



Gastric Juice Polymerase Chain Reaction (PCR) for The Diagnosis of *Helicobacter pylori* Infection in Patients with Upper Gastrointestinal Bleeding: Comparison with Other Classical Diagnostic Methods

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Objectives

To determine the diagnostic efficacy of gastric juice PCR for the detection of *H. pylori* infection compared to histology, rapid urease test and culture in patients with upper gastrointestinal bleeding.

Methods

Sixty-four patients who presented with UGIB and were undergoing upper GI endoscopy between 1 January, 2015 and 31 March, 2015 were enrolled consecutively. Gastric biopsy specimens from the corpus and antrum were taken for rapid urease test, histology (hematoxylin and eosin) and culture. Five milliliters of gastric juice was aspirated by a sterile ERCP catheter via the endoscope working channel. The sample was evaluated by agarose gel electrophoresis and Southern blot hybridization for the 23S rRNA gene of *H. pylori*. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), accuracy, positive and negative likelihood ratio for gastric juice *H. pylori* PCR were compared to histology, rapid urease test and culture.

Baseline characteristics of patients with upper gastrointestinal bleeding

Characteristics	Total (n = 64)	
	Number	Percent
Age		
Mean±S.D.	59.61±15.80	
Median(min-max)	51(18 - 85)	
Gender		
Male	41	64.1%
Female	23	35.9%
Underlying diseases		
Diabetes mellitus	16	25.0%
Hypertension	25	39.1%
CAD	7	10.9%
Dyslipidemia	11	17.2%
CKD	12	18.8%
Others	8	12.5%
History of drug used		
Aspirin	31	48.4%
NSAIDS	14	21.9%
Symptom to EGD		
Melena	34	53.1%
Hematemesis	17	26.6%
Melena and Hematemesis	13	20.3%
Amount of PRC transfection units (n=44)		
Mean±S.D.	2.50 ± 1.41	
Median(min-max)	2(1 - 6)	
Rockall score		
Mean±S.D.	2.52 ± 1.88	
Median(min-max)	2(0-6)	
Blatchford score		
Mean±S.D.	11.23 ± 3.82	
Median(min-max)	3.62(3 - 19)	

Results

Of 64 patients, 41 were male and 23 were female. The mean age was 59 years. There were 53.1% of patients who presented with melena, 26.6% with hematemesis, and 20.3% with both melena and hematemesis. The means of Rockall and Blatchford scores were 2.52 and 11.23, respectively. Endoscopic findings showed lesion at stomach in 51 patients, duodenum in 6 patients and in both stomach and duodenum in 7 patients. The most common cause was peptic ulcer (60%). The prevalence of *H. pylori* infection, either positive culture or positive rapid urease test plus histology, was 43.8%. The sensitivity of gastric juice PCR for *H. pylori* was significantly higher than histology (92.9% vs 25%, $P < 0.001$) but equal to rapid urease test (92.9%) and culture (96.4%). Further analysis showed a non-significant difference in the sensitivity of rapid urease test, culture and gastric juice PCR for *H. pylori* between patients with and without blood in the stomach (47% and 53%, respectively).

Conclusion

Gastric juice PCR for *H. pylori* is highly sensitive for diagnosing *H. pylori* infection in patients with upper gastrointestinal bleeding. It is non-invasive, non-biopsy-based test.

Endoscopic findings

EGD	Total (n = 64)	
	Number	Percent
Site of the lesion		
Stomach	51	79.7%
Duodenum	6	9.4%
Both sites	7	10.9%
Stomach (n=58)		
Gastric ulcer	30	51.7%
- Clean base ulcer	26	86.3%
- Non bleeding visible vessel	4	13.7%
Erosive gastritis	14	24.1%
Hemorrhagic gastritis	8	13.8%
Non erosive gastritis	2	3.4%
Malignancy	2	3.4%
Mallory weiss tear	2	3.4%
Duodenum (n=13)		
Duodenal ulcer	13	100%

Comparison of sensitivity, specificity and accuracy of various tests in diagnosing *Helicobacter pylori* infection

Test	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Accuracy (%)	LR positive	LR negative
	Rapid urease test	92.9 (75.0-98.8)	61.1 (43.5-76.4)	65 (48.3-78.9)	91.7 (71.5-98.5)	75.0	2.3 (1.57-3.64)
Histology	25.0 (11.4-43.2)	100 (88-100)	100 (55.1-100)	63.2 (49.3-75.2)	67.2	-	0.73 (0.61-0.93)
Culture	96.4 (79.7-99.8)	100 (88-100)	100 (84.5-100)	97.3 (84.2-99.9)	93.4	-	0.04 (0.01-0.24)
Gastric juice PCR	92.9 (74.0-98.2)	55.6 (38.3-71.7)	61.9 (45.7-76.0)	90.9 (69.4-98.4)	71.9	2.09 (1.43-3.05)	0.13 (0.03-0.51)

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