Management of Coagulopathy in Obstetrics

September 21th, 2012
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UCSF Department of Anesthesia

Objectives
- Overview Coagulation Disorders
- Coagulation in Pregnancy
- Bleeding Disorders in Pregnancy
  - Thrombocytopenia
  - von Willebrand Disease
  - Hemophilias
- Anticoagulant Therapy
- Alternatives to Epidural Analgesia

What is the US Epidural Rate?

More moms choose to limit childbirth pain
As many as 90 percent of births at Chicagoland hospitals may include use of an epidural analgesia
April 25, 2012 | By Leslie Mann, Special to the Tribune
Contraindications to Epidural & Spinal Anesthesia

- Patient Refusal or Inability to Cooperate
- Increased ICP from Mass Lesion
- Skin or Tissue Infection at Needle Placement Site
- Uncorrected Maternal Hypovolemia
- Inadequate Experience with Technique
- Frank Coagulopathy

Chestnut’s or Obstetric Anesthesia 2009, 4th Edition, pg. 431

- 27 States Included
- Overall US Epidural Rate is 61% in 2008
- First Births 68.1%
- Ranges By State From 72% to 22%
- California is 42.5%
Hemostatic Changes

Factors VII, VIII, X, XII, vWF and plasma fibrinogen (I) are increased after the 3rd month

Factors II, V, and IX are unchanged or slightly increased

Factors XI and XIII are decreased

20% decrease in platelet count doesn’t increase bleeding time

PT and PTT decreased 20%

AT3 decreased

Thrombocytopenia in Pregnancy

<table>
<thead>
<tr>
<th>Pregnancy-related</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational (or incidental, 75%)</td>
<td>Spurious (EDTA-induced platelet aggregation) Send a citrate sample to exclude this</td>
</tr>
<tr>
<td>Pre-eclampsia (PET)</td>
<td>Autoimmune immune thrombocytopenic purpura, drug-induced, systemic lupus erythematosus, anticardiolipin syndrome)</td>
</tr>
<tr>
<td>Haemolysis, elevated liver enzymes and low platelet (HELLP syndrome)</td>
<td>Viral, e.g. HIV, EBV, CMV von Willebrand type IB disease</td>
</tr>
<tr>
<td>Disseminated intravascular coagulation</td>
<td>Haemolytic uraemic syndrome/thrombotic thrombocytopenic purpura</td>
</tr>
<tr>
<td>Acute fatty liver</td>
<td>Congenital/marrow disease/hypersplenism/liver disease</td>
</tr>
<tr>
<td>Folate deficiency</td>
<td>Drugs (not low molecular weight heparins)</td>
</tr>
</tbody>
</table>

Gestational Thrombocytopenia

- Affects 5% Pregnancies
- Platelet counts typically > 70,000/µL
- 70% of cases platelets are > 130,000/µL
- Typically occurs in the 3rd trimester
- Brief course of corticosteroids may be administered

Immune Thrombocytopenia (ITP)

- ITP occurs 1 to 2 in every 1000 pregnancies
- Can be difficult to distinguish from benign gestational thrombocytopenia
- Insufficient production & increased destruction
- May be idiopathic or secondary to meds, malignancies, viral, or autoimmune
- Severe neonatal thrombocytopenia in 9% - 15%
- Neonatal intracranial hemorrhage in 1% to 2%
Immune Thrombocytopenia (ITP)

- Diagnosis of exclusion
- Thrombocytopenia in nonpregnant state
- Blood smear with normal red cell morphology
- Normal LFTs, PT, PTT
- Mean platelet count below 70,000/µL


Immune Thrombocytopenia (ITP)

- Glucocorticoids are first line treatment
- If steroid resistant, intravenous immunoglobulin
- High dose IVIg over 2 to 5 days effective in raising platelet count over several days but transient
- Anti-RhD may be considered if IVIg ineffective
- Splenectomy reserved for severe refractory ITP


Practice Patterns of Anesthesiologists Regarding Situations in Obstetric Anesthesia Where Clinical Management Is Controversial

Yaakov Beilin, MD, Carol A. Bodian, DrPH, Elizabeth M. Haddad, BS, and Andrew B. Leibowitz, MD

(Anesth Analg 1996;83:735–41)

1. Would place an epidural anesthetic in an otherwise healthy parturient with the following platelet count?

<table>
<thead>
<tr>
<th>Platelet Count</th>
<th>Academic</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>100,000 – 150,000</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>80,000 – 99,000</td>
<td>66%</td>
<td>55%</td>
</tr>
<tr>
<td>50,000 – 79,000</td>
<td>16%</td>
<td>9%</td>
</tr>
<tr>
<td>&lt; 50,000</td>
<td>2%</td>
<td>0%</td>
</tr>
</tbody>
</table>

No published evidence suggests a specific platelet count predicts risk of epidural hematoma.

