QUALITY IN ENDOSCOPY: ERCP

Anti-platelet agents, anti-coagulants and coagulation disorders

Jeanin van Hooft, MD, PhD
Academic Medical Center, University of Amsterdam, The Netherlands
Anti-platelet agents, anti-coagulants and coagulation disorders

- Introduction
- Procedure-related bleeding risk
- Condition-related thrombotic risk
- Anti-platelet agents
- Anti-coagulants
- Coagulation disorders
- Questions to be answered
# Procedure-related bleeding risk

## High-risk procedures ≥ 1%
- Polypectomy
- **Biliary or pancreatic sphincterotomy** 2.0-3.2%
- Pneumatic or bougie dilation
- PEG placement
- Therapeutic balloon-assisted enteroscopy
- EUS with FNA
- Endoscopic hemostasis
- Tumor ablation by any technique
- Cystogastrostomy
- Treatment of varices

## Low-risk procedures <1%
- Diagnostic endoscopy incl biopsy
- **ERCP without sphincterotomy** 0.26%
- EUS without FNA
- Diagnostic balloon-assisted enteroscopy
- Capsule endoscopy
- Enteral stent deployment

Ref. 1, 2, 3
Anti-platelet agents, anti-coagulants and coagulation disorders

**Procedure-related bleeding risk**

- **Influencing factors**
  - Patient specific
    - Cholangitis
    - Hemodialysis
  - Medication
  - Type of procedure
    - Adjustments
      - Blended rather than pure-cutting current (grd A)
      - Temporary stent placement
  - Endoscopist case volume

*Ref. 1, 2*
# Anti-platelet agents, anti-coagulants and coagulation disorders

## Condition-related thrombotic risk

### High-risk conditions

- Atrial fibrillation associated with valvular heart disease
- Atrial fibrillation associated with congestive heart failure or a left ventricular ejection fraction of < 35%
- Atrial fibrillation associated with a history of thrombotic event
- Atrial fibrillation associated with hypertension, diabetes, or age < 75 years
- Mechanical valves in the mitral position
- Mechanical valves in patients who have had a prior thrombotic event
- Coronary stents placed within one year*
- Acute coronary syndrome
- Nonstented percutaneous coronary intervention after myocardial infarction

### Low-risk conditions

- Deep vein thrombosis
- Chronic or paroxysmal atrial fibrillation that is not associated with valvular disease
- Bioprosthetic valves
- Mechanical valves in aortic position

*Especially drug eluted stents

Ref. 1, 2, 3
Anti-platelet agents, anti-coagulants and coagulation disorders

**Condition-related thrombotic risk**

- Some facts on thrombotic risks
  - Risk of major embolic event for mechanical valve
    - 4 per 100 patient-years
    - 2.2 per 100 patient-years
    - 1 per 100 patient-years
  - Risk of major embolic event for atrial fibrillation

Ref. 2, 3

Quality in Endoscopy: ERCP, Munich 2011
### Table 4. CHADS$_2$ score

<table>
<thead>
<tr>
<th>Clinical parameters</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive heart failure</td>
<td>1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Age ≥75 years</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1</td>
</tr>
<tr>
<td>Secondary prevention in patients with previous ischemic stroke, transient ischemic attack</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHADS$_2$ score</th>
<th>Stroke rate (per 100 patient-years) without antithrombotic therapy</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.9</td>
<td>1.2–3.0</td>
</tr>
<tr>
<td>1</td>
<td>2.8</td>
<td>2.0–3.8</td>
</tr>
<tr>
<td>2</td>
<td>4.0</td>
<td>3.1–5.1</td>
</tr>
<tr>
<td>3</td>
<td>5.9</td>
<td>4.6–7.3</td>
</tr>
<tr>
<td>4</td>
<td>8.5</td>
<td>6.3–11.1</td>
</tr>
<tr>
<td>5</td>
<td>12.5</td>
<td>8.2–17.5</td>
</tr>
<tr>
<td>6</td>
<td>18.2</td>
<td>10.5–27.4</td>
</tr>
</tbody>
</table>
Anti-platelet agents, anti-coagulants and coagulation disorders

Condition-related thrombotic risk

- Some facts on thrombotic risks
  - Risk of major embolic event for mechanical valve
    - 4 per 100 patient-years
    - 2.2 per 100 patient-years
    - 1 per 100 patient-years
  - Risk of major embolic event for atrial fibrillation
  - Risk of embolic event due to interruption of anti-coagulants
    - 1% 4-7 days interruption

