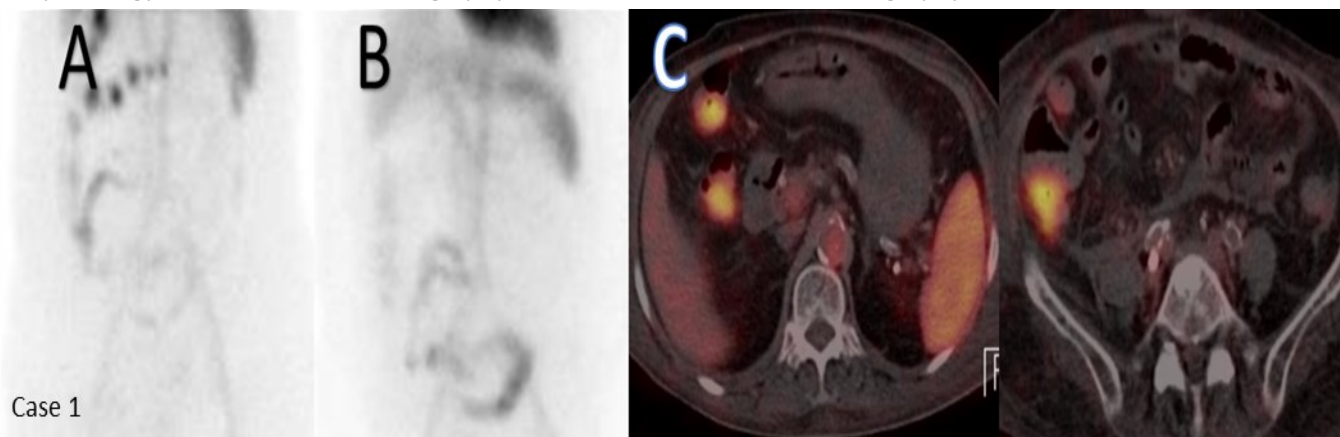
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## Abstract

The aim of this case series is to decide the diagnostic value of the additional SPECT/CT imaging during gastrointestinal bleeding site definition by scintigraphy as well as to determine the time point to perform. The outcomes of the patient included in this case series revealed that the 24th hour imaging might bear false positive findings of gastrointestinal bleeding and early SPECT/CT should be preferred. Additional findings in CT proportion of the study must be carefully interpreted in patients with known primary intraabdominal malignancy.

**Keywords:** gastrointestinal bleeding, SPECT/CT, scintigraphy.

**Case 1.** The 67 year old female patient who was presented with lower gastrointestinal bleeding symptoms. The colonoscopy revealed no significant finding. Scintigraphy revealed right lower colon as bleeding site with antegrade and retrograde bleeding findings (Figure 1A, 1B) as well as SPECT/CT findings at the same time (Figure 1C). Surgery and pathology results confirmed scintigraphy. Patient died 2 weeks after scintigraphy.

