Provocative Mesenteric Angiography for Occult Lower Gastrointestinal Hemorrhage

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INTRODUCTION: For patients with occult lower GI hemorrhage and a negative arteriogram, provocative mesenteric angiography (PMA) is a technique that entails intra-arterially administered tissue plasminogen activator (TPA) and vasodilator as well as systemic heparin in order to provoke active extravasation, so that it can be embolized. The purpose of this study is to determine the safety and efficacy of PMA in a large cohort.

METHODS: Retrospective review was performed on 119 provocative mesenteric angiograms on 109 patients (73 males, average 67.9 years, range 7-94) over a 20-year period. Patients were included if they were admitted for a LGIB, had an initial negative angiography, and subsequently received TPA during the procedure. Medications were administered incrementally until active extravasation was visualized or until the operator deemed prudent to stop. Pertinent clinical, radiologic, and laboratory notes were reviewed. Complication rates within 30 days of the procedure were assessed.

RESULTS: Of the 119 PMAs, active extravasation was seen in 27.7% (n=33) of the procedures.

- Vessel-order (p=0.035), stool quality (p=0.003), prior positive CT scan (p=0.021), prior positive RBC scan (p=0.021), mean number of prior endoscopies (p=0.012), and difference in hematocrit levels at admission and lowest after admission (p=0.005) were correlated with a positive PMA.
- Total medication doses and blood transfusion amounts did not correlate significantly with positive studies.
- No major bleeding complications or intracranial hemorrhage encountered. Three minor self-limited groin hematomas encountered (2.5%).

CONCLUSION: Provocative mesenteric angiography demonstrated minimal bleeding risk in this cohort of patients, with a 27.3% positivity rate. Results of prior imaging, prior number of endoscopies, stool quality, decrease in hematocrit levels, and vessel-order correlate significantly with successful provocation of bleeding.

Provocative Mesenteric Angiogram are **safe** and **efficacious** procedures in patients with LGIB.

Positive **predictors** are prior **positive CT and RBC scans, stool quality, drop in HCT**, and the **vessel-order interrogated**.

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Table 1. Previous Diagnostic Imaging Correlation

Examination	Positive PMA	Negative PMA	P Value
Mean No. Prior Scans	4.6	4.7	NS
Prior RBC Scan	19 (32.2)	40 (67.8)	
Mean No.	1.2	0.72	NS
Positive Prior RBC Scan	16 (43.2)	21 (56.8)	P = 0.021
Prior CTA GIB	18 (30.5)	41 (69.5)	
Mean No.	1.5	1.0	NS
Positive Prior CTA GIB	11 (50.0)	11 (50.0)	P = 0.021
Prior Angiograms	24 (42.1)	33 (57.9)	
Mean No.	0.91	0.62	NS
Prior Endoscopy	21 (22.8)	71 (77.2)	
Mean No.	1.5	2.6	P=0.012
Positive Prior Endoscopy	15 (28.3)	38 (71.7)	NS

Note.—Values in parentheses are percentages. NS = not significant (P > .05)

Table 2. Potential Predictors of PMA Success

Characteristic	Positive PMA	Negative PMA	P Value
Admit Reason			NS
Acute	24 (35.3)	44 (64.7)	
Chronic	5 (20.0)	20 (80.0)	
In-patient	3 (18.8)	13 (81.3)	
Outpatient/PMA	0 (0.0)	7 (100)	
Post-Op	1 (50)	1 (50)	
Melena	5 (11.1)	40 (88.9)	P = 0.003
Hematochezia	28 (36.8)	48 (63.2)	
Admission hematocrit (L/L)	30.3	28.0	NS
Lowest pre-PMA hematocrit (L/L)	21.7	22.7	NS
Change in HCT	-8.6	-5.3	P = 0.0052
# of patients transfused	32 (31.7)	69 (68.3)	P = 0.018
Mean Packed RBCs Transfused (units)	11.3	7.6	NS
Mean Packed RBCs Transfused/LOS (units/day)	0.80	0.64	NS
Massive Hemorrhage	9 (39.1)	14 (60.9)	NS
ICU Stay	15 (32.6)	31 (67.4)	NS
Vasopressor Use	8 (30.8)	18 (69.2)	NS
Transferred	9 (17.6)	42 (82.4)	NS
Lowest INR Value before Angiogram	1.4	1.2	NS
LOS after angiogram (days)	10.0	8.7	NS

Note.—Values in parentheses are percentages. NS = not significant (P > .05)

Gastrointestinal (GI); Gastrointestinal bleed (GIB); Hematocrit (HCT); Intensive care unit (ICU); Length of stay (LOS); Lower gastrointestinal bleed (LGIB); Red blood cell (RBC); Provocative mesenteric angiogram (PMA); Tissue plasminogen activator (TPA);