CONSIDERATIONS
- Bleeding History
- Clinical evidence of bleeding?
- Medications promoting bleeding?
- Recent platelet count?
- Recent change in platelet count?
- Platelet quality?
- Levels of other coagulation factors?
- DIC?
- Risks vs benefits of neuraxial block
**Von Willebrand Disease**

- Most common hereditary bleeding disorder
- Deficiency of vWF and decreased FVII activity
- Workup: CBC, Coags, fibrinogen, PFA-100
- Heme Consult and specific assays:
  - vWF antigen (vWF:Ag)
  - vWF activity ristocetin cofactor (VF:Rco)
  - vWF:RCo/vWF:Ag
  - Factor VIII cofactor activity
  - vWF gel electrophoresis
  - vWF and Factor VIII binding assay
  - Low-dose ristocetin-induced platelet aggregation test (RIPA)


**Hemophilia**

- Hemophilia A (FVIII) and B (FIX) are X-linked recessive
- Women can be carriers, usually asymptomatic as factor levels exceed 50%
- Recombinant factor replacement should be considered if levels less than 50IU/L
Indications for Anticoagulation

- Prophylaxis and treatment of VTE
- Prevention of embolism from mechanical heart valves
- Prevention of recurrent pregnancy loss in patients with thrombophilias

Rates of spinal hematoma in obstetrics range between:
1 in 50,000 to less than 1 in 200,000

Anticoagulants likely increase the risk of spinal hematoma following neuraxial blockade.

The true rate of hematoma formation in obstetric patients receiving anticoagulants remains unknown.

Before Neuraxial Block or Catheter Withdrawal

<table>
<thead>
<tr>
<th>Drug</th>
<th>US</th>
<th>Europe</th>
<th>Nordic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heparin (SC)</td>
<td>None&lt;sup&gt;10K/d&lt;/sup&gt;</td>
<td>4-6h&lt;sup&gt;15K/d&lt;/sup&gt;</td>
<td>N/A</td>
</tr>
<tr>
<td>Heparin (IV) (+PTT or ACT)</td>
<td>2-4h</td>
<td>4h</td>
<td>3-4h</td>
</tr>
<tr>
<td>LMWH (prophylactic)</td>
<td>10-12h</td>
<td>12h</td>
<td>10h</td>
</tr>
<tr>
<td>LMWH (treatment)</td>
<td>24h</td>
<td>24h</td>
<td>24h</td>
</tr>
<tr>
<td>Fondaparinux (&lt;2.5mg/d)</td>
<td>N/A</td>
<td>36-42h</td>
<td>36h</td>
</tr>
<tr>
<td>Aspirin</td>
<td>None</td>
<td>None</td>
<td>12h</td>
</tr>
<tr>
<td>Clopidogrel</td>
<td>7 days</td>
<td>7 days</td>
<td>5 days</td>
</tr>
<tr>
<td>Ticlopidine</td>
<td>14 days</td>
<td>10 days</td>
<td>5 days</td>
</tr>
<tr>
<td>Warfarin (INR)</td>
<td>Normal&lt;sup&gt;B&lt;/sup&gt; &lt;1.5&lt;sup&gt;W&lt;/sup&gt;</td>
<td>&lt;1.4</td>
<td>&lt;1.2–1.8&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Nordic guidelines for neuraxial blocks in disturbed haemostasis from the Scandinavian Society of Anaesthesiology and Intensive Care Medicine

Acta Anaesthesiol Scand 2010; 54: 16–41

Regional Anesthesia in the Patient Receiving Antithrombotic or Thrombolytic Therapy
American Society of Regional Anesthesia and Pain Medicine Evidence-Based Guidelines (Third Edition)
Regional Anesthesia and Pain Medicine • Volume 35, Number 1, January-February 2010

