Management of Antiplatelet Therapy in Patients with Cardiac Stents Undergoing Procedures

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**PATIENT PRESENTATION**
(Inpatient or Outpatient)

Patient with cardiac stent\(^1\) on dual antiplatelet therapy\(^2\) in need of procedure. In all cases document risk discussion with patient.

- Gastrointestinal or Interventional Radiology procedure?  
  - Yes
  - See Page 2 for Interventional Radiology Procedures
  - See Page 3 for Gastrointestinal Procedures
  - No

- Procedure requires discontinuation of dual antiplatelet therapy?  
  - Yes
  - Stent in place less than 1 year?  
    - Yes
    - Consult Cardiology (Interventional/Invasive) as soon as possible if patient scheduled for procedure  
    - Consult IMPAC as soon as possible for high risk procedures or medically complex patient  
    - Proceed only for time sensitive/urgent/emergent procedures  
    - For elective procedures, risks of delaying should outweigh risk of thrombosis\(^3\)
    - No
    - For complex coronary interventions/reinterventions and high thrombotic risk: consult Cardiology and/or IMPAC as soon as possible  
    - For low thrombotic risk: remain on aspirin and hold second antiplatelet medication (See Appendix B)
  - No
  - Continue with procedure

\(^1\)Includes bare metal and drug eluting stents; see Appendix A for drug eluting stents  
\(^2\)Dual antiplatelet therapy: aspirin plus one of the second antiplatelet agents listed in Appendix B  
\(^3\)Risk of thrombosis: 6% risk of perioperative stent thrombosis and 45% mortality for perioperative MI secondary to stent thrombosis
Patient able to proceed with procedure on dual antiplatelet therapy

Yes

Category 1: Low Risk

Continue with dual antiplatelet therapy and procedure

No

Stent in place less than 1 year?

Yes

Category 2: Moderate Risk

Refer to Cardiology (Interventional/Invasive) and/or IMPAC for consult

No

Category 2: Moderate Risk

Refer to IMPAC for consult

At time of IR Pre-Procedural Assessment:
- Continue aspirin
- May hold second antiplatelet agent for 5 days before procedure until seen by IMPAC

No

Category 3: High Risk

Process Risk

TREATMENT

Note: Per discussion with Cardiology (Interventional/Invasive) / IMPAC the risk of discontinuing antiplatelet medication should be considered in conjunction with the risk of the procedure followed by a discussion with the patient regarding the overall risk.

1 Dual antiplatelet therapy: aspirin plus one of the second antiplatelet agents listed in Appendix B
2 Interventional Radiology Procedure Risk Categories – See Appendix C
3 Risk of discontinuing antiplatelet medication will be evaluated by the Interventional/Invasive Cardiology group based on:

- Type of stent
- Comorbidities (i.e., diabetes, renal insufficiency)
- Size of vessel and location
- Imaging modality - OCT or IVUS at end of procedure
- Pressure deployed
- Acute or chronic setting of initial stent implantation

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Gastrointestinal Procedures

PATIENT PRESENTATION
(Inpatient or Outpatient)

Patient with cardiac stent on dual antiplatelet therapy and scheduled for gastrointestinal procedure

TREATMENT

Continue with dual antiplatelet therapy and procedure

- Refer to Cardiology (Interventional/Invasive) and IMPAC for consult

- Refer to Cardiology (Interventional/Invasive) and IMPAC for consult

- Continue aspirin

- Consider stopping second antiplatelet agent for 5 days before endoscopy

- Restart second antiplatelet agent the day following the procedure

1 Dual antiplatelet therapy: aspirin plus one of the second antiplatelet agents listed in Appendix B

2 Procedures stratified based on risk of bleeding

   Procedures with Low Risk of Bleeding
   - Diagnostic procedures with or without biopsy
   - Biliary or pancreatic stenting
   - Diagnostic endoscopic ultrasound
   - ERCP without sphincterotomy (to be further individualized based on discussion with endoscopist)
   - Endoscopic ultrasound without fine needle aspiration (to be further individualized based on discussion with endoscopist)
   - Capsule endoscopy

   Procedures with High Risk of Bleeding
   - Colonoscopic polypectomy
   - ERCP with sphincterotomy
   - Endoscopic mucosal resection or endoscopic submucosal dissection
   - Endoscopic dilatation of strictures on the upper or lower GI tract
   - Endoscopic therapy of varices
   - Percutaneous gastrostomy
   - Endoscopic ultrasound with fine needle aspiration (to be further individualized based on discussion with endoscopist)
   - Endoscopic ablative therapies (Barrx ablation or cryotherapy for Barrett’s and/or tumor ablation with argon plasma coagulator)

3 Risk of discontinuing antiplatelet medication will be evaluated by the Interventional/Invasive Cardiology group based on:
   - Type of stent
   - Comorbidities (i.e., diabetes, renal insufficiency)
   - Imaging modality - OCT or IVUS at end of procedure
   - Pressure deployed
   - Acute or chronic setting of initial stent implantation

Note: Per discussion with Cardiology (Interventional/Invasive) / IMPAC the risk of discontinuing antiplatelet medication should be considered in conjunction with the risk of the procedure followed by a discussion with the patient regarding the overall risk.

