Innovations in Gastroenterology

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Disclosures

• I have no conflicts of interests in my discussion.

• Off-Label – Every topic has off-label discussion/considerations.
Objectives

- Gain understanding of evolving techniques and technology in gastroenterology
- Develop new treatment plans for patient encountered with gastroenterology diagnoses.
30,000 Feet View of Discussion

- H. pylori
- Inflammatory Bowel Disease
- Hepatitis C
- Hepatitis B
- Irritable Bowel Syndrome
- Endoscopy
- Acute Pancreatitis
- C difficile Colitis
- Gastrointestinal Bleeding
H. pylori

- Regimens

- Clarithromycin Triple Therapy
  - Clarithromycin, Amoxicillin, PPI – 14 days - Approved

- Bismuth Quadruple Therapy
  - Metronidazole, Tetracycline, Bismuth, PPI – 14 days (FDA Approved – combination pill [Pylera])
Candidates for Testing
2017 ACG Guidelines

- PUD
- Gastric mucosa-associated lymphoid tissue (MALT) lymphoma
- Early Gastric Cancer
- Dyspepsia (uninvestigated)
- Functional Dyspepsia
- Gastroesophageal Reflux Disease (GERD)
- Low-dose Aspirin use
- Non-steroidal anti-inflammatory drug (NSAID) use
- Iron Deficiency Anemia
- Idiopathic thrombocytopenic purpura (ITP)
- Asymptomatic individuals and the risk of gastric cancer
- Others

*Am J Gastroenterol* 2017;112:212-238
H. pylori

Key Questions:
1. Is there a penicillin (PCN) allergy?
2. Previous macrolide (MCL) exposure for any reason?

PCN allergy: No
MCL exposure: No
Recommended treatments:
Bismuth quadruple
CONCOMITANT
Clarithromycin triple
With amoxicillin
Other options:
Sequential
HYBRID
Levofloxacin triple
Levofloxacin sequential
LOAD?

PCN allergy: No
MCL exposure: Yes*
Recommended treatments:
Bismuth quadruple
Levofloxacin triple
Levofloxacin sequential
Other options:
Concomitant therapy?
Sequential therapy?
Hybrid therapy?
LOAD?

PCN allergy: Yes
MCL exposure: No
Recommended treatments:
Clarithromycin triple with metronidazole
Bismuth quadruple

PCN allergy: Yes
MCL exposure: Yes*
Recommended treatment:
Bismuth quadruple
Inflammatory Bowel Disease

- Vaccinations

**All patients**
- Influenza
- HBV
- HAV – DHH Notice -3/26/19
- MMR (pre-Biologic)
- TdaP
- Varicella (pre-Biologic)
- Pneumococcus 13
- Pneumococcus 23

**Age Dependent**
- Recombinant Zoster (50-60)
- Meningocococcus (18-23)
- HPV (12-21M/26F) or 45

*Am J Gastroenterol 2017:112:241-258*
Inflammatory Bowel Disease

- Smoking Cessation – Crohn’s Disease (CD)
- Annual Cervical Cancer Screening
- Colonoscopy (1-2 yrs) at 8 years (Extensive Disease) or 12-15 years (Left-Sided)
- Annual Dermatology Examination (Immunomodulators)
- Bone Mineral Density Testing
- Depression/Anxiety Screening
Inflammatory Bowel Disease Treatment

- Myriad of Treatment Options
  - 5 ASAs – Mild Ulcerative Colitis (UC)
  - Glucocorticoids – Short Term (CD/UC)
    - Budesonide - High First Pass Metabolism (CD/UC)
  - Thiopurines – Azathioprine/6MP (CD/UC)
  - Methotrexate – (CD) – Fibrosis Risk/Need Folate
  - TNF Inhibitors – Various (CD/UC)
    - Chimeric/Humanized/PEG Fab Fragment
  - α1β7 Antibody – Gut Specific (CD/UC)
    - A1β4 Antibody – Gut/CNS – PML Risk (CD) – Not Used
  - JAK Kinase Inhibitor – Tofacinitib (UC) – Lipid/PE

