ทวีปที่ ๒๔ พฤศจิกายน พ.ศ.๒๕๕๕
ยิ่งยง ชินธรรมมิตร์
ศิริราช

Clinical Approach to Bleeding

- Local vs. Systemic bleeding vs. Mixed
- Primary vs. Secondary hemostatic defect vs. Mixed
- Congenital vs. Acquired vs. Mixed

eg, Myoma uteri, injured artery, tumor bleed, Peptic ulcer, telangiectasia, angiodysplasia
**Systemic Bleeding**

<table>
<thead>
<tr>
<th></th>
<th>Primary (PLT, Bl.vv.)</th>
<th>Secondary (Coag. F)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Congenital</strong></td>
<td>Glanzmann thrombasthenia, Bernard-Soulier synd, CNT dis</td>
<td>Hemophilia, def. of FXI, V, VII, X, I, V+VIII, etc.</td>
</tr>
<tr>
<td><strong>Acquired</strong></td>
<td>AA, AL, ITP, TTP, APDE, uremia, antiplatelet</td>
<td>warfarin, heparin, vit. K def, FVIII inhibitor</td>
</tr>
</tbody>
</table>

**Prolonged PT, normal APTT**

**Congenital**
- F7 def  →  F7 assay

**Acquired**
- Liver dis
- Warfarin
- Vit. K def
- DIC – clinical, d-dimer, fibrinogen
- Def. of fibrinogen
- F7 inhibitor – mixing test

**Normal PT, prolonged APTT**

**Congenital**
- Factor assay
- Def of F8, 9, 11, 12;
- vWD

**Acquired**
- Heparin → Hx
- Inhibitor of F8, 9, 11, 12
- Lupus anticoagulant

**Clinical, specific test**

**Prolonged APTT, Normal PT**

<table>
<thead>
<tr>
<th><strong>Bleeding</strong></th>
<th><strong>No bleeding</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixing test</td>
<td>Mixing test</td>
</tr>
</tbody>
</table>

**Correctable?**

- Yes
  - Def of F8, 9, 11
  - vWD
- No
  - F8 inhibitor
  - Inhibitor of F9, 11

- Yes
  - F12 def
  - Def of HMWK, PK
- No
  - lupus anticoagulant
Mixing Test (1:1)

<table>
<thead>
<tr>
<th>Incubation Mixture</th>
<th>15 min</th>
<th>30 min</th>
<th>1 hr</th>
<th>2 hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal plasma alone</td>
<td>32</td>
<td>32</td>
<td>36</td>
<td>40</td>
</tr>
<tr>
<td>Normal plasma plus - FVIII def. plasma (no inhibitor)</td>
<td>37</td>
<td>37</td>
<td>41</td>
<td>45</td>
</tr>
<tr>
<td>- plasma + inh. 1 BU</td>
<td>37</td>
<td>38</td>
<td>45</td>
<td>53</td>
</tr>
<tr>
<td>- plasma + inh. 5 BU</td>
<td>43</td>
<td>47</td>
<td>55</td>
<td>64</td>
</tr>
<tr>
<td>- plasma + inh. 20 BU</td>
<td>54</td>
<td>61</td>
<td>77</td>
<td>92</td>
</tr>
</tbody>
</table>

Prolonged PT, prolonged APTT

- Def of F10,5,2,1,5+8
- Acquired
  - DIC
  - Liver dis
  - Warfarin
  - Vit. K def
  - Heparin high dose
  - Snake venom
  - Inhibitor of F10,5,2,1
  - Paraproteinemia
  - Amyloidosis (F10 def)

Case Study 1

M 77 yr, large palpable ecchymoses
- PT 82.5 sec (9.9 – 12.7); INR = 8.64
- aPTT 84.7 sec (22.4 – 31.6)
- Platelet adequate
- Never bleed

Most likely Dx?
### Case Study 2

F 55 yr  
- Nephrotic syndrome  
- Plan kidney Bx  
- PT 10 sec (9-12)  
- APTT 42 sec (22-30)  
- Never bleed  
- Dx?  

- Mixing APTT (1:1) 27 sec  

Most likely Dx? FFP?

### Case Study 3

M 66 y  
- CVT consult Med  
- Postop (D3) AVR  
- Bleeding via ICD  
- Off heparin iv 12 hr  
- PRC, FFP, cryo.  
- PT 22 sec (9-12)  
- APTT >180 sec  
- Most likely Dx? Mx?

### Case Study 4

M 62 y  
- Multiple myeloma  
- Fracture humerus  
- PT 14 sec (9-12)  
- APTT 35 sec (22-30)  
- Never bleed  
- Management?

### Case Study 5

F 26 yr  
- SLE 1 yr  
- spont. ecchymosis, hemothorax  

- PT 37.8 sec (control 13.5)  
- Mixing PT (1:1) 14.7  
- APTT 72.5 sec (control 28.4)  
- Mixing APTT (1:1) 32.7  
- TT 17.9 sec (control 17.6)  
- LA +ve

Most likely Dx?  
Most proper Ix?
Case Study 6

M 27 y
- Ecchymosis
- No other symptom
- CBC normal
- PT & PTT normal
Lab outside hospital
- vWF Rco 35% (50-150)
- FVIII = 38%

Case Study 7

F 30 y
- Preg G3P2
- Vaginal delivery
- ทำหนามแผลไม่เลือด
- Platelet adequate
- PT 10 sec (9-12)
- APTT 46 sec (22-30)
- Never bleed (Surgery, dental extraction)

Case Study 8

M 75 y
- HT, DLP, CAD
- Easy large ecchymosis
- Check before dental procedure
- Platelet 81,000
- PT 14.3 (10-13)
- APTT 29.3 (22.0-32.4)
- Normal LFT
- no risk of vit. K def

Good Blood Sample?

- Correct anticoagulation?...3.2% citrate
- Tube properly filled?... Adeq. bl. vol., correct sequence of tubes filling
- Collected through venous line?...heparin !!
- Hct >55%?...excess citrate !!
- Sample clotted? Hemolyzed?
- Plasma – platelet-poor?... LA false -ve
- Time from blood draw to analysis?...F8, vWF activity, protein S; APTT ratio in heparin monitoring
Case Study 9

F 23 y, OPD case
• Preg, G1P0
• Plan C/S
• CBC – normal
• PT 10 sec (9-12)
• **APTT 120 sec**
• Never bleed on dental procedure
• No family Hx of bleed

Most likely Dx?
Mx?

Mixing APTT (1:1)
27 sec (22-30)