

A Gastrointestinal Bleed Detected On Subtraction Scintigraphy: A Case Study

G Currie, J Wheat

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Abstract

This article reports an interesting case of lower gastrointestinal hemorrhage (LGIH) detected using subtraction imaging on ^{99m}Tc RBC scintigraphy.

INTRODUCTION

An 83 year old female presented for scintigraphic evaluation of suspected LGIH. Acquisition parameters included a 128x128 matrix for a 60 seconds per frame continuous dynamic acquisition over 60 minutes. A rapid 3 second angiographic phase dynamic preceded the 60 second dynamic. The study was performed using an in vitro ^{99m}Tc red blood cell (RBC) label using a commercially available kit preparation. Blood pool data was displayed and interpreted by four independent physicians as conventional 60 second frames and after summation to five minutes frames.

FINDINGS

Two physicians reported the study positive for a LGIH while the remaining two physicians reported a negative study (Fig. 1). The first physician reporting a positive study detected a small bowel bleed at 12 minutes post IV. The second physician reported transverse colon bleed detected at 15 minutes post IV.

Subtraction scintigraphy was used to further evaluate the data. Using reference subtraction scintigraphy (RSS), a new data set was created by subtracting frame 1 (reference frame) from each subsequent frame ($_{1,2}$). The resulting images represent altered biodistribution in the period between the two frames. Thus, a bleed should appear as an area of increased accumulation of the radiotracer.

The subtraction images provide confirmation of a gastrointestinal bleed (Fig. 2). The RSS data provided earlier and more definite delineation of bleeding at 8 minutes post IV. Earlier detection may translate to more accurate

localisation of the bleed site; in this case demonstrating an upper gastrointestinal hemorrhage. Moreover, the removal of superimposed background activity provides a better impression of blood transit and, therefore, further contributed to bleed localisation. Later RSS images demonstrate transit of the bleed centrally in the small bowel (Fig. 3).

Figure 1

Figure 1: One minute dynamic blood pool data reported as normal (2 physicians), a small bowel bleed (1 physician) and a transverse colon bleed (1 physician).

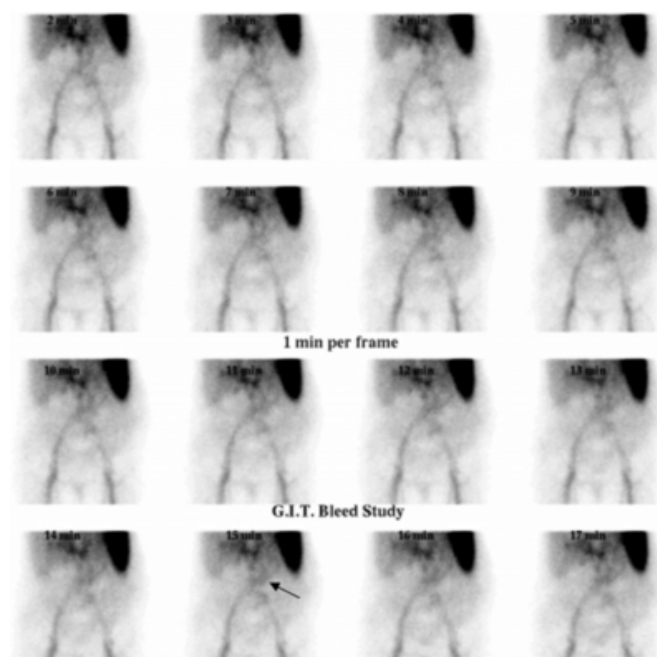


Figure 2

Figure 2: One minute RSS data providing clear evidence of a bleed.

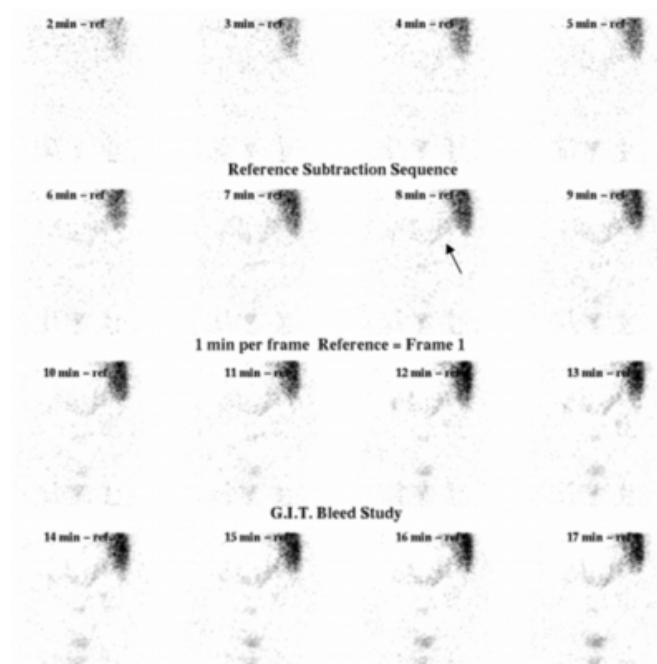


Figure 3

Figure 3: One minute RSS data demonstrating blood transit in small bowel.



DISCUSSION

This case highlights the interpretation difficulties associated with ^{99m}Tc RBC scintigraphic evaluation of LGIH. The high background activity of ^{99m}Tc RBCs and the normal biodistribution in vascular structures confounds interpretation on occasion which may result in either false positive or false negative findings. While ^{99m}Tc sulphur colloid scintigraphy offers the advantage of high target to background ratios in the bleeder, it does not provide a wide window of opportunity for imaging; an important factor due to the intermittent nature of LGIH.

Subtraction scintigraphy offers a tool that combines the high contrast of ^{99m}Tc sulphur colloid imaging in LGIH with the wide window of opportunity for imaging of ^{99m}Tc RBCs. This case highlights the role of subtraction scintigraphy as a useful adjunct to conventional scintigraphy for bleed detection, earlier detection and, thus, more accurate bleed localisation.

CORRESPONDENCE TO

Geoff Currie School of Biomedical Sciences Locked Bag 588 Charles Sturt University Wagga Wagga 2678 Australia
Telephone: 61 2 69332822 Facsimile: 61 2 69332578 Email: gcurrie@csu.edu.au

References

1. Currie, G, Towers, P & Wheat, J 2006, Improved detection and localization of lower gastrointestinal haemorrhage using subtraction scintigraphy: phantom analysis, *J Nucl Med Technol*, vol. 34, no. 3, pp. 160-168.
2. Currie, G, Towers, P & Wheat, J 2007, Improved detection and localisation of lower gastrointestinal haemorrhage using subtraction scintigraphy: clinical study, *J Nucl Med Technol*, vol. 35, no. 2, pp. 105-111.

Author Information

Geoffrey Currie, M MedRadSc, M AppMngt, MBA, PhD
School of Biomedical Sciences, Charles Sturt University

Janelle M. Wheat, M MedRadSc, DHlthSc
School of Biomedical Sciences, Charles Sturt University