Am J Gastroenterol 2018;113:481-517
Am J Gastroenterol 2019;114:384-413
Hepatitis C

- Will not provide details regarding treatment
- Directly Acting Antivirals (DAAs) are mainstay of treatment.
  - Announced 3/26/2019
  - Starts July 1, 2019 - Medicaid
  - ‘Netflix’ style pricing – Novel
  - Sofosbuvir/Valpatasvir

Shreveport Times, 3/27/2019
HCV Blood Donor Distribution

Am J Epidemiol 2008; 167:743-750
Hepatitis C virus (HCV) undergoes a number of steps in order to infect a host cell and replicate. New direct-acting antiviral agents can block the process at different points, offering hope of a sustained virologic response (ie, a cure) with an all-oral regimen.

Virus enters cell and releases RNA, which is translated into a large polyprotein that must be cleaved into its smaller proteins by proteases.

Protease inhibitors prevent the viral polyprotein from being cleaved into its constituent proteins.

Cleavage of polyprotein blocked. Viral replication suppressed.
Benefits of Eradication in the Era of Directly Acting Antivirals

- Reduced Steatosis
- Decreased Malignant Lymphoma
- Reduced Type 2 Diabetes Mellitus/Insulin Resistance
- Improved Cognitive Performance
- Reduction in Fatigue
- Improvement in Myocardial Perfusion Defects
- Reduced Incidence of Stroke
- Reduced Renal and Cardiovascular Outcomes with DM
- Complete Resolution of MC-Related Complications
- Regression of Complete Remission of HCV-associated Lymphoma
- Reduced Mortality

Gastroenterology 2015; 149:1345-1360
HCV Guidance: Recommendations for Testing, Managing, and Treating Hepatitis C

Last Updated: May 24, 2018 | www.hcvguidelines.org
Recommended and alternative regimens listed by evidence level and alphabetically for:

**Treatment-Naive Genotype 1a Patients Without Cirrhosis** (part 1 of 2)

<table>
<thead>
<tr>
<th>RECOMMENDED</th>
<th>DURATION</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily fixed-dose combination of elbasvir (50 mg)/grazoprevir (100 mg) for patients without baseline NS5A RASs for elbasvir</td>
<td>12 weeks</td>
<td>I, A</td>
</tr>
<tr>
<td>Daily fixed-dose combination of glecaprevir (300 mg)/pibrentasvir (120 mg)</td>
<td>8 weeks</td>
<td>I, A</td>
</tr>
<tr>
<td>Daily fixed-dose combination of ledipasvir (90 mg)/sofosbuvir (400 mg)</td>
<td>12 weeks</td>
<td>I, A</td>
</tr>
<tr>
<td>Daily fixed-dose combination of ledipasvir (90 mg)/sofosbuvir (400 mg) for patients who are non-black, HIV-uninfected, and whose HCV RNA level is &lt;6 million IU/mL</td>
<td>8 weeks</td>
<td>I, B</td>
</tr>
<tr>
<td>Daily fixed-dose combination of sofosbuvir (400 mg)/velpatasvir (100 mg)</td>
<td>12 weeks</td>
<td>I, A</td>
</tr>
</tbody>
</table>

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\(a\) Includes genotype 1a resistance-associated substitutions at amino acid positions 28, 30, 31, or 93 known to confer antiviral resistance.

\(b\) This is a 3-tablet coformulation. Please refer to the prescribing information.

\(c\) The dose of daclatasvir may need to be increased or decreased when used concomitantly with cytochrome P450 3A/4 inducers and inhibitors, respectively. Please refer to the prescribing information and the section on HIV/HCV coinfection for patients on antiretroviral therapy.
Recommended and alternative regimens listed by evidence level and alphabetically for:

### Treatment-Naive Genotype 1b Patients Without Cirrhosis (part 1 of 2)

<table>
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<tr>
<th>RECOMMENDED</th>
<th>DURATION</th>
<th>RATING</th>
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Treatment of Hepatitis C Virus Infection: Is It Time for the Internist to Take the Reins?

