Management of Antiplatelet Therapy in Patients with Cardiac Stents Undergoing Procedures

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**PATIENT PRESENTATION**
(Inpatient or Outpatient)

Patient with cardiac stent on dual antiplatelet therapy in need of procedure. In all cases document risk discussion with patient.

- Gastrointestinal, interventional radiology, or pulmonary procedure?
  - Yes
  - Has stent been in place < 1 year?
    - Yes
      - Consult Cardiology (Interventional/Invasive) as soon as possible if patient scheduled for procedure
      - Consult POEM 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
    - No
      - Procedure requires discontinuation of dual antiplatelet therapy?
        - Yes
          - For complex coronary interventions/reinterventions and high thrombotic risk: consult Cardiology and/or POEM as soon as possible
          - For patients on vorapaxar: consult Cardiology and/or POEM as soon as possible
          - For low thrombotic risk: remain on aspirin and hold second antiplatelet medication as indicated in Appendix C
        - No
          - Continue with procedure
  - No
    - See Appendix D for Peri-Procedure Antiplatelet Management

POEM = Peri-operative Evaluation and Management Center

1 Includes bare metal and drug eluting stents; see Appendix A for FDA approved drug eluting stents
2 Dual antiplatelet therapy: aspirin plus one of the second antiplatelet agents listed in Appendix B
Note: The proceduralist determines whether the procedure can be performed safely while on dual antiplatelet therapy with risk of acceptable bleeding
3 Risk of thrombosis: 6% risk of perioperative stent thrombosis and 45% mortality for perioperative myocardial infarction secondary to stent thrombosis
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IR Procedures

**PATIENT PRESENTATION**
(Inpatient or Outpatient)

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

**PROCEDURE RISK**

- Low Risk
  - Yes
  - No

- High Risk
  - Yes
  - No

**TREATMENT**

- Continue with dual antiplatelet therapy and procedure
- Refer to Cardiology (Interventional/Invasive) and/or POEM for consult
- Refer to POEM for consult
- At time of IR pre-procedure assessment:
  - Continue aspirin
  - May hold second antiplatelet agent before procedure until seen by POEM as indicated in Appendix C

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1. Dual antiplatelet therapy: aspirin plus one of the second antiplatelet agents listed in Appendix B
2. IR Procedural Bleeding Risks – see Appendix E
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 – optical coherence tomography (OCT) or intravascular ultrasound (IVUS) at end of procedure
   - Pressure deployed
   - Acute or chronic setting of initial stent implantation

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GI Procedures

PATIENT PRESENTATION
(Inpatient or Outpatient)

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

Is patient able to proceed with procedure on dual antiplatelet therapy based on risk of bleeding?

Yes

- Low Risk

Continue with dual antiplatelet therapy\(^1\) and procedure

No

- Has stent been in place < 1 year?

Yes

- High Risk\(^2\)

Refer to Cardiology (Interventional/Invasive) and POEM for consult

No

- High Risk\(^2\)

See Appendix D for Peri-Procedure Antiplatelet Management

- Refer to Cardiology (Interventional/Invasive) and POEM for consult
- Continue aspirin
- Consider stopping second antiplatelet agent prior to procedure as indicated in Appendix C

Note: Per discussion with Cardiology (Interventional/Invasive) and POEM, the risk of discontinuing antiplatelet medication\(^3\) 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

\(^2\) GIProcedural Bleeding Risks – see Appendix F

\(^3\) Risk of discontinuing antiplatelet medication will be evaluated by the Interventional/Invasive Cardiology group based on:
- Type of stent
- Size of vessel and location
- 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

TREATMENT

Low Risk\(^2\)

Continue with dual antiplatelet therapy\(^1\) and procedure

High Risk\(^2\)

Refer to Cardiology (Interventional/Invasive) and POEM for consult

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

\(2\) GIProcedural Bleeding Risks – see Appendix F

\(3\) Risk of discontinuing antiplatelet medication will be evaluated by the Interventional/Invasive Cardiology group based on:
Pulmonary Procedures

PATIENT PRESENTATION
(Inpatient or Outpatient)

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

Is patient able to proceed with procedure on dual antiplatelet therapy? Yes / No

Has stent been in place < 1 year? Yes / No

PROCEDURE RISK

Low Risk

TREATMENT

Continue with dual antiplatelet therapy and procedure

High Risk

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

See Appendix D for Peri-Procedure Antiplatelet Management

Note: Per discussion with Cardiology (Interventional/Invasive) and POEM, 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 Pulmonary Procedural Bleeding Risks – see Appendix G
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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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>● Cypher™</td>
<td></td>
<td></td>
</tr>
<tr>
<td>○ Taxus®</td>
<td></td>
<td></td>
</tr>
<tr>
<td>○ Taxus Liberte™</td>
<td>Boston Scientific</td>
<td>10/2008</td>
</tr>
<tr>
<td>○ ION™</td>
<td>Boston Scientific</td>
<td>4/2011</td>
</tr>
<tr>
<td>Zotarolimus</td>
<td>Medtronic</td>
<td>2/2008</td>
</tr>
<tr>
<td>○ Endeavor®</td>
<td></td>
<td></td>
</tr>
<tr>
<td>○ Resolute Integrity™</td>
<td>Medtronic</td>
<td>2/2012</td>
</tr>
<tr>
<td>○ Resolute Onyx™</td>
<td>Medtronic</td>
<td>2/2018</td>
</tr>
<tr>
<td>Everolimus</td>
<td>Guidant/Abbott</td>
<td>7/2008</td>
</tr>
<tr>
<td>○ XIENCE V®</td>
<td>Boston Scientific</td>
<td>7/2008</td>
</tr>
<tr>
<td>○ Promus®</td>
<td></td>
<td></td>
</tr>
<tr>
<td>○ Promus Element™ Plus</td>
<td>Boston Scientific</td>
<td>11/2011</td>
</tr>
<tr>
<td>○ Synergy™</td>
<td>Boston Scientific</td>
<td>10/2015</td>
</tr>
<tr>
<td>○ Xience Sierra™</td>
<td>Abbott</td>
<td>5/2018</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®)
  - Vorapaxar (Zontivity®)

