Approach to the Biliary Stricture

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Disclosures related to this talk

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Educational objectives

- Discuss the etiology and treatment of benign biliary strictures
- Review the evaluation of indeterminate biliary strictures
- Discuss management options of malignant bifurcation strictures

Case Presentation

- A 67 year old male presents with weight loss, fatigue and painless jaundice.
- Abdominal ultrasound reveals a hilar mass, dilated intrahepatic ducts, normal distal CBD.
- There are several 1-2cm peripheral masses in the right and left lobe. One is biopsied and adenocarcinoma of biliary origin is detected.
Case Presentation

- His oncologist wants to give him systemic chemotherapy and would like you to decompress his biliary tree.

Would you proceed and what type of stent(s) would you use.
Talk Outline

• Benign strictures
• Indeterminate strictures
• Malignant strictures

Benign Biliary Disease

Benign Strictures
PSC
Post operative stricture
Inflammatory stricture
Chronic Pancreatitis
PSC

ERCP of PSC

- Strictures
- Focal dilation and narrowing
- Irregularity of the bile duct wall
- Diffuse disease
PSC and ERCP

- Diagnosis
- Tissue sampling to detect malignancy
- Use of MRI/MRCP to detect masses
- Therapy of dominant strictures

Endoscopic therapy of PSC dominant strictures

- Carefully select patients for therapy
- Exclude malignancy at each ERCP
- Balloon dilate without stenting
- Stent placement only for edema post dilation and then for short term (2 weeks)
- Liberal use of antibiotics post treatment
- Repeat dilation as needed
Dilation devices

- Biliary balloons
- Sohendra rotary dilating catheter

Devices for the very tight stricture

- .018 inch guide wires
  - .021 inch coated wire behaves like an .018 inch wire
- Hydrophilic coatings
- 3-4-5 catheter
- Angioplasty balloons
  - Limited availability
- Low profile biliary balloons
- Rotary dilator (stent extractor) (8.5 French)
Balloon Dilation

PSC Balloon Cholangiogram

Balloon dilation

Endoscopic Therapy of Dominant Strictures in PSC

- Balloon dilate all dominant extra hepatic strictures
- Follow LFT’s and symptoms
- Repeat therapy if jaundice does not resolve or recurs
- Maintain a high suspicion for malignancy
Endoscopic Therapy of PSC

- Little published data
- No randomized or controlled series
- Endoscopic therapy may improve survival and delay need for transplantation
  - IU experience 63 pts. over 6 years
  - 5 yr survival higher than predicted by Mayo score (83% vs 65%)

Baluyut et al. Gastrointest endosc 2001 53:308-312

Benign Biliary Disease

Benign Strictures
- PSC
- Post operative stricture
- Inflammatory stricture
- Chronic Pancreatitis
Difficult Biliary Stricture

- Location
  - Periampullary
    - May make cannulation difficult,
    - Need contrast to delineate the anatomy
  - Distal CBD (Intrapancreatic)
    - Close to scope, improved forces for dilation
    - Single lumen
Difficult Biliary Stricture

- Location
  - Bifurcation and beyond
    - Lose mechanical forces
    - Directional tools needed
    - Multiple lumens
Post operative bile duct strictures

• Increasing evidence that endoscopic management is an excellent option
• Very effective for main duct lesions >1cm from the bifurcation
• Trend to longer stenting with larger number of stents (3-10 French stents for 1 year)

Post op stricture
Balloon dilate
Biliary stents for Post operative strictures

Improvement after long term stenting
Benign Biliary Strictures

Chronic Pancreatitis

• Obstruction of the bile duct can occur in the setting of chronic pancreatitis.
• Obstruction can lead to secondary biliary cirrhosis.
• Pancreatic carcinoma should be excluded.
• Surgical bypass is still considered therapy of choice.
• Treatment with long term plastic stenting can be attempted but with an anticipated low success rate.

Catalano et al. Treatment of symptomatic distal cedr stenosis secondary to chronic pancreatitis: Comparison of single vs. multiple simultaneous stents. Gastrointest Endosc 2004;60;945-52.

Use of covered biliary stents for benign indications

• Increased anecdotal experience with fully covered metallic stents
• Remains a FDA unapproved indication
• No reported difficulty in removal of fully covered metallic stents in a small series*
• Anticipate additional fully covered stent designs for this purpose in the near future

### Fully covered metallic stent

### Indeterminate stricture

- Brush cytology
- Forceps biopsy
- Brush for FISH
- Cholangioscopy
  - Directed biopsy
  - Role of confocal Microscopy
Single operator in indeterminate strictures at an expert center

Single center study from Hyderabad India
- SOC accuracy 89%
- SOC biopsy 82%

Single operator cholangiopancreatoscopy at a single center in the USA

Single center study from Gainesville Florida
- SOC w biopsy
  - Sensitivity 76.5%
  - Accuracy 84.6%
  - NPV 69.2%
NBI use in cholangioscopy


NBI use in cholangioscopy
Tumor vessels

Complications of Cholangioscopy

- Cholangitis especially in patients with multiple strictures*
  - Water infused during procedure can disperse bacteria into poorly decompressed segments
  - IV antibiotics before cholangioscopy
  - Avoid fluid infusion in complex strictures