Shyam Kotttilil, MD, PhD; Mary Wright, MD, MPH; Michael A. Polis, MD, MPH; and Henry Masur, MD
Hepatitis B

- Story is still pending.

**Fig. 1** HBV Life cycle and therapeutic targets. The colour dots represent different drugs that work in many stages of the life cycle: a Binding HBV to NTCP receptor and endocytosis, b Uncoating nucleocapsid protein and release into cytosol, c Nuclear transport and bind to cell nucleus, d Shell of capsid disintegration and release of RNA, e rcDNA conversion to cccDNA, f Transcription, g RNA exportation from cell nucleus to cytosol, h Translation, i HBx stops transcription silence, j New nucleocapsids formed with RNA, k DNA synthesis from RNA (Target of Nucleos(t)ide analogues), l Nucleocapsid envelopment in Golgi apparatus, m HBsAg + HBeAg secretion and new viral particle.
Hepatitis B

Fig. 2 Suggested combination strategies to achieve HBV cure
Irritable Bowel Syndrome

- Rome IV Criteria
  - Recurrent abdominal pain, on average 1 day per week in last 3 months with 2 or more criteria
    - Related to defecation
    - Associated with a change in stool frequency
    - Associated with a change in stool form (appearance)

![Bristol Stool Form Scale](image)

Rome IV
National Institute of Diabetes and Digestive and Kidney Disease
Irritable Bowel Syndrome

• Exercise (Very Low) Quality of Evidence
• Low FODMAP Diet – No gluten Free (Very Low)
• Fiber Supplementation (Psyllium) (Strong)
• Pro: Probiotics (Low)
• Rifaximin for Global IBS Symptom Reduction (Moderate)
• Peppermint Oil (Low)
• Antispasmoditics for IBS Symptoms (Very Low)

• Con: Prebiotics/Synbiotics (Very Low)
Irritable Bowel Syndrome

- Tricyclic Antidepressants (High) and SSRIs (Low) Psychological Therapy (Very Low)

- Linaclotide (High) – 14-amino acid peptide (human guanylin/uroguanylin-like compound)
- Plecanitide (Moderate) – 16 amino acid peptide (uroguanylin)
- Lubiprostone (High) – Chloride Channel Activator

- Eluxadoline (Moderate) – Avoid with Cholecystectomy (opioid agonist/antagonist)
- Alosetron (Low) – Ischemic Colitis – 5HT₃ antagonist – Female Only

- Con: Loperamide (Very Low)
- Con: Polyethylene Glycol (Low)
- Con: 5-ASAs (Low)

Am J Gastroenterol 2018; 113:1-18 Monograph Supplement
Endoscopy

- Withdrawal Times in Colonoscopy
  - > 6 minutes – higher yield

- Adenoma Detection Rate
  - High Detectors reduce CRC interval rate
  - 1% Adenoma > 5% CRC

Endoscopy

- Chromoendoscopy
  - Methylene Blue
  - Indigo Carmine
  - Ulcerative Colitis Dysplasia Detection
(A–C) High definition and dye chromoendoscopy show flat depressed colonic lesion Paris IIb+IIc. (D, E) NBI with magnification revealed Kudo pit pattern type IV–V.

(A, B) High definition (HD) and dye chromoendoscopy (DCE) show colonic flat elevated dysplastic lesions, Paris IIA+IIb with irregular margins.

