MRI of the Gastrointestinal Tract: Crohn’s Disease

Diego R. Martin, M.D., Ph.D.
The MD Anderson Endowed Chair of Molecular Imaging Chair, Department of Radiology and the Houston Methodist Research Institute Center for Translational Imaging Houston Methodist Texas
drmartin@houstonmethodist.org
MRI Bowel

Methodology Take-Home Points

➢ IBD – Method of choice for IBD diagnostics
➢ Most important images
   ➢ SST2 +/-FS
   ➢ 3D GRE Gad
   ➢ DWI
   ➢ TFISP
T2-Weighted Imaging

➢ Single Shot (HASTE, SSFSE, sSH)
➢ Optimization
  ➢ Parallel Processing with surface coils (iPAT, ASSET, SENSE)
  ➢ SPAIR fat suppression

Gastroenterology 2007;133:385-90
JMRI 2008;28:113-40
JMRI 2008;27:1448-54
2-Monitor Layout:

**CorT2**  **CorT2FS**  **AxT2**  **AxT2FS**  **SagT2**  **HiResT2**

**Cor 3D gre**  **Pre**  **Arterial**  **Venous**  **Delayed**  **Cor-Del**

**SPAIR-T2 single shot - JMRI 2008;27(6):1448-54**
Small Bowel – Oral Contrast

Bowel Paralytic: Glucagon / Buscopan
Gastrointestinal Tract MRI

- Single shot T2 FSE w fat suppression-SPAIR
- Highly sensitive and specific for active inflammation
  - IBD
  - *-itis
  - Acute abdomen-pelvis
Appendix
Appendix
16M Intermittent Pain – ?Crohn’s Disease
Appendicitis

HASTE T2

VIBE

HASTE T2

HASTE-SPAIR T2

VIBE – gad delayed
Large Bowel

Martin et al Radiology 2002;225:5976-02
Large Bowel
Crohn’s Disease – Five Pillars of Diagnostics

TFISP
Crohn’s Disease - 1

- Scope, Capsule and Biopsy
  - Mucosa and only mucosa
Crohn’s Disease - 2

- MRI
  - Submucosa and deeper disease
Crohn’s Disease - 3

- Submucosal and deeper disease
  - Most serious symptoms
  - Most significant impact on medical therapy
  - Most significant impact on surgical therapy
Mucosa can heal over deeper disease and scope evaluation may under-represent disease extent
Crohn’s Disease - 5

➢ Differentiations between CT and MR

➢ Xrays vs. no-xrays

➢ Contracted bowel vs. disease

➢ Inflammation vs. fibrosis
Crohn’s Disease - Fibrosis
Crohn’s Disease - Inflammation
Crohn’s Disease
Crohn’s Disease
Crohn’s Disease
Crohn’s Disease - Treated
Crohn’s Disease
Crohn’s Disease - Fistula

➢ True FISP
Crohn’s Disease
Crohn’s Disease - Abscess
Crohn’s Disease
Non-specific Colic
Intractable RLQ Pain
21F Repeated Abdominal Pain

- Extensive evaluation including endoscopy
- Diagnosis of Irritable Bowel Syndrome (IBS)
21F Repeated Abdominal Pain

- MRI diagnosis = Crohn’s Disease
30M Cough and Diarrhea

➢ Diagnosis of asthma and viral enteritis
Ulcerative Colitis
30M Cough and Diarrhea

- MRI diagnosis = Ulcerative Colitis with associated alveolitis
Differentiating Other Bowel Disease

- Obstruction
- Ischemia
- Perforation
- Inflammation/Infection
65F “drain abscess”
Gastrointestinal Tract MRI

- Summary – IBD – Crohn’s Disease
MRI Crohn’s Disease – Pearls

➢ Bowel wall thickening and enhancement
  = Inflammation and/or fibrosis

➢ Wall edema (T2↑)
  = Inflammation
**MRI Crohn’s Disease – Pearls**

- **Scope or Biopsy**
  - Mucosal disease

- **MRI**
  - Submucosa-muscularis-serosa-periserosa
  - Do not see mucosal disease

*Gastroenterology* 2007;133:385-90
*JMRI* 2008;28(5):113-40
MRI Crohn’s Disease – Pearls

➢ Mucosa has high capacity to heal
➢ Disproportionate deeper disease common
➢ Scope/biopsy can under-measure disease
MRI Crohn’s Disease – Pearls

Management

- Active inflammation = Steroids
- Maintenance = 6MP/Biologics (Humira/Cyltezo/Amjefita/Cimzia/Tysabi/Stelara)
- Fistula = Biologics(Active)/Surgical resection(Chronic)
- Fibrotic disease, no inflammation, with marked obstructive stenosis / tethering symptoms = Surgical resection
Thank You For Your Attention!!

dmartin@radiology.arizona.edu