Ref. 2, 3
Anti-platelet agents, anti-coagulants and coagulation disorders

Anti-platelet agents
Anti-platelet agents, anti-coagulants and coagulation disorders

Anti-platelet agents

- Drug class:
  - Aspirin (acetylsalicylic acid)
  - Dipyridamole
    - Persantin
  - Thienopyridines
    - Clopidogrel (Plavix)
    - Prasugrel
    - Ticlopidine
  - Glycoproteine IIb/IIIa
    - Abciximab (Reopro)
    - Eptifibatide
Anti-platelet agents, anti-coagulants and coagulation disorders

**Anti-platelet agents**

- **Mechanism:**
  - Interfere with the initiation and formation of platelet plugs (primary hemostasis)

<table>
<thead>
<tr>
<th>Anti-platelet agent</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>TX A2 inhibitor</td>
</tr>
<tr>
<td>Dipyridamole</td>
<td>AMP activator</td>
</tr>
<tr>
<td>Thienopyridines</td>
<td>ADP receptor antagonist</td>
</tr>
<tr>
<td>GP IIb/IIIa</td>
<td>GP IIb/IIIa receptor antagonist</td>
</tr>
</tbody>
</table>

![Diagram of platelet activation](image)
### Anti-platelet agents

- **Duration of action and reversal**

<table>
<thead>
<tr>
<th>Drug class</th>
<th>Duration of action</th>
<th>Elective</th>
<th>Urgent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aspirin</strong></td>
<td>10 days</td>
<td>NA</td>
<td>Transfuse platelets</td>
</tr>
<tr>
<td><strong>Dipyridamole</strong></td>
<td>2-3 days</td>
<td>Hold</td>
<td>Transfuse platelets</td>
</tr>
<tr>
<td><strong>Thienopyridines</strong></td>
<td>3-7 days</td>
<td>Hold</td>
<td>Transfuse platelets</td>
</tr>
<tr>
<td><strong>Glycoproteine IIb/IIIa</strong></td>
<td>2-48 hours</td>
<td>NA</td>
<td>Transfuse platelets</td>
</tr>
</tbody>
</table>

*Ref. 2, 3*
Anti-platelet agents, anti-coagulants and coagulation disorders

**Anti-platelet agents**

- Vascular stents and dual anti-platelets therapy (DAT) (Aspirin + Thienopyridines)
  - Bare metal stents
    - At least 4-6 weeks DAT
    - High risk procedures after 4-6 weeks → monotherapy (aspirin)
  - Drug eluted stent (DES)
    - At least 12 months DAT
    - High risk procedures after 12 months → monotherapy (aspirin)

*Ref. 2, 3, 4, 6*
## Anti-platelet agents

### Recommendations:

<table>
<thead>
<tr>
<th>Drug class</th>
<th>Low-risk procedure</th>
<th>High-risk procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>Continue</td>
<td>Continue*</td>
</tr>
<tr>
<td>Dipyridamole</td>
<td>Continue</td>
<td>Continue**</td>
</tr>
<tr>
<td>Thienopyridines</td>
<td>Continue</td>
<td>Postpone Adjust treatment Discontinue (LTR)</td>
</tr>
<tr>
<td>Glucoproteine IIb/IIla</td>
<td>NR</td>
<td>NR</td>
</tr>
</tbody>
</table>

* consider indication
** safety unknown
LTR = Low Thrombotic Risk
NR = No Recommendation

Ref. 1, 2, 3, 5
Anti-platelet agents, anti-coagulants and coagulation disorders

Anti-coagulants
**Anti-coagulants**

- **Drug class:**
  - Vitamin K Antagonist (VKA)
    - Warfarin (USA & UK)
    - Acenocoumarol
    - Phenprocoumon
  - Heparin (unfractionated)
  - LMWH
  - Factor Xa inhibitor
    - Rivaroxaban
  - Thrombin inhibitor
    - Dabigatran

Next generation drugs
Anti-platelet agents, anti-coagulants and coagulation disorders

Anti-coagulants

- Mechanism:
  - Interfere with the fibrin formation (secondary hemostasis)
### Anti-coagulants