Eosinophilic Esophagitis

- First reports in 1960s – Endoscopy in 1990s
- Atopic male (M:F 3:1)
- Presents in childhood or during 3rd or 4th decade of life
- Possible predominance in non-Hispanic Whites
- Associated with atopic diatheses (food allergy, asthma, eczema, chronic rhinitis, environmental allergies)
- Solid Food Dysphagia/Food Impaction (34-54%)
- Chest Pain, Heartburn, Upper Abdominal Pain

Am J Gastroenterol 2013;108:679-692
Eosinophilic Esophagitis

- Esophageal eosinophilia on biopsy
- Assess for all causes of esophageal eosinophilia
- Isolated esophageal eosinophilia
  - PPI trial followed by repeat endoscopy and biopsy
  - PPI-non-responsive (persistent eosinophilia and symptoms)
    - EoE (immune-mediated)
  - PPI-responsive (eosinophilia and symptoms resolved)
    - Non-GERD PPI-REE (mechanism yet unknown)
    - GERD with eosinophils (acid-mediated)
Eosinophilic Esophagitis

Treatment

• PPI
• Budesonide
  • 8 week topical trial
  • Swallowed with Honey/Sucralose
• Dietary Elimination
  • Fish, Nuts, Soy, Egg, Wheat, Milk
• Esophageal Dilation
  • Conservative approach in refractory patients

Am J Gastroenterol 2013;108:679-692
Acute Pancreatitis

- Dx (Clinical)
  - Persistent, severe epigastric abdominal pain
  - May be rapid in gallstone pancreatitis
  - 90% will have nausea/vomiting
  - 5% Hypotension
  - Severe – Fever, Tachypnea, Hypoxemia, Hypotension

Am J Gastroenterol 2013; 108:1400-1415
Gastro 2018;154:1096-1101
Acute Pancreatitis

• Diagnosis (Lab):
  • Lipase
    • Sensitivity/Specificity – 82-100%
    • Last longer than Amylase

• Diagnosis (Imaging):
  • Interstitial: Focal or diffuse pancreatic enlargement/Heterogeneous Enhancement
  • Necrosis – Lack of enhancement with I.V. Contrast

Am J Gastroenterol 2013; 108:1400-1415
Gastro 2018;154:1096-1101
Acute Pancreatitis

• Diagnosis
  • Requires presence of 2 of 3 criteria
    • Acute Pain (Epigastric)
    • Lipase > 3 X Upper Limit of Normal (DM > 5 X ULN)
    • Characteristic Imaging Findings (CT)

Am J Gastroenterol 2013; 108:1400-1415
Gastro 2018;154:1096-1101
Acute Pancreatitis

- Management
  - 5-10 ml/kg/hour of isotonic crystalloid solution (250-500 mL/hr)
  - Lactated Ringer’s may be superior
  - Hypotension – 20 mL/kg – 30 minute Bolus IV followed by 3 ml/hg/hour for 8 to 12 hours

- Laboratory Target Goals
  - Reassess fluid requirements in 1st 6 hours

- Monitor patients with renal failure/CHF/Elderly

Am J Gastroenterol 2013; 108:1400-1415
Gastro 2018;154:1096-1101
Acute Pancreatitis

- Lab Monitoring
  - HR < 120 beats/minute
  - MAP 65 to 85 mm Hg
  - Urine Output (>0.5 to 1 ml/kg/hr)
  - Hct (35-44%)
  - BUN decreased (Delta)

- 24 hours – Morbidity/Mortality Reduction
- Lactated Ringers – Less SIRS

Am J Gastroenterol 2013; 108:1400-1415
Gastro 2018;154:1096-1101
Acute Pancreatitis

- Poor Fluid Delivery results in Increased Risk of

Necrotic Pancreatitis

Am J Gastroenterol 2013; 108:1400-1415
Gastro 2018;154:1096-1101
Acute Pancreatitis

- Pain Control
  - Fluid Resuscitation
  - Opioids are safe and effective

- Nutrition
  - Oral Feedings early in mild pancreatitis (24 hours)
  - Severe pancreatitis – Place NG or NJ tube (intestinal barrier)

