CIRA Case of the Week
July 2015

Case Courtesy of Drs. Vik Agarwal, CS Ho & Eran Shlomovitz

Joint Department of Medical Imaging
University of Toronto

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Case Presentation

- 50 year old female with Primary Biliary Cirrhosis
  - Treated with a liver transplant
  - Post-op developed ascending cholangitis
  - WBC elevated, febrile & septic

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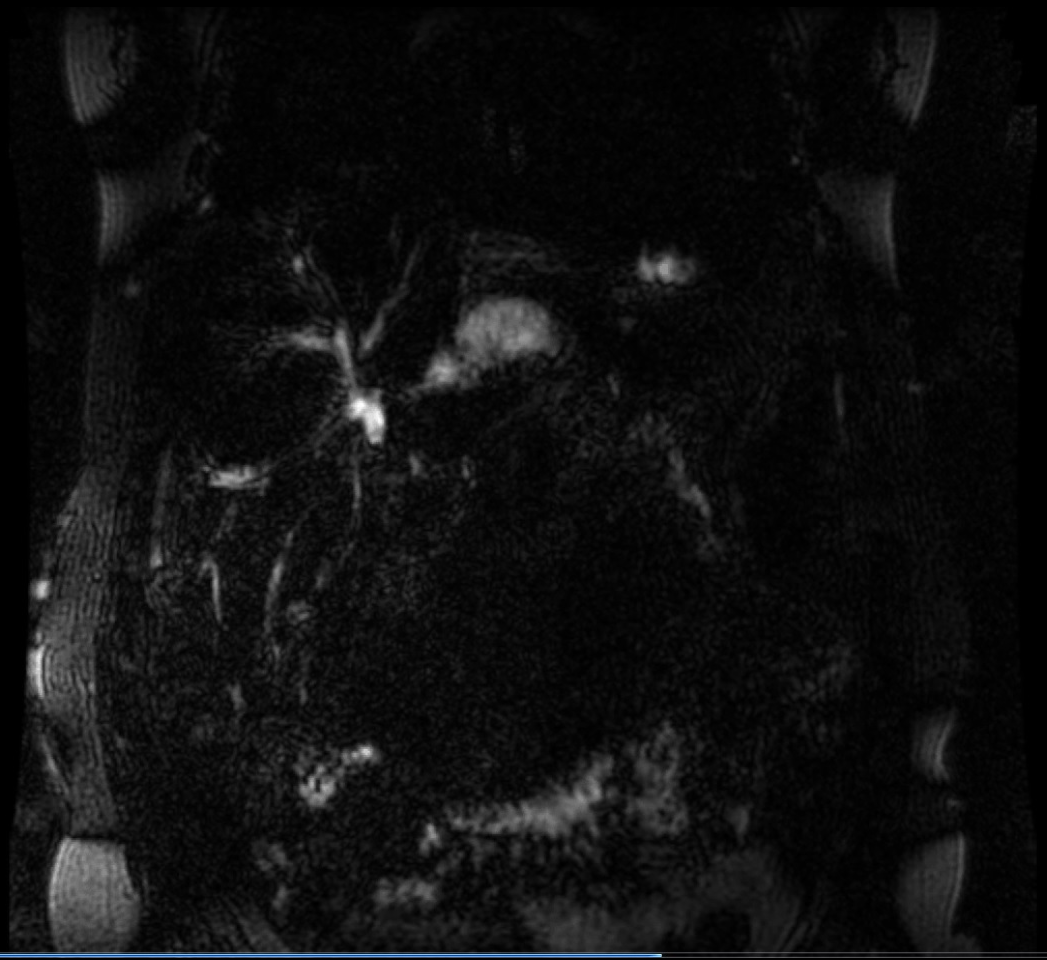
Pre Intervention MRI



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MRI Findings

- Biliary stricture in the region of the anastomosis
- Mildly dilated biliary radicals
- Enhancement of the biliary tree (not shown)

- Plan:
  - PTCD with internalization and eventual PTA of the stricture

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Attempted PTC Internalization

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Cholangiographic Findings

- Biliary tree is opacified by a 5F Kumpe catheter
- Multiple surgical clips are seen (in expected region of the anastomosis) and no contrast seen in the duodenum
- Unable to cross stricture despite multiple attempts with multiple wire/catheter combinations and operators

