Outcomes and cost-effectiveness analysis of CTA-first policy in patients with lower GI bleed

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BACKGROUND & OBJECTIVES

- Computed Tomography Angiography (CTA) is an imaging study with high accuracy for diagnosing acute lower gastrointestinal bleed (LGIB)
- Due to the lower diagnostic yield of unprepared colonoscopy, CTA may serve as an alternative or complementary tool in diagnosing LGIB in the acute setting
- This study utilizes data from a tertiary academic center where, starting December 2014, patients presenting with acute LGIB typically undergo a CTA before other diagnostic or therapeutic interventions
- **Objective:** to evaluate the cost-effectiveness and the impact of this diagnostic intervention on patient outcomes by comparing the period before and after the implementation of the CTA-first policy

MATERIAL & METHODS

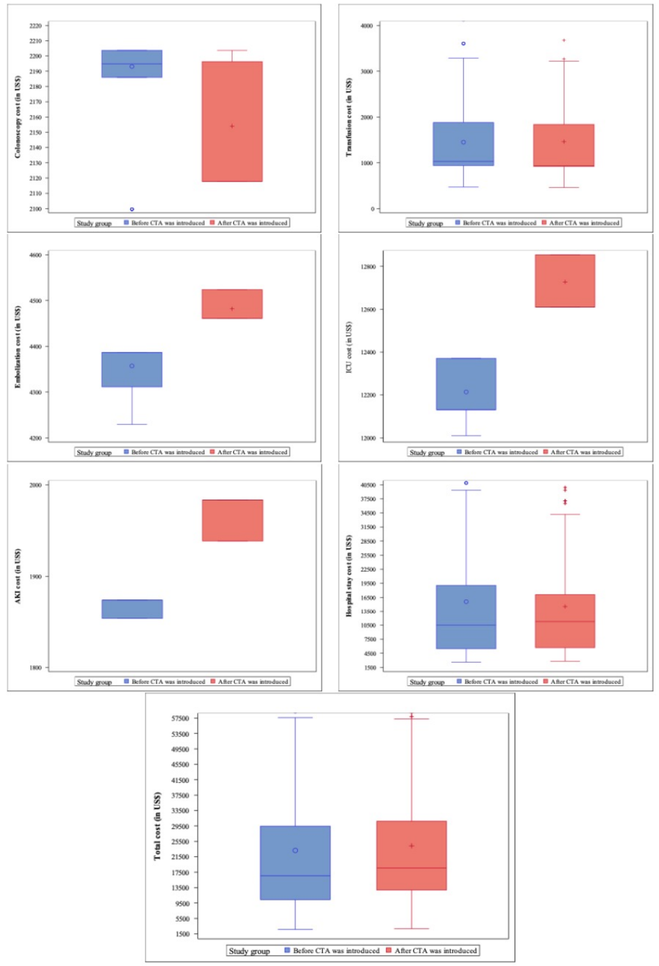
- Retrospective chart review of adult patients who presented to the ED with acute LGIB and were admitted to the hospital from January 2011 to December 2016
- Collected baseline characteristics. Allowed charges amounts sourced from Rhode Island DOH claims data and Fair Health
- Charges evaluated for AKI, length of ICU/hospital stay, transfused blood units, colonoscopies, arterial embolizations, and CTAs
- Comparison of characteristics between before (B-CTA) and after (A-CTA) policy groups using Chi-square and Student's t-test
- Multivariable linear regression to investigate CTA implementation's association with colonoscopy utilization and AKI development

RESULTS

Table 1. Baseline Characteristics and Outcomes of Patients with Acute LGIB Admissions: Comparing B-CTA and A-CTA Policy Periods (2011-2016).

Patient encounter characteristics	Study group			
	B-CTA (n=276)	A-CTA[a] (n=298)	*P*-value	Overall (n=574)
Male gender, no. (%)	158 (53.0)	139 (50.4)		297 (51.7)
Race, no. (%)				
Black/African American	28 (9.4)	30 (10.9)		58 (10.1)
White or Caucasian	233 (78.2)	203 (73.6)		436 (76.0)
Other/unknown/Refuse to answer	37 (12.4)	43 (15.6)		80 (13.9)
Age at admission, mean (SD)	68.3 (16.6)	68.2 (17.3)		68.2 (17.3)
CCI, mean (SD)	1.1 (1.3)	0.9 (1.2)		1.0 (1.2)
CCI ≥ 2, no. (%)	83 (27.9)	72 (26.1)		155 (27.0)
Findings on presentation				
Hemoglobin, mean (SD)	9.7 (2.1)	9.7 (2.2)		9.7 (2.1)
Creatinine, mean (SD)	1.2 (1.2)	1.3 (1.5)		1.3 (1.3)
Transfusion, no. (%)	163 (54.7)	112 (40.6)	0.0007	275 (47.9)
Number of transfused units, mean (SD)	2.9 (2.0)	2.8 (2.3)	0.7468	5.5 (4.9)
LOS, mean (SD)	5.8 (5.2)	5.1 (4.5)	0.0946	5.5 (4.9)
AKI	34 (11.4)	104 (37.7)	<0.0001	138 (24.0)
Dialysis	5 (1.7)	9 (3.3)	0.2193	14 (2.4)
ICU	59 (19.9)	52 (18.9)	0.5563	111 (19.4)
Mechanical ventilation	4 (6.8)	0 (0.0)	0.1212	4 (3.6)
Embolization	13 (4.5)	12 (4.4)	0.9525	25 (4.4)
Colonoscopy	248 (83.2)	150 (54.4)	<0.0001	398 (69.3)
CTA	104 (35.0)	170 (61.6)	<0.0001	274 (47.8)

Figure 1. Average Cost Box-Plot



1.Patient encounters: Total of 574
- B-CTA group (before policy): 276
- A-CTA group (after policy): 298

2.Baseline characteristics:
- Similar between both groups (Table 1)

3.Outcomes:
- Transfusions: fewer in A-CTA group
  Colonoscopies: fewer in A-CTA group
- AKI events: more in A-CTA group

4.Multivariate analysis:
- Colonoscopy likelihood: A-CTA group 77% less (aOR 0.23; 95% CI: 0.15-0.35)
- AKI development: A-CTA group 5 times more likely (aOR 5.0; 95% CI: 0.33-0.85)

5.Cost-effectiveness
- Colonoscopy costs: higher in B-CTA era
- Embolization, ICU admission, AKI costs: increased in A-CTA era
- Transfusions and hospital stay similar between groups
- Average total costs: no significant difference (B-CTA $23,141±17,977 vs A-CTA $24,337±17,663, p=0.4222)

CONCLUSIONS

- CTA-first policy implementation led to fewer colonoscopies and blood transfusions but increased AKI events
- No significant cost reduction observed after CTA policy implementation
- CTA remains a valuable tool for diagnosing LGIB; further research needed to evaluate overall cost-effectiveness

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