- Prophylactic Antibiotics – Avoid in severe acute pancreatitis and early necrosis

Am J Gastroenterol 2013; 108:1400-1415
Gastro 2018;154:1096-1101
C. difficile Colitis

• Leading cause of hospital-associated gastrointestinal illnesses
• High Burden on Health Care Systems
• Extended length of stays

• Shift from Hospital-Acquired to Community Acquired Infections

Am J Gastroenterol 2013;108:478-498
C. Difficile Evaluation

Clinicians and laboratory personnel agree at the institutional level to not submit stool specimens on patients receiving laxatives and to submit stool specimens only from patients with unexplained and new onset ≥ 3 unformed stools in 24 h for testing for CDI.

Stool toxin test* as part of a multiple step algorithm (i.e. GDH plus toxin; GDH plus toxin, arbitrated by NAAT; or NAAT plus toxin) rather than a nucleic acid amplification test (NAAT) alone.

NAAT alone OR stool toxin test* as part of a multiple step algorithm (i.e. GDH plus toxin; GDH plus toxin, arbitrated by NAAT; or NAAT plus toxin) rather than a toxin test alone.

*Approved stool EIA toxin tests vary widely in sensitivity. Laboratories should choose a toxin test with sensitivity in the upper range of sensitivity as reported in the literature [146-149, 156].

CID 2018;66:e1-e48
C. Difficile Treatment

<table>
<thead>
<tr>
<th>Clinical Definition</th>
<th>Supportive Clinical Data</th>
<th>Recommended Treatmenta</th>
<th>Strength of Recommendation/ Quality of Evidence</th>
</tr>
</thead>
</table>
| Initial episode, non-severe  | Leukocytosis with a white blood cell count of ≤15,000 cells/mL and a serum creatinine level < 1.5 mg/dL | • VAN 125 mg given 4 times daily for 10 days, OR  
• FDX 200 mg given twice daily for 10 days  
• Alternate if above agents are unavailable: metronidazole, 500 mg 3 times per day by mouth for 10 days | Strong/High  
Strong/High  
Weak/High |
| Initial episode, severeb     | Leukocytosis with a white blood cell count of ≥15,000 cells/mL or a serum creatinine level > 1.5 mg/dL | • VAN, 125 mg 4 times per day by mouth for 10 days, OR  
• FDX 200 mg given twice daily for 10 days | Strong/High  
Strong/High |
| Initial episode, fulminant   | Hypotension or shock, ileus, megacolon                                                   | • VAN, 500 mg 4 times per day by mouth or by nasogastric tube. If ileus, consider adding rectal instillation of VAN. Intravenously administered metronidazole (500 mg every 8 hours) should be administered together with oral or rectal VAN, particularly if ileus is present. | Strong/Moderate (oral VAN);  
Weak/Low (rectal VAN);  
Strong/Moderate (intravenous metronidazole) |

Metronidazole suggested for mild disease in ACG guidelines.

CID 2018;66:e1-e48
Am J Gastroenterol 2013;108:478-498
# C. Difficile Treatment

<table>
<thead>
<tr>
<th>First recurrence</th>
<th>...</th>
<th>Weak/Low</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• VAN 125 mg given 4 times daily for 10 days if metronidazole was used for the initial episode, OR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Use a prolonged tapered and pulsed VAN regimen if a standard regimen was used for the initial episode (e.g., 125 mg 4 times per day for 10–14 days, 2 times per day for a week, once per day for a week, and then every 2 or 3 days for 2–8 weeks), OR</td>
<td>Weak/Low</td>
</tr>
<tr>
<td></td>
<td>• FDX 200 mg given twice daily for 10 days if VAN was used for the initial episode</td>
<td>Weak/Moderate</td>
</tr>
<tr>
<td>Second or subsequent recurrence</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• VAN in a tapered and pulsed regimen, OR</td>
<td>Weak/Low</td>
</tr>
<tr>
<td></td>
<td>• VAN, 125 mg 4 times per day by mouth for 10 days followed by rifaximin 400 mg 3 times daily for 20 days, OR</td>
<td>Weak/Low</td>
</tr>
<tr>
<td></td>
<td>• FDX 200 mg given twice daily for 10 days, OR</td>
<td>Weak/Low</td>
</tr>
<tr>
<td></td>
<td>• Fecal microbiota transplantation*</td>
<td>Strong/Moderate</td>
</tr>
</tbody>
</table>
Upper Gastrointestinal Bleeding

