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Title: Video capsule endoscopy as first procedure for acute gastrointestinal bleeding: an approach to minimizing exposure to SARS-CoV-2 and conserving resources.

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Introduction: Video capsule endoscopy (VCE) has been proposed as an alternative triaging tool for diagnosis of hematemesis and non-hematemesis (GIB). Randomized controlled trials have shown higher detection rates of bleeding with VCE when used as the first procedure compared with standard of care (SOC). This approach has been shown to be safe, and well tolerated. VCE is particularly suitable for the diagnosis of GIB in suspected/established SARS-CoV-2 (COVID) patients as it requires minimal patient contact (one staff person) to set up, and it avoids aerosolization and sedation. We used VCE as the first diagnostic modality in hemodynamically stable patients with GIB. Here we report the outcomes of the first 50 patients undergoing VCE in the COVID era as compared to 57 historical controls in the pre-COVID era.

Methods: Hemodynamically stable patients with suspected GIB/severe anemia admitted to our hospital between March and May 2020 and who underwent VCE as the first line diagnostic modality composed the experimental group. Demographic, clinical, and outcome data was collected and analyzed. The control group comprised of patients undergoing evaluation for GIB by SOC at our hospital in January 2020. Continuous variables were compared using Student t-test. Categorical variables were compared using Fisher's exact test.

Results: Patients in both groups had similar baseline characteristics. More patients in the COVID cohort presented with melena and fewer presented with hematochezia as their manifestation of their GIB. This difference was only significant for hematochezia. Bleeding could be localized in 38 (76%) of the COVID cohort patients as compared to 36 (63%) of the historical controls using the first diagnostic modality, $p > 0.05$ significant. Only 22 (44%) of the VCE patients underwent additional invasive diagnostic/therapeutic maneuvers and the majority were spared more invasive testing. Only 13 (26%) of the VCE patients, as compared to 47 (82%) of the historical controls underwent upper endoscopy for evaluation of GIB. There was no significant difference in transfusion requirements, degree of hemoglobin drop, in-hospital mortality, re-admission or rebleeding rates between the two groups.

Conclusion: VCE appears to be a safe alternative to traditional diagnostic evaluation of GIB in the era of COVID. It reduced risk of exposure of staff to endoscopic aerosols, conserved personal protective equipment and reduced staff utilization.

Table 1- Baseline characteristics

	covid	Pre-covid	p- value
n	50	57	
Male	30 (60)	36 (63)	0.77
Average Age	68 +/- 14.3	61.8+/-14.5	0.03
Developed GI bleed in the hospital	17 (34)	18 (32)	0.76
Race			
Caucasian	34 (68)	39 (68)	0.82
African American	6 (12)	4 (7)	
Hispanic	3 (6)	4 (7)	
Asian	1 (2)	0 (0)	
other	6 (12)	10 (18)	
Comorbidities			
COPD	10 (20)	11 (19)	0.71
CHF	17 (34)	9 (16)	0.07
CAD	22 (44)	19 (33)	0.4
Cirrhosis	8 (16)	16 (28)	0.21
ESRD	5 (10)	4 (7)	0.86
Severe Aortic stenosis	1 (2)	1 (2)	1
Diabetes	19 (38)	19 (33)	0.99
ASA class			
1	1 (2)	1 (2)	
2	7 (14)	4 (7)	
3	31 (62)	37 (65)	
4	11 (22)	15 (26)	
NSAID use	4 (8)	9 (16)	0.28
Aspirin	27 (54)	19 (33)	0.09
P2Y12	7 (14)	5 (9)	0.72
Coumadin/heparin	11 (22)	9 (16)	
Direct oral anticoagulants	9 (18)	3 (5)	
No anticoagulation	17 (34)	33 (58)	
Baseline HGB (g/dl)	10.6 +/-2.1	11.4 +/- 2.4	0.12
Lowest HGB (g/dl)	6.9 +/-1.9	7.5 +/-1.9	0.12
HGB drop (g/dl)	3.7+/-1.2	3.8 +/- 2.3	0.75
BUN/cr>20	34 (66)	34 (60)	
INR>2	10 (20)	4 (7)	0.09
Presenting symptom			
Hematemesis	5 (10)	9 (16)	0.49
Melena	31 (62)	25 (44)	0.13
Hematochezia	2 (4)	10 (18)	0.03
Anemia	12 (24)	13 (23)	0.73

Table 2- outcomes

First test	covid	Pre-covid	p-value
EGD	0 (0)	47 (82)	<0.001
Colonoscopy	0 (0)	7 (12)	<0.001
Capsule	50 (100)	3 (5)	<0.001
Bleeding localization on first test	38 (76)	36 (63)	0.2
Bleeding localization at the end	39 (76)	41 (72)	0.45
Needing any invasive procedures	22 (44)	55 (96)	<0.001
Capsule only	29 (58)	2 (4)	<0.001
Blood transfusion (units)	2.7+/-3.6	2.5 +/-2.6	0.8
Number of invasive procedures			
1	17 (34)	44 (77)	<0.001
2	2 (4)	12 (21)	0.01
3	2 (4)	1 (2)	0.86
4	0 (0)	0 (0)	1
5	1 (2)	0 (0)	1
Additional procedures needed			
EGD	13 (26)	1 (2)	<0.001
Colonoscopy	7 (14)	7 (12)	1
VCE	2 (4)	3 (5)	0.75
Enteroscopy	5 (10)	1 (2)	0.1
CT angiogram	0 (0)	0 (0)	1
IR	0 (0)	0 (0)	1
Surgery	1 (2)	0 (0)	0.86
Total EGD	13 (26)	47 (82)	<0.01
Total Colonoscopy	7 (14)	14 (25)	0.22
Video capsule Safety			
Gastric evacuation time (hh:min)	1:09 +/- 0:09		
Gastric evac > 1h	15 (30)		
Capsule entered colon	42 (84)		
KUB needed	6 (12)		
Complication			
In hospital mortality	2 (4)	2 (4)	1
GI bleed mortality	0 (0)	0 (0)	1
Rebleeding	7 (14)	9 (16)	0.71
Re-admission for bleeding	5 (10)	5 (9)	1
Bowel obstruction	0 (0)		
Bowel perforation	0 (0)		
Capsule aspiration	0 (0)		
Capsule retention	3 (6)		