Short-term agents administered parenterally:

- Glycoprotein IIb/IIIa inhibitors
- Abciximab (ReoPro®)
- Eptifibatide (Integritin®)
- Tirofiban (Aggrastat®)

APPENDIX C: Recommended Hold Days for Second Antiplatelet Agents

<table>
<thead>
<tr>
<th>Second Antiplatelet</th>
<th>Recommended Hold Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clopidogrel (Plavix®)</td>
<td>5</td>
</tr>
<tr>
<td>Ticagrelor (Brilinta™)</td>
<td>5</td>
</tr>
<tr>
<td>Prasugrel (Effient®)</td>
<td>5</td>
</tr>
<tr>
<td>Vorapaxar (Zontivity®)</td>
<td>8</td>
</tr>
</tbody>
</table>

1 Not currently on UT MD Anderson Cancer Center formulary
Management of Antiplatelet Therapy in Patients with Cardiac Stents Undergoing Procedures

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APPENDIX D: Peri-Procedure Antiplatelet Management

- Aspirin 81 mg throughout peri-procedure period unless risk of peri-procedure bleeding outweighs risk of stent thrombosis
- If on dual anti-platelet therapy, hold second agent prior to procedure as indicated in Appendix C
- After procedure: administer second agent\(^1\) with a one-time loading dose if recommended by Cardiology (Interventional/Invasive)/POEM:
  - Clopidogrel loading dose 300 mg or
  - Ticagrelor loading dose 180 mg or
  - Prasugrel\(^2\) loading dose 60 mg
- Resume maintenance dose on the following day after the loading dose\(^1\):
  - Clopidogrel maintenance dose 75 mg daily or
  - Ticagrelor maintenance dose 90 mg twice daily to start 12 hours after loading dose or
  - Prasugrel\(^2\) maintenance dose 10 mg once daily

APPENDIX E: IR Procedural Bleeding Risks

<table>
<thead>
<tr>
<th>Low Risk of Bleeding</th>
<th>High Risk of Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-tunneled venous access</td>
<td>Transjugular liver biopsy</td>
</tr>
<tr>
<td>Central line removal (non-tunneled)</td>
<td>Tunneled central venous catheter placement or removal</td>
</tr>
<tr>
<td>IVC filter placement or retrieval</td>
<td>Angiography, arterial intervention with access size up to 6 French</td>
</tr>
<tr>
<td>Drainage catheter exchange greater than 6 weeks (biliary, nephrostomy, abscess)</td>
<td>Trans-arterial embotherapy</td>
</tr>
<tr>
<td>Thoracentesis</td>
<td>Venous interventions</td>
</tr>
<tr>
<td>Non-tunneled chest tube placement (pleural space)</td>
<td>Portal vein embolization and stenting</td>
</tr>
<tr>
<td>Paracentesis</td>
<td>Non-organ biopsy (e.g., retroperitoneal, vertebral, intra-abdominal)</td>
</tr>
<tr>
<td>Intraproteroneal catheter placement</td>
<td>Non-organ drainage (e.g., abdominal or retroperitoneal abscess)</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>
</tr>
<tr>
<td>Superficial abscess drainage</td>
<td>Gastrostomy tube placement</td>
</tr>
</tbody>
</table>

\(^1\) Consult Cardiology (Interventional/Invasive) and/or POEM for post procedure management of vorapaxar

\(^2\) Not currently on UT MD Anderson Cancer Center formulary
APPENDIX F: GI Procedural Bleeding Risks

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

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
- Treatment of varices
- Endoscopy hemostasis
- 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)

APPENDIX G: Pulmonary Procedural Bleeding Risks

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

High Risk of Bleeding:
- Diagnostic bronchoscopy with EBUS TBNB
- Tunneled pleural catheter placement or removal
- Diagnostic bronchoscopy with transbronchial biopsy
- Diagnostic bronchoscopy with endobronchial biopsy
- Therapeutic bronchoscopy with endobronchial tumor destruction, stenosis relief, management of hemoptysis
- Pleuroscopy, pleural biopsy

BAL = bronchial alveolar lavage
EBUS TBNB = endobronchial ultrasound-guided needle aspiration

ERCP = endoscopic retrograde cholangiopancreatography
SUGGESTED READINGS


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DEVELOPMENT CREDITS

This practice consensus statement is based on majority opinion of the Management of Antiplatelet Therapy in Patients with Cardiac Stents Undergoing Procedures work group at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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