Established institutional protocols in place
- Develop institution-specific protocols for management
- Have available support staff trained to assist in endoscopy

ABC’s and adequate resuscitation
- Evaluate and resuscitate
- Transfuse blood if hemoglobin ≤70g/L
- Correct coagulopathy but do not delay endoscopy

Early risk stratification / initial management
**Pre-endoscopy**
- Consider placement of nasogastric tube
- Determine the Blatchford or pre-endoscopic (clinical) Rockall score to stratify into low- and high-risk categories
- Do not use somatostatin or octreotide
- Consider promotility agents in patients likely to have blood clots in the stomach
- Consider pre-endoscopic PPI therapy

**At early endoscopy**
- Determine the complete Rockall score (using the additional endoscopic information)

Discharge very low-risk patients pre-endoscopically if Blatchford score is 0
Admit all other patients

Clin Gastroenterol Hepatol 2012;10:234-239
Upper Gastrointestinal Bleeding

Low-risk patients (without high-risk endoscopic lesions)
- Initiate daily dose oral PPI
- Consider early discharge same day or next day

High-risk patients (exhibiting high-risk endoscopic lesions)
Endoscopic therapy
- Endoscopic hemostasis as clips, thermoablation or sclerotherapy alone or in combination with epinephrine for high-risk lesions
- Clot in ulcer bed requires irrigation to determine the presence of an adherent clot
- Adherent clots - consider endoscopic therapy or sole PPI use
Pharmacologic therapy
- High-dose IV bolus + continuous infusion of PPI (initial bolus equivalent to 80 mg of omeprazole followed by infusion equivalent to 8 mg/hour of omeprazole for 72 hrs)
- H2RA are not recommended
Management issues
- High-risk stigmata patients hospitalized for 72 hrs
- Stable patients after endoscopy can be fed within 24 hrs

If rebleeding occurs
- Second attempt at endoscopic therapy recommended
- Seek surgical consultation
- Percutaneous embolization can be considered as an alternative to surgery

Upon discharge
- Discharge patients with prescription for daily oral PPI for a duration determined by the cause of the bleed
- Test for H. pylori and eradicate accordingly with subsequent confirmation of eradication
- Repeat negative H. pylori tests outside the acute setting
- Adding a PPI to a traditional NSAID or switching to COX-2 inhibitor alone are strategies associated with increased risk for recurrent ulcer bleeding; recommend COX-2 + PPI instead for patients having bled on NSAID or COX-2, if cardiovascular status allows it
- Restart ASA therapy when cardiovascular risks outweigh risk of rebleeding, aiming for <7 days when safe: add a PPI as secondary prophylaxis since clopidogrel alone has increased risk for rebleeding
- Add PPI to patients having bled on clopidogrel

Clin Gastroenterol Hepatol 2012;10:234-239
GI Bleeding Scores

- Use a personal device score calculator

- Rockall Score
  - Uses Endoscopic data for complete score
  - Age, Shock, Comorbidity, Diagnosis (EGD), Endoscopic Stigmata
  - Variation in accuracy for post-endoscopy rebleeding

- Blatchford Score
  - BUN, Hb, SBP, HR, and presence of melena, syncope, hepatic disease, and/or cardiac failure
  - Score = 0 >> Low likelihood of need for urgent endoscopy
Upper Gastrointestinal Bleeding

![Graph showing survival according to transfusion strategy]