- **Duration of action and reversal**

<table>
<thead>
<tr>
<th>Drug class</th>
<th>Duration of action</th>
<th>Routes of reversal</th>
<th>Elective</th>
<th>Urgent</th>
</tr>
</thead>
<tbody>
<tr>
<td>VKA</td>
<td>3-5 days</td>
<td>Hold</td>
<td>FFP ± vit K PCC</td>
<td></td>
</tr>
<tr>
<td>Heparin</td>
<td>4-6 hours</td>
<td>Hold</td>
<td>Hold Protamine</td>
<td></td>
</tr>
<tr>
<td>LMWH</td>
<td>12-24 hours</td>
<td>Hold</td>
<td>Hold Protamine</td>
<td></td>
</tr>
<tr>
<td>NGD</td>
<td>24 hours</td>
<td>Hold</td>
<td>None VIIa*</td>
<td></td>
</tr>
</tbody>
</table>

*FFP = Fresh Frozen Plasma
PCC = Prothrombin Complex Concentrate
NGD = Next Generation Drugs
* Under investigation

Ref. 2, 3
Anti-platelet agents, anti-coagulants and coagulation disorders

Anti-coagulants

• Bridge therapy in endoscopy
  – Indication
    • Only in high thrombotic risk conditions
  – Methods
    • Guidelines AHA/ACC: recommend Heparin but state that LMWH may be considered
      – Hold VKA
      – If INR ≤ 2.0 start Heparin
      – Stop Heparin 4-6 hours before procedure
      – Resume Heparin 2-6 hours after procedure
      – Resume VKA evening of procedure
Anti-coagulants

- Guidelines ACCP: recommend LMWH though limited data and controversy in patients with mechanical valve.
  - Hold VKA
  - If INR ≤ 2.0 start LMWH
  - Stop LMWH 8-24 hours before procedure
  - Resume LMWH 24 hours after procedure
  - Resume VKA evening of procedure
**Anti-platelet agents, anti-coagulants and coagulation disorders**

**Anti-coagulants**

- **Recommendations:**

<table>
<thead>
<tr>
<th>Drug class</th>
<th>Low-risk procedure</th>
<th>High-risk procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>VKA</td>
<td>Continue</td>
<td>Discontinue (Consider bridge therapy)</td>
</tr>
<tr>
<td>Heparin</td>
<td>NR</td>
<td>Discontinue</td>
</tr>
<tr>
<td>LMWH</td>
<td>Continue</td>
<td>Discontinue</td>
</tr>
<tr>
<td>NGD</td>
<td>NR</td>
<td>NR</td>
</tr>
</tbody>
</table>

*NR=No Recommendation*
Anti-platelet agents, anti-coagulants and coagulation disorders

Coagulation disorders
Coagulation disorders

- Type of coagulation disorders (main)
  - Von Willebrand disease
    - ↓Platelet adhesion and aggregation
    - ↓Half-life factor VIII
  - Hemophilia A
    - ↓Factor VIII
  - Hemophilia B
    - ↓Factor IX
Coagulation disorders

- **Recommendation:**

<table>
<thead>
<tr>
<th>Coagulation disorder</th>
<th>Low-risk procedure</th>
<th>High-risk procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Von Willebrand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type I</td>
<td>Desmopressin</td>
<td>Replacement of VWF</td>
</tr>
<tr>
<td>Type II</td>
<td>Replacement of VWF</td>
<td>Replacement of VWF</td>
</tr>
<tr>
<td>Type III</td>
<td>Replacement of VWF</td>
<td>Replacement of VWF</td>
</tr>
<tr>
<td>Hemophilia A</td>
<td>Replacement of VIII</td>
<td>Replacement of VIII</td>
</tr>
<tr>
<td>Hemophilia B</td>
<td>Replacement of IX</td>
<td>Replacement of IX</td>
</tr>
</tbody>
</table>

Ref. 7
Anti-platelet agents, anti-coagulants and coagulation disorders

Questions to be answered

• Is there really an indication?
• What is the bleeding risk of the intended intervention?
  – Do I need to perform a sphincterotomy?
• What is the bleeding risk related to this patient?
  – Do I know patient's medical history and medication?
• What is the thrombotic risk of this patient?
• What is the urgency of the procedure?
• Can risks be avoided?
  – Alternative therapy?
  – Adjustment of medication?
Thanks for your attention
Reference List