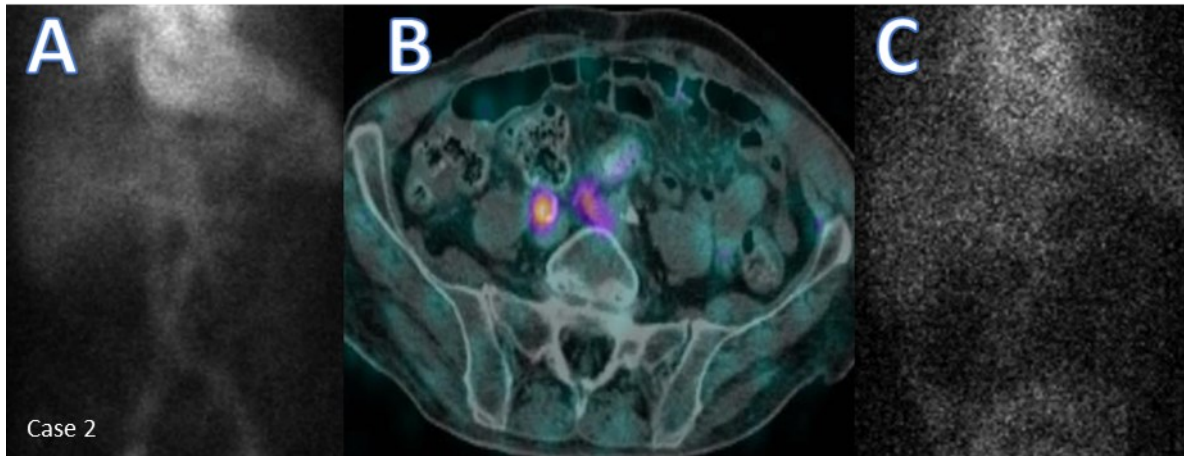


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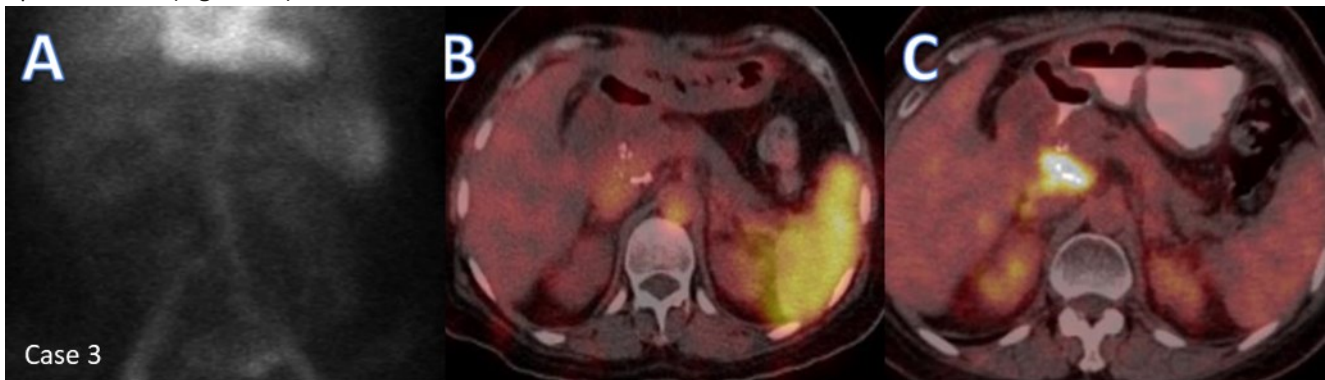
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**Case 2.** The 70 years old male patient with diagnosis of larengeal carcinoma suspicion of gastrointestinal bleeding due to the blood content through the gastrostomy site. Neither the endoscopy nor scintigraphy revealed gastrointestinal bleeding (Figure 2A). 24th hour imaging showed false positive findings in the pelvic region (Figure 2B) additional SPECT/CT confirmed the findings (Figure 2C). Seven months follow up with endoscopy verified negativity for gastrointestinal bleeding.



**Case 3.** 54 years old female patient with history of operation and radiation therapy due to the diagnosis of klatskin tumor. CT angiography revealed no bleeding site. Gastrointestinal bleeding was determined at rectum in the early phase scintigraphy but SPECT/CT revealed suspicious erythrocyte accumulation at operation site as well as minimal pelvic fluid as an additional finding (Figure 2A, 2B). Endoscopy follow up showed angiodysplasia of the antrum. 18F FDG PET/CT was performed to the patient due to the tumor marker elevation which showed disease progression at operation site (Figure 3C).



## Discussion

The diagnostic power of the scintigraphy in the determination of bleeding site is high especially in small volume bleeding. Additionally intermittent bleeding might be determined by means of scintigraphy despite negativity in the other diagnostic procedures. SPECT/CT is a relatively new development in the gastrointestinal bleeding site determination during scintigraphy examination. It is not certain how this technique should be implemented in routine practice. The aim of this analysis was to demonstrate possible benefits of this modality in gastrointestinal bleeding as well as draw a conclusion when and how to perform and interpret the results.

According to this small case series SPECT/CT imaging might decrease the false positive results and support the imaging findings with additional anatomic detail information.

SPECT/CT imaging additional to the  $^{99m}\text{Tc}$  erythrocyte scintigraphy was not sufficiently documented methodology in the workup of the gastrointestinal bleeding radionuclide imaging. There are some case reports that showing the additional benefits in duodenal bleeding (1), by providing anatomical determination of lesions associated with bleeding including an arteriovenous malformation (2), and Meckel Diverticulum in adult (3, 4). The results of this mini analysis also verify that the most important contribution of additional SPECT/CT in the standard scintigraphy is the demonstration of the anatomic lesions including the diverticular lesion, malignant tumors or the small bowel bleeding which are problematic in diagnosis.

There are limited number of case series or original research in the literature about the diagnostic support provided by additional SPECT/CT imaging in gastrointestinal bleeding. In the study of Soyluoglu S et al. it was concluded that the SPECT/CT is a feasible modality in determination of bleeding site which can guide for surgery (5).

This case series included the planar scintigraphy as well as SPECT/CT analysis of the patients who were referred for the diagnosis of the bleeding site. The results of this analysis showed that SPECT/CT might contribute diagnostic analysis by additional anatomic detail information and decrease false positive interpretation. The timing of the imaging and SPECT/CT limited to the early phase might also be suggested to prevent false positivity.

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#### Authorship Contributions

**Concept:** Z.P.K., P.P.O., **Design:** Z.P.K., P.P.O., **Supervision:** Z.P.K., P.P.O., G.Y., Z.S.S., **Data Collection and/or Processing:** Z.P.K., P.P.O., G.Y., Z.S.S., **Analysis and/or Interpretation:** Z.P.K., P.P.O., G.Y., Z.S.S., **Literature Review:** Z.P.K., **Writer:** Z.P.K.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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