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Management

- Cannot traverse the stricture at the anastomosis (from the biliary or enteric side)
- Magnetic compression anastomosis is planned

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Background

- Biliary strictures post-liver transplant
  - Can occur in 8-31% of recipients
  - Can be a fatal complication
  - Felt to be 2' to hypertrophic changes & ischemic injury
  - Can occur because of
    - Pancreatitis
    - PSC
    - Other inflammatory process of biliary tree
- Usual management is PTA/stent of stricture or surgery
- This case explores a novel technique that can be employed when a wire will not cross the stricture

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Background

- ~1988 Yamanouchi introduced idea of MCA
- Deliver magnets to both end of stricture
- How does this work?
  - Attractive force of magnets
    - Induces ischemic necrosis
    - When tissues slough, a hole is created
  - This hole is a biliary-enteric fistula which allows bile to pass and decompress the system

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Background

- Since tract forms from necrosis – restenosis rates should be low
- Clinical feasibility, efficacy and safety have been studied
  - Cases in Asia (<100)
  - Russia (<50)
    - Presented at SIR in 2009

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Magnetic Compression Anastomosis

- Under fluoroscopic guidance, place N42 Neodymium-Iron-Boron magnets over the wire in the region of the anastomosis
- Using endoscopic guidance, place N42 Neodymium-Iron-Boron magnets over the wire in the region of the enteric side of the anastomosis
- Decompress biliary system while the new anastomosis forms

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Magnet Placement – Biliary Side

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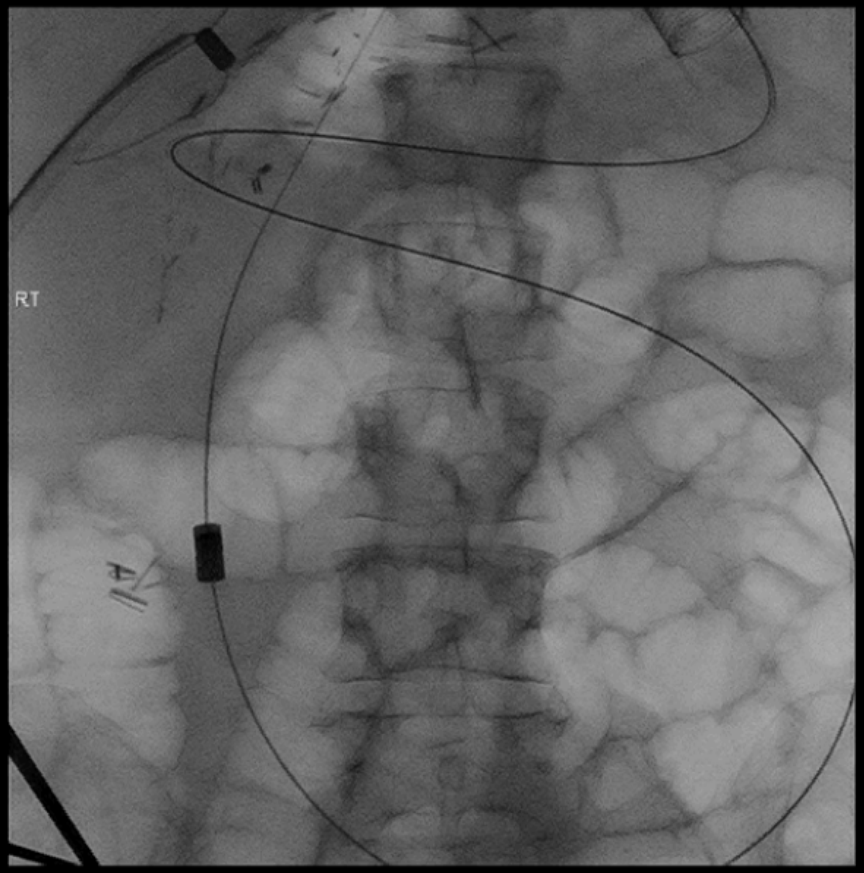
Magnet Placement – Enteric Side



