Clinical Predictors of Positive Computed Tomographic Angiography (CTA) Results and Ongoing Bleeding at Intervention

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INTRODUCTION

Gastrointestinal bleeding (GIB) is a common presentation to the emergency department. Computed tomographic angiography (CTA) is a valuable diagnostic tool in identifying the source of active bleeds. Bleeding detected on CTA often resolves before intervention can occur, complicating clinical decision making and resource utilization. Identifying clinical predictors of active and persistent bleeding at the time of intervention can help to optimize patient management and minimize overuse of CTA. This study aims to identify clinical predictors of (1) positive CTA results, and (2) bleeds that persist to time of intervention.

METHODS

In this single center IRB-approved study, all CTAs performed for the evaluation of GIB between January 2018 and December 2023 were identified for analysis. Electronic medical records (EMR) and radiology reports were retrospectively reviewed for CTA results and findings at time of intervention. Clinical variables were also collected. Chi-square, Mann-Whitney U, and multivariate logistic regression were used to assess the relationship between clinical variables and study outcomes.

Adjusted Logistic Regression (CTA Result)

Variable	OR	CI	P_Value
Gender	2.16	1.234–3.832	0.0076
AGE	0.996	0.977–1.016	0.7055
Hgb	1.599	0.908–2.884	0.1095
Hct	0.823	0.671–1.001	0.0551
HR	0.988	0.974–1.002	0.0875
MAP	1.005	0.99–1.02	0.5293
INR	1.042	0.937–1.245	0.482
Anticoagulation	0.795	0.398–1.566	0.5097
gib_location	2.982	1.606–5.693	0.0007
intervention_bleeding	2.25	1.223–4.213	0.0099

Adjusted Logistic Regression (Intervention Bleeding)

Variable	OR	CI	P_Value
Gender	1.42	0.771–2.647	0.2634
AGE	0.99	0.969–1.012	0.3531
Hgb	0.829	0.445–1.551	0.5542
Hct	1.024	0.826–1.266	0.8246
HR	1.005	0.99–1.02	0.5293
MAP	1.002	0.986–1.019	0.8076
INR	0.957	0.698–1.078	0.6218
Anticoagulation	1.626	0.788–3.349	0.1844
gib_location	0.837	0.447–1.584	0.5796
intervention_time	0.97	0.949–0.989	0.0052

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RESULTS

459 patients undergoing CTA for suspected GIB were identified. 153 had a positive CTA (+CTA) and 306 had a negative CTA (-CTA) at initial screening. Intervention data was available for 120/153 patients with +CTA and 151/306 patients with –CTA. Of these 120 +CTA cases, 44 continued to bleed at the time of intervention and 76 had spontaneous resolution of bleeding. Of the 151 –CTA patients, 32 continued to bleed at time of intervention while 119 had spontaneous resolution.

On univariate analysis, +CTA was associated with Hct, male gender, lower GIB location, and continued bleeding at the time of intervention. On unadjusted and adjusted multivariable analysis, only male gender and lower GI bleeding remained significant independent predictors of initial +CTA. On univariate analysis, bleeding at intervention was associated with Hgb, Hct, INR, and time to intervention. On unadjusted multivariable analysis, Hgb, Hct, upper GIB location, and time to intervention remained significant, but on adjusted multivariable analysis, the only independent predictor of persistent bleeding at intervention was a shorter time to intervention.

DISCUSSION & CONCLUSION

35.3% of patients with an initial +CTA had bleeding that persisted to the time of intervention. Bleeding spontaneously resolved in 64.7% of patients with an initial +CTA . Independent predictors of +CTA were male gender and lower GIB location. The only independent predictor of persistent bleeding was shorter time to intervention. Limitations of this study include its retrospective nature and variable reporting in the EMR.