



This is the Author's version of the paper published as:

Author: G. Currie and J. Wheat

Author Address: gcurrie@csu.edu.au

jwheat@csu.edu.au

Title: A Gastrointestinal Bleed Detected On Subtraction Scintigraphy: A case study

Year: 2007

Journal: Internet Journal of Gastroenterology

Volume: 6

Pages: Texas, USA

ISSN: 1528-8323

URL:

<http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ijge/vol6n1/scinti.xml>

Keywords: LGIH, RBC, scintigraphy

Abstract: This article reports an interesting case of lower gastrointestinal hemorrhage (LGIH) detected using subtraction imaging on 99mTc RBC scintigraphy.

**A GASTROINTESTINAL BLEED DETECTED ON
SUBTRACTION SCINTIGRAPHY: A CASE
STUDY.**

Geoffrey Currie, M MedRadSc, M AppMngt, MBA, PhD

Janelle Wheat, M MedRadSc, DHlthSc

School of Biomedical Sciences, Charles Sturt University, Wagga Wagga, Australia.

Correspondence:

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

Foot line: SUBTRACTION SCINTIGRAPHY IN LGIH

ABSTRACT

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

KEY WORDS: RBC, LGIH, subtraction 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 ($I,2$). 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).

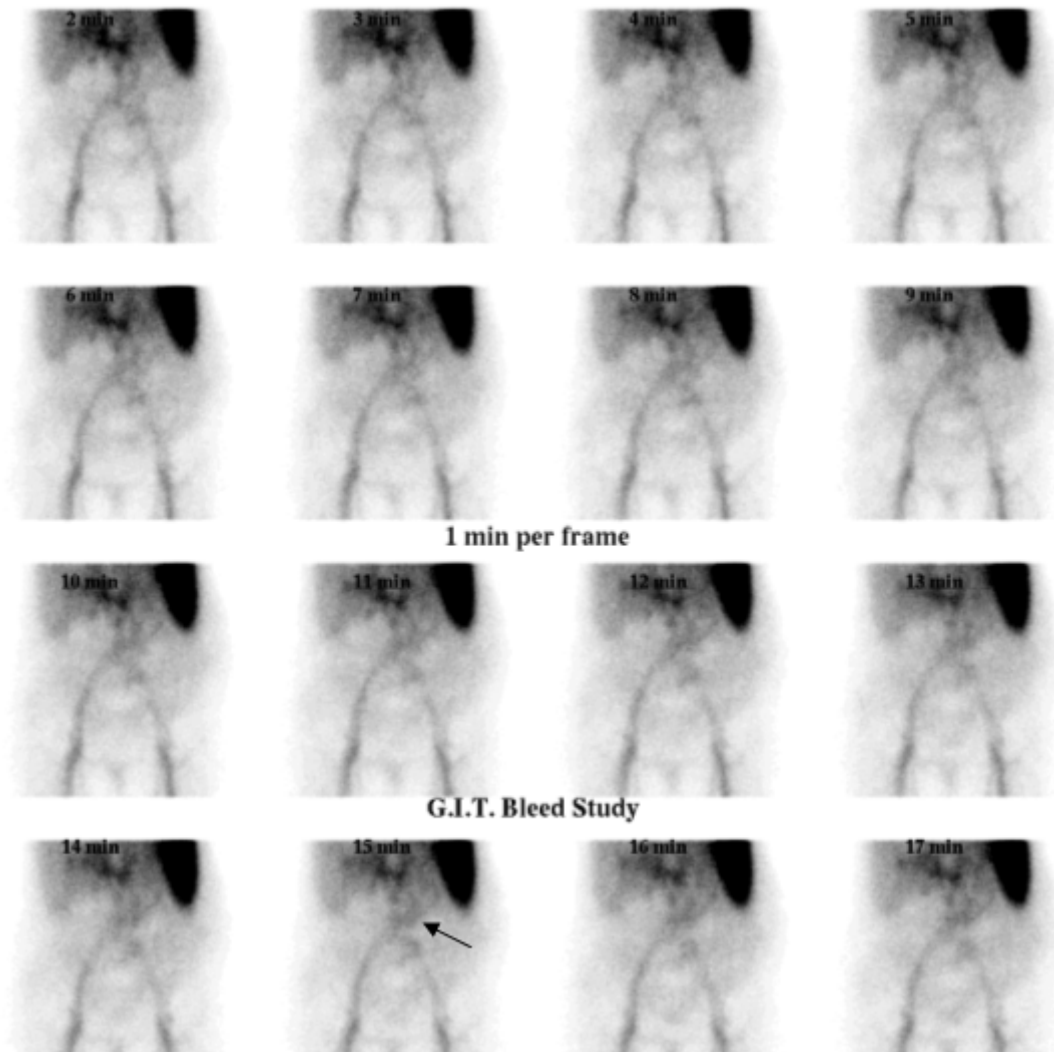


Figure 1: One minute dynamic blood pool data reported as normal (2 physicians), a small bowel bleed (1 physician) and a transverse colon bleed (1 physician).

