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The first UK data for CT angiography in persisting upper GI bleeding

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DSS conceptualised and designed the study.

PDM, KK, CT, NH, MK and HP recruited patients for the study.

PDM, KK, CT, NH, HP, DK, MK, SAR and DSS analysed and interpreted the data.

SAR and DSS drafted the article.

All authors approved the final article.

Key words: CT angiogram, upper gastrointestinal bleed, diagnostic yield, outcome

To the Editor,

We read with interest the study by S Kumar et al. that noted that patients with new Gastrointestinal (GI) bleeding during admission to ICU were more likely to die during hospitalisation.[1] GI bleeding cannot always be controlled or identified at gastroscopy (OGD), 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 computed tomography 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 is 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 6 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 ten 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 male, 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.

72% of patients had a bleeding site identified at endoscopy whilst 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 embolization rate was 69.6%. The diagnostic yield for direct to FA was 100% and embolization rate was 100%. 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 Hb than controls (8.56 and 8.73 vs11.69 respectively $p<0.0001$). There were no significant differences between CTA and FA patients. No comborbidities were related to angiography. Six patients had surgical intervention for persisting bleeding. In a further seven it was suggested that if re-bleeding 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 to those who went directly to FA (11%) but this was not significant (p=0.5). The re-bleeding rate of the whole cohort was 1.6%.

In conclusion, CTA has a diagnostic yield of 56.1% and embolization rate of 69.6% in this UK study. This data allows 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 UGIB however larger studies are needed before incorporation to newer guidelines developed.

Author	Year	Country	Number of patients	Methodology	Diagnostic Yield	Outcomes
Raju	2017	UK	59	Retrospective analysis of endoscopy and radiology databases	56.1%	16/41 embolized
Scheffel[4]	2007	Switzerland	9	Unblinded, retrospective assessment of multi-detector-row CT	70%	Post CT: 4x coiling, 3x stent graft insertion, 1x embolization, 1x 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 post mortem findings.	100%	Site found in all cases, aetiology found in 90.9% of cases, in 2/6 pseudoaneuryms 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 (16x embolized, 1x surgery, 1x died), 63 negative CTAs (37x no rebleed, 19x embolized, 5x surgery, 1x repeat negative CTA, 1x died)
Yoon[7]	2006	Korea	26	Prospective study of multi-detector row CT in major haemorrhage using angiography as reference standard	57.1%	-
Jaeckle[8]	2008	Germany	10	Multi-detector CT findings correlated to endoscopy, angiography or surgery	50%	In all cases anatomical site identified

Table 1. Diagnostic yields of patients with upper GI bleed undertaking a CTA

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