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APPENDIX A: FDA Approved Drug Eluting Stents

<table>
<thead>
<tr>
<th>Stent</th>
<th>Company</th>
<th>Date Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endeavor (zotarolimus)</td>
<td>Medtronic</td>
<td>2/2008</td>
</tr>
<tr>
<td>XIENCE V (everolimus)</td>
<td>Guidant/Abbott</td>
<td>7/2008</td>
</tr>
<tr>
<td>Promus (everolimus)</td>
<td>Boston Scientific</td>
<td>7/2008</td>
</tr>
<tr>
<td>Taxus Liberte (paclitaxel)</td>
<td>Boston Scientific</td>
<td>10/2008</td>
</tr>
<tr>
<td>ION (paclitaxel)</td>
<td>Boston Scientific</td>
<td>4/2011</td>
</tr>
<tr>
<td>Promus Element Plus (everolimus)</td>
<td>Boston Scientific</td>
<td>11/2011</td>
</tr>
<tr>
<td>Resolute Integrity (zotarolimus)</td>
<td>Medtronic</td>
<td>2/2012</td>
</tr>
<tr>
<td>Synergy (everolimus)</td>
<td>Boston Scientific</td>
<td>10/2015</td>
</tr>
</tbody>
</table>

APPENDIX B: Antiplatelet Agents

Dual antiplatelet therapy consists of aspirin and one of the second antiplatelet agents

- Aspirin
- **Second antiplatelet agent:**
  - Clopidogrel (Plavix®)
  - Ticagrelor (Brilinta™)
  - Prasugrel (Effient®)\(^1\)

Short-term agents administered parenterally:

- Glycoprotein IIb/IIIa inhibitors
- Abciximab (ReoPro®)\(^1\)
- Eptifibatide (Integrilin®)
- Tirofiban (Aggrastat®)\(^1\)

\(^1\) Not currently on UT MD Anderson Cancer Center Formulary

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APPENDIX C: Risk Categories for Interventional Radiology Procedures

<table>
<thead>
<tr>
<th>Category 1: Low Risk of Bleeding</th>
<th>Category 2: Moderate Risk of Bleeding</th>
<th>Category 3: High Risk of Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-tunneled venous access</td>
<td>Transjugular liver biopsy</td>
<td>Transjugular intrahepatic porto-systemic shunt</td>
</tr>
<tr>
<td>Central line removal (non-tunneled)</td>
<td>Tunneled central venous catheter placement or removal</td>
<td>Lung interventions: biopsy, drainage (parenchymal)</td>
</tr>
<tr>
<td>IVC filter placement or retrieval</td>
<td>Angiography, arterial intervention with access size up to 6 French</td>
<td>Solid organ biopsies</td>
</tr>
<tr>
<td>Drainage catheter exchange greater than 6 weeks (biliary, nephrostomy, abscess)</td>
<td>Trans-arterial embolotherapy</td>
<td>Solid organ drainage: nephrostomy, biliary, cholecystostomy</td>
</tr>
<tr>
<td>Thoracentesis</td>
<td>Venous interventions</td>
<td>Ablations: solid organs, bone, soft tissues, lung</td>
</tr>
<tr>
<td>Non-tunneled chest tube placement (pleural space)</td>
<td>Portal vein embolization and stenting</td>
<td></td>
</tr>
<tr>
<td>Paracentesis</td>
<td>Non-organ biopsy (e.g., retroperitoneal, vertebral, intra-abdominal)</td>
<td></td>
</tr>
<tr>
<td>Intraperitoneal catheter placement</td>
<td>Non-organ drainage (e.g., abdominal or retroperitoneal abscess)</td>
<td></td>
</tr>
<tr>
<td>Superficial (e.g., lymph nodes) or palpable mass biopsies</td>
<td>Drainage catheter exchange less than 6 weeks (biliary, nephrostomy, abscess)</td>
<td></td>
</tr>
<tr>
<td>Superficial abscess drainage</td>
<td>Gastrostomy tube placement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spine procedures: vertebroplasty, kyphoplasty</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tunneled drainage catheter placement (e.g., Denver catheter)</td>
<td></td>
</tr>
</tbody>
</table>

APPENDIX D: Peri-Procedure Antiplatelet Management

1. Aspirin 81 mg throughout perioperative period unless risk of perioperative bleeding outweighs risk of stent thrombosis
2. Hold second agent for 5 days prior to procedure
3. After procedure: administer second agent with a one-time loading dose if recommended by Cardiology (Interventional/Invasive) / IMPAC:
   - Clopidogrel loading dose 300 mg or
   - Ticagrelor loading dose 180 mg or
   - Prasugrel1 loading dose 60 mg
4. Resume maintenance dose on the following day after the loading dose:
   - Clopidogrel maintenance dose 75 mg daily or
   - Ticagrelor maintenance dose 90 mg twice daily to start 12 hours after loading dose or
   - Prasugrel1 maintenance dose 10 mg once daily

1 Not currently on UT MD Anderson Cancer Center Formulary

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APPENDIX E: Pulmonary Procedural Bleeding Risks

**Low Risk of Bleeding:**
- Diagnostic bronchoscopy airway exam
- Diagnostic bronchoscopy with BAL
- Thoracentesis

**Intermediate Risk of Bleeding:**
- Diagnostic bronchoscopy with EBUS TBNA
- Tunneled pleural catheter placement or removal

**High Risk of Bleeding:**
- Diagnostic bronchoscopy with transbronchial biopsy
- Diagnostic bronchoscopy with endobronchial biopsy
- Therapeutic bronchoscopy with endobronchial tumor destruction, stenosis relief, management of hemoptysis
- Pleuroscopy, pleural biopsy
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**SUGGESTED READINGS**


DEVELOPMENT CREDITS

This practice consensus algorithm is based on majority expert opinion of the Antiplatelet work group at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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