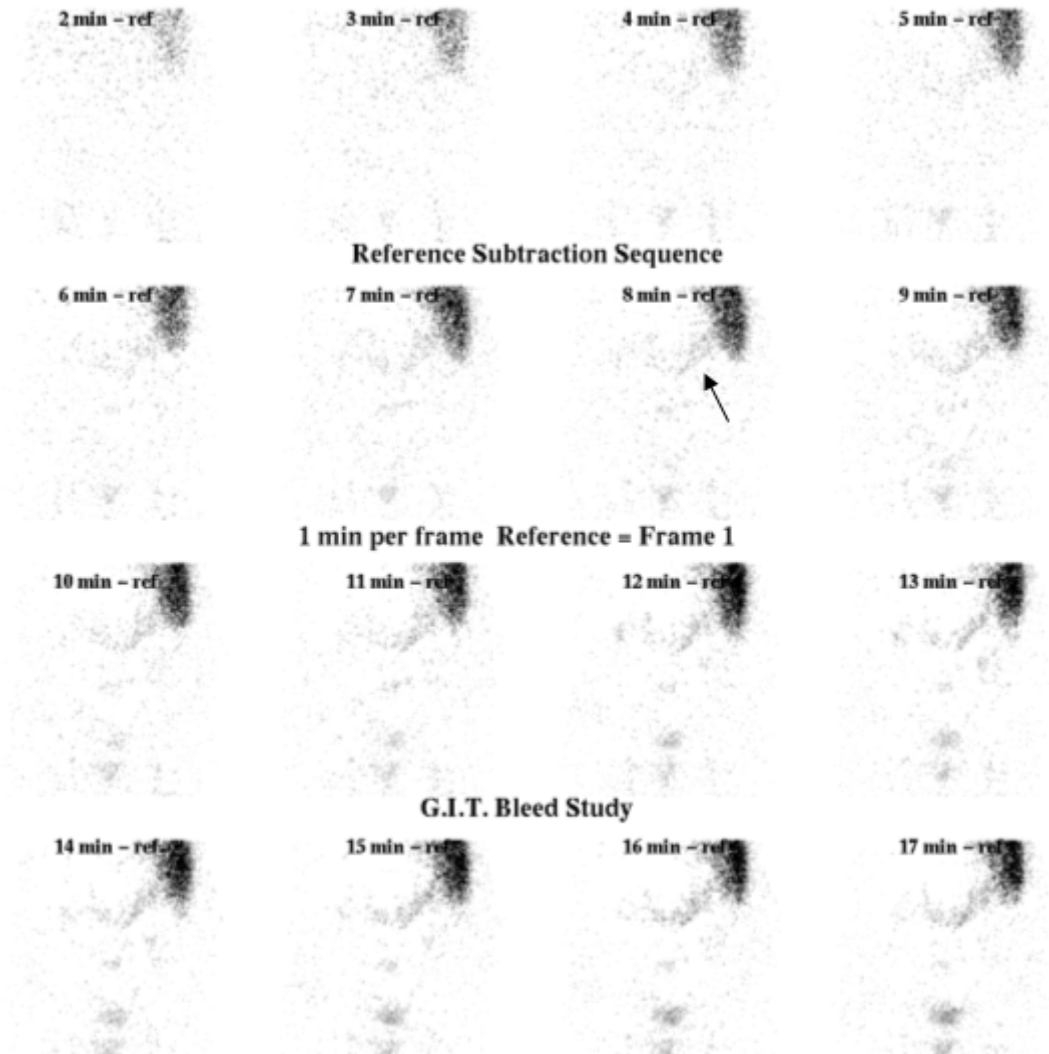


Figure 2: One minute RSS data providing clear evidence of a bleed.

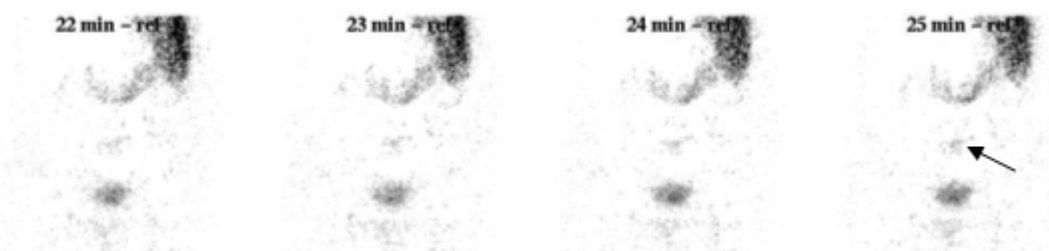


Figure 3: One minute RSS data demonstrating blood transit in small bowel.

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.

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.