Advancing magnet over the wire

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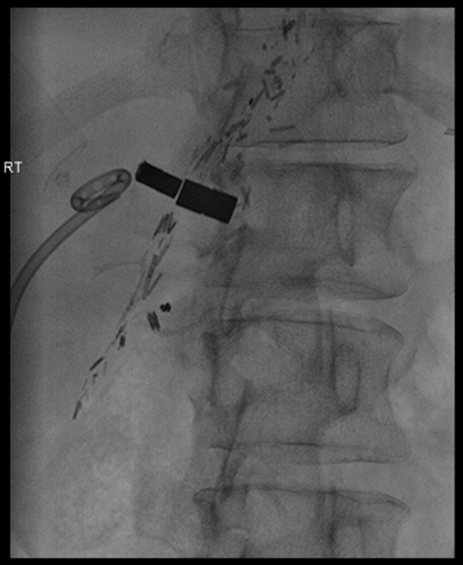
Magnet Placement – Enteric Side



Final Placement of Magnet

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Creation of Anastomosis

2 weeks later

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Case Outcome

- Patient had a successful creation of a biliary-enteric anastomosis
- Cholangiogram at 3 weeks post intervention shows a widely patent anastomosis
- No further cholangitis or hospital admissions

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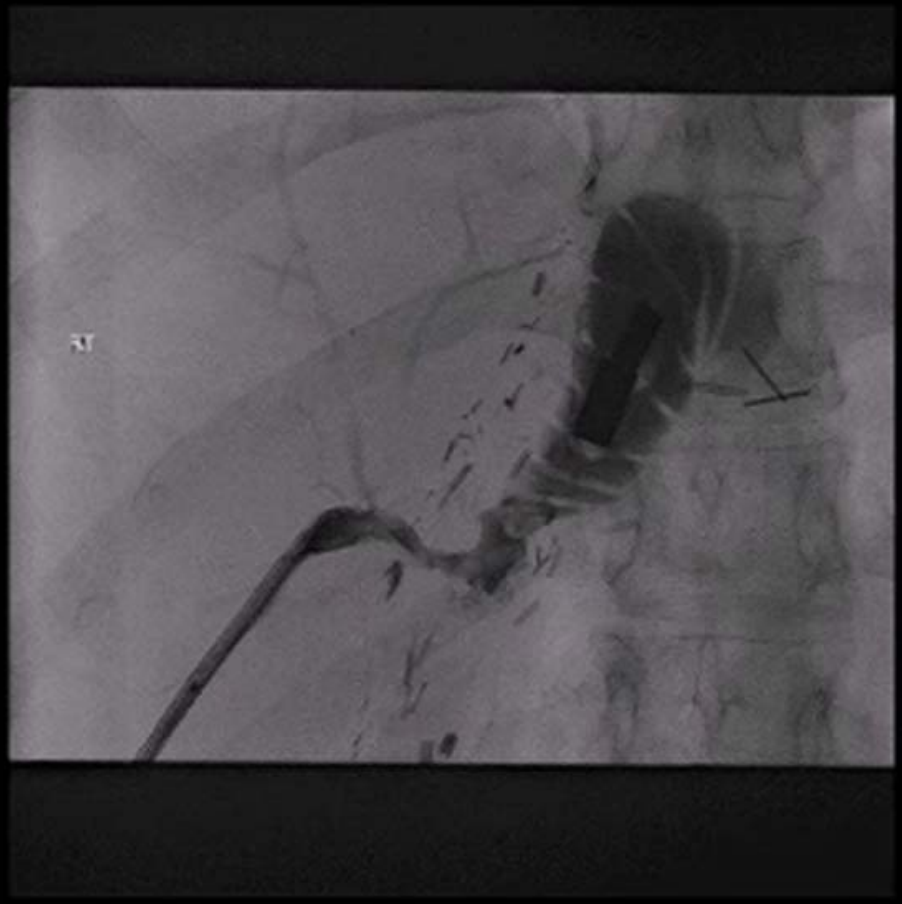
Case Outcome



Widely patent biliary-enteric anastomosis

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Future Directions

- First case of its kind in Canada
- Technique been used in:
  - Benign biliary strictures
  - Achalasia
  - Non-benign strictures (instead of stents)
- Can this be used in:
  - Ureters
  - Colorectal anastomosis
  - Veins?

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Conclusion

- MCA is an evolving new technology
- Can be safely used by VIR as a non-surgical treatment for biliary strictures *(which cannot be crossed with a guidewire)*
- What else can be done with these magnets?

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