Sethi A et al. GIE Feb. 2011

Talk Outline

- Benign strictures
- Indeterminate strictures
- Malignant strictures
Bismuth-Corlette classification of hilar cholangiocarcinoma

Imaging of malignant biliary strictures

Role of MRI

- MRI with MRCP provides a detailed map of the pathology to direct diagnostic efforts and therapy
- MRI with contrast may detect lesions at the sight of the stenosis other metastasis or nodes to sample
- MRCP to plan treatment and stent(s) placement
  - Decompress the most significant portion of the liver
  - Avoid contrast injection into multiple areas that are difficult to decompress
  - Stenting one segment of the liver is often adequate for palliation
Pretreatment planning

- Review MRCP
- Design approach to decompression
  - 1 stent in largest segment of functional liver for basic palliation
  - 2 stents in largest segments of functional liver for optimum palliation and if chemotherapy or more aggressive therapy is planned.
  - Plastic stents (with sideholes) if preoperative decompression is required or if endoluminal therapy is anticipated
Bifurcation stenting options

• Plastic stents
  – With or without additional side holes

• Uncovered metallic stents
  1. Single segment if large enough to palliate

Placement of bifurcation metallic stents

• Stents can be left at bifurcation or additional stents added to allow the stent to cross the papilla for access.
  – Anecdotal experience  no evidence based randomized trials to guide us
Bifurcation stenting options

• Plastic stents
  – With or without additional side holes
• Uncovered metallic stents
  1. Single segment if large enough to palliate
  2. Side by side stents placed one at a time if anatomy allows

Side by side uncovered metallic stents
Use of a temporary plastic stent to facilitate the placement of multiple self-expanding metal stents in malignant biliary hilar strictures

Figure 1. Drawing displaying the role of the temporary plastic stent (orange) in preventing complete expansion of the initial SEMS (yellow) before the second stent (blue octagon) has been positioned. The drawing on the left demonstrates the problem of SEMS impaction without the plastic stent.

Deviere J et al 2005 GIE 62:605

Use of a temporary plastic stent to facilitate the placement of multiple self-expanding metal stents in malignant biliary hilar strictures

J Deviere et al.  2005 GIE 62:605
Bifurcation stenting options

- Plastic stents
  - With or without additional side holes
- Uncovered metallic stents
  1. Single segment if large enough to palliate
  2. Side by side stents placed one at a time if anatomy allows
  3. Stent in stent Y shaped stent procedure

Bifurcation tumor

Stent in Stent technique

Level of obstruction
Bifurcation tumor
Stent in Stent technique

Place wire first then follow and inject the segment.

Leave first wire then recannulate and place a wire in the opposite system.

Bifurcation tumor
Stent in Stent technique

Balloon dilate right and left strictures and common duct to duodenum.
**Bifurcation tumor**

**Stent in Stent technique**

Place stent with wide mesh into the left system while maintaining the wire in the right system.

Recannulate the stent and using the wire as a guide pass a catheter and wire through the stent into the right system.
Bifurcation tumor
Stent in Stent technique

Remove the locator wire in the right and deploy the second metal stent crossing the stent wall resulting in a Y configuration

Bifurcation stenting options

- Plastic stents
  - With or without additional side holes
- Uncovered metallic stents
  1. Single segment if large enough to palliate
  2. Side by side stents placed one at a time if anatomy allows
  3. Stent in stent Y shaped stent procedure
  4. Simultaneous placement of smaller diameter stents
    - 8mm diameter but side by side deployment
Endoluminal therapies of malignant strictures

- Surgical resection often not possible
- Limited response to systemic therapies
- May allow longer stent patency
- Anecdotal reports of prolonged survival with both radiofrequency ablation and photodynamic therapy

Radiofrequency Ablation

Habib EndoHPB catheter. Electrodes shown by arrows; the solid line indicates the 25-mm length of coagulative necrosis after catheter activation.

GASTROINTESTINAL ENDOSCOPY 73:1 149-153
Use of RFA for therapy of cholangiocarcinoma

RFA catheter in place

2 weeks post initial RFA

Reddy et al GIE

Photodynamic Therapy

• Applications in other GI diseases
• Well suited to therapy of malignant strictures
• Delivery of laser light via fiber optics
• Epithelial tissue responsive to therapy
Photodynamic Therapy: Theory

Red light → Activated Photosensitizer → Photosensitized Neoplastic cells

Photodynamic Therapy: Theory

Photosensitizer + \( O_2 \) → \( O_2^\cdot \) → Neoplastic cells
Photodynamic Therapy

- Open label series demonstrate efficacy
- Randomized comparison trials pending
- Cost and side effects remain issues
- Ongoing trials designed to demonstrate the role of PDT in the management of these complex disorders

Case presentation

- At ERCP an air cholangiogram was used to delineate the main left and right systems.
- Wires placed into each system.
- Bilateral uncovered metallic stents placed from the dilated ducts to the duodenum
- Chemotherapy delivered stents patent to date
Take home points

• Use of MRI with MRCP for dx and therapy if CHD or bifurcation is involved
• PSC; balloon dilate, rarely stent, antibiotics
• Post op and Chronic Pancreatitis strictures; stent long term (1 year multiple stents, 10mm)
• Indeterminate strictures; Brush cytology biopsy and brush for FISH
• Bifurcation strictures; proceed cautiously do not fill ducts you cannot decompress. Stent options in handout.

Thank you!

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