First UK data for CT angiography in persisting upper GI bleeding

We read with interest the study by S Kumar *et al* that noted that patients with new gastrointestinal (GI) bleeding during admission to the intensive care unit (ICU) were more likely to die during hospitalisation.¹ GI bleeding cannot always be controlled or identified at gastroscopy; therefore, guidelines recommend radiological intervention.^{2 3} Radiological intervention may be of value in uncontrolled GI bleeding where a lesion has already been identified at endoscopy or if no lesion has been detected endoscopically but the patient continues to be haemodynamically unstable. Fluoroscopic angiography (FA) is time consuming, requires significant expertise and has significant ionising radiation exposure. However, the recent advent of CT angiography (CTA) potentially offers a sensitive, rapid and accurate diagnosis of the source of persisting GI bleeding and has a lesser risk of vessel dissection or damage than catheter angiography. For these

reasons, it is sometimes used as the new radiological first-line test by comparison to FA.^{2 3} Historically, surgery would be considered for refractory bleeding; however, there are currently no randomised controlled trials comparing surgery and radiological approaches.

There are limited data on CTA, and for this reason, we wanted to present the first UK study in the context of the international literature. Our non-systematic review of the literature using the search Mesh terms 'upper gastrointestinal bleed*' and 'ct angio*' on PubMed up to July 2017 and our study resulted in six studies in total that showed the application of CTA in upper GI bleeding (table 1). The use of * allowed for all suffixes to be accepted.

Our retrospective analysis of endoscopy and radiology databases was used to identify patients who underwent radiological intervention for GI bleeding at Sheffield Teaching Hospitals over a 10-year period. Pre-endoscopy Rockall scores, routine haematology and biochemistry results taken prior to endoscopy and inpatient mortality rates were compared. A total of 59

patients (35 males, mean age 69.3) underwent imaging for upper GI bleeding during the study period. A control group of 757 patients (who did not undergo FA or CTA) from the South Yorkshire GI bleed audit was used for comparison.

In total, 72% of patients had a bleeding site identified at endoscopy while 15% found bleeding but no site identified and 13% had no bleeding site found. The diagnostic yield for CTA was 56.1%, and the subsequent therapeutic intervention with FA and embolisation rate was 69.6%. The diagnostic yield for direct to FA was 68% and embolisation rate was 63%. Patients who underwent CTA were older (70 vs 67 years, $P=0.039$) and presented with higher pre-endoscopy Rockall scores (3.91 vs 3.69, $P=0.003$) than controls. Both CTA and 'direct to FA patients' presented with lower haemoglobin (Hb) than controls (8.56 and 8.73 vs 11.69, respectively, $P<0.0001$). There were no significant differences between CTA and FA patients. No comorbidities were related to angiography. Six patients had surgical intervention for persisting bleeding. In a

Table 1 Diagnostic yields of patients with upper gastrointestinal (GI) bleed undertaking a CT angiography (CTA)

Author	Year	Country	Patients (n)	Methodology	Diagnostic yield (%)	Outcomes
Raju	2017	UK	59	Retrospective analysis of endoscopy and radiology databases	56.1	16/41 embolised
Scheffel ⁴	2007	Switzerland	9	Unblinded, retrospective assessment of multi-detector-row CT	70	Post CT: 4× coiling, 3× stent graft insertion, 1× embolisation, 1× no finding
Frattaroli ⁵	2009	Italy	11	Blinded study of patients undergoing endoscopy and then multi-detector-row CT with diagnosis confirmed by angiography, surgery or postmortem findings	100	Site found in all cases, aetiology found in 90.9% of cases, in 2/6 pseudoaneurysms CTA found information not seen on endoscopy
Chan ⁶	2015	UK	81	Retrospective study of all patients having CT angiography for GI haemorrhage	20.7	18 positive CTAs (16× embolised, 1× surgery, 1× died), 63 negative CTAs (37× no rebleed, 19× embolised, 5× surgery, 1× repeat negative CTA, 1× died)
Yoon ⁷	2006	Korea	26	Prospective study of multi-detector row CT in major haemorrhage using angiography as reference standard	57.1	—
Jaekle ⁸	2008	Germany	10	Multi-detector CT findings correlated to endoscopy, angiography or surgery	50	In all cases anatomical site identified

further seven, it was suggested that if rebleeding occurred they would require surgical intervention but these individuals remained haemodynamically stable. Inpatient mortality rates were higher in those who underwent CTA prior to FA (22%) compared with those who went directly to FA (11%) but this was not significant ($P=0.5$). The rebleeding rate of the whole cohort was 1.6%.

In conclusion, CTA has a diagnostic yield of 56.1% and embolisation rate of 69.6% in this UK study. These data allow for appropriate counselling of patients being considered for CTA and should be considered in patients in the ICU setting with new GI bleeding. Our study demonstrates the role for CT angiogram in upper gastrointestinal bleed (UGIB); however, larger studies are needed before incorporation to newer guidelines developed.

Suneil A Raju,¹ Peter D Mooney,¹ Karuna Kodali,¹ Charmaine Toh,¹ Daniel Kusumawidjaja,² Naomi Hersey,³ Hugo Penny,¹ Matthew Kurien,¹ David S Sanders¹

¹Department of Infection and Immunity and Cardiovascular Science, Academic Unit of Gastroenterology, The University of Sheffield, Sheffield, UK

²Sheffield Vascular Institute, Northern General Hospital, Sheffield, UK

³Department of Radiology, Northern General Hospital, Sheffield, UK

Correspondence to Dr Suneil A Raju, Gastroenterology and Liver Unit, Royal Hallamshire Hospital, Sheffield, S10 2JF, UK; suneilraju@gmail.com

Contributors DSS conceptualised and designed the study. PDM, KK, CT, NH, MK and HP recruited patients for the study. SAR and DSS drafted the article. All authors approved the final article, analysed and interpreted the data.

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