**A Survival, According to Transfusion Strategy**

**No. at Risk**

<table>
<thead>
<tr>
<th></th>
<th>Restrictive strategy</th>
<th>Liberal strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>444</td>
<td>445</td>
</tr>
<tr>
<td>0</td>
<td>429</td>
<td>428</td>
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<tr>
<td>5</td>
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</tr>
<tr>
<td>45</td>
<td></td>
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</tbody>
</table>

**Days**

**P=0.02 by log-rank test**

**B Death by 6 Weeks, According to Subgroup**

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Restrictive Strategy</th>
<th>Liberal Strategy</th>
<th>Hazard Ratio (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>23/444 (5)</td>
<td>41/445 (9)</td>
<td>0.55 (0.33–0.92)</td>
<td>0.02</td>
</tr>
<tr>
<td>Patients with cirrhosis</td>
<td>15/139 (11)</td>
<td>25/138 (18)</td>
<td>0.57 (0.30–1.08)</td>
<td>0.08</td>
</tr>
<tr>
<td>Child–Pugh class A or B</td>
<td>5/113 (4)</td>
<td>13/109 (12)</td>
<td>0.30 (0.11–0.85)</td>
<td>0.02</td>
</tr>
<tr>
<td>Child–Pugh class C</td>
<td>10/26 (38)</td>
<td>12/29 (41)</td>
<td>1.04 (0.45–2.37)</td>
<td>0.91</td>
</tr>
<tr>
<td>Bleeding from varices</td>
<td>10/93 (11)</td>
<td>17/97 (18)</td>
<td>0.58 (0.27–1.27)</td>
<td>0.18</td>
</tr>
<tr>
<td>Bleeding from peptic ulcer</td>
<td>7/228 (3)</td>
<td>11/209 (5)</td>
<td>0.70 (0.26–1.25)</td>
<td>0.26</td>
</tr>
</tbody>
</table>
Upper Gastrointestinal Bleeding

- **H. pylori**
  - *H. pylori* therapy
    - Document cure; stop PPI/H2RA

- **NSAID**
  - Stop NSAID; if NSAID required, use coxib+ PPI

- **Low-dose aspirin**
  - Primary CV prevention
    - Do not resume aspirin in most patients
  - Secondary CV prevention
    - Resume aspirin soon after hemostasis (e.g., 1–7 days) in most patients and start PPI

- **Idiopathic**
  - Maintenance PPI
Upper Gastrointestinal Bleeding

- Endoscopy < 24 hours after presentation
- High-Risk Endoscopic Stigmata – Treat
- Early Discharge – Low Risk Lesions
- No Treatment for Clean Based Ulcers/Pigmented Spots
- Combination Therapy Superior
- Clot – IV PPI Therapy
- Second-Look Endoscopy (Usually not needed)

Clin Gastroenterol Hepatol 2012;10:234-239
Small Bowel Bleeding

[Diagram showing the process of managing small bowel bleeding, including steps such as Brisk/massive suspected small bowel bleeding, Unstable, Stabilize patient, Red cell scan or CT angiography, Angiography, Embolization, and Specific management enteroscopy vs surgery and intraoperative enteroscopy.]
Small Bowel Bleeding

Sub-acute ongoing small bowel bleeding

Stabilize patient

Consider VCE vs CTE

Positive

Proceed to deep endoscopy

Positive

Treat accordingly

Negative

Consider RBC scan and or angiography or surgery ± intraoperative endoscopy

Negative
Gastrointestinal Bleeding

- Nanopowder Hemostatic Agent TC-325
  - Uncontrolled Bleeding
  - Gastrointestinal Cancer Bleeding
  - Duodenal Ulcer with massive bleeding
  - Approved May 2018
Summary

- A variety of developments have been made in gastroenterology
- Many of the developments are practical in nature and based on reanalysis of current practices
- Future developments will involve technology, data review and pharmaceutical achievements.