Regional anaesthesia and antithrombotic agents: recommendations of the European Society of Anaesthesiology
Wielke Gagarten, Erik Vandermeulen, Hugo Van Aken, Sibylle Koeck, Juan V. Liu and Charles M. Samama
European Journal of Anaesthesiology 2010, Vol 27 No 12
### After Neuraxial Block or Catheter Withdrawal

<table>
<thead>
<tr>
<th>Drug</th>
<th>US</th>
<th>Europe</th>
<th>Nordic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heparin (SC)</td>
<td>0–1h</td>
<td>1h</td>
<td>N/A</td>
</tr>
<tr>
<td>Heparin (IV)</td>
<td>1h</td>
<td>1h</td>
<td>1–5/6h</td>
</tr>
<tr>
<td>LMWH (prophylactic)</td>
<td>6–8h/2h</td>
<td>4h</td>
<td>6h</td>
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<tr>
<td>LMWH (treatment)</td>
<td>24h/2h</td>
<td>4h</td>
<td>6h</td>
</tr>
<tr>
<td>Fondaparinux (&lt;2.5mg/d)</td>
<td>N/A</td>
<td>6–12h</td>
<td>6h</td>
</tr>
<tr>
<td>Aspirin</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Clopidogrel</td>
<td>-</td>
<td>After</td>
<td>After</td>
</tr>
<tr>
<td>Ticlopidine</td>
<td>-</td>
<td>After</td>
<td>After</td>
</tr>
<tr>
<td>Warfarin (INR)</td>
<td>-</td>
<td>After</td>
<td>After</td>
</tr>
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</table>

### Labor Analgesia Options / Efficacy

<table>
<thead>
<tr>
<th>Method</th>
<th>% Using</th>
<th>Very Helpful</th>
<th>Some Helpful</th>
<th>Not Very Helpful</th>
<th>Not Helpful</th>
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<tbody>
<tr>
<td>Epidural</td>
<td>63</td>
<td>78</td>
<td>15</td>
<td>3</td>
<td>4</td>
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<tr>
<td>Tub Immersion</td>
<td>6</td>
<td>49</td>
<td>41</td>
<td>10</td>
<td>1</td>
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<tr>
<td>Shower</td>
<td>8</td>
<td>32</td>
<td>52</td>
<td>13</td>
<td>2</td>
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<td>Birth Ball</td>
<td>5</td>
<td>32</td>
<td>52</td>
<td>13</td>
<td>2</td>
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<tr>
<td>Nitrous Oxide</td>
<td>2</td>
<td>30</td>
<td>22</td>
<td>21</td>
<td>26</td>
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<td>30</td>
<td>52</td>
<td>13</td>
<td>6</td>
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<tr>
<td>Opioids</td>
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<td>24</td>
<td>42</td>
<td>20</td>
<td>9</td>
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<td>Mental Strategy</td>
<td>30</td>
<td>22</td>
<td>52</td>
<td>18</td>
<td>5</td>
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<td>Compress</td>
<td>15</td>
<td>21</td>
<td>62</td>
<td>14</td>
<td>3</td>
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<tr>
<td>Breathing</td>
<td>61</td>
<td>21</td>
<td>48</td>
<td>21</td>
<td>10</td>
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<tr>
<td>Position Change</td>
<td>60</td>
<td>19</td>
<td>60</td>
<td>16</td>
<td>5</td>
</tr>
</tbody>
</table>

Maternity Center Association: Listening to Mothers Survey 2002
**Remifentanil and Pregnancy**

- The placenta contains nonspecific esterases
- Fetal esterases nearly fully developed at birth
- Remifentanil can be turned off minutes before delivery without fetal respiratory depression
- Plasma concentrations in pregnancy are ½ of non-pregnancy due to a larger volume of distribution and higher clearance


**Side Effects of Remifentanil:**

- Mild transient maternal desaturation
- Mild sedation
- Nausea and vomiting (0% to 60%)
- No notable neonatal effects (APGARS and cord gases all WNL)
- No neonate needed naloxone
- Low incidence of FHR abnormalities (no intervention)


**RCT Remifentanil vs. Epidural**

Implementation:

- Remifentanil in standard concentration
- Have a *standardized* order set
- Initial patient controlled dose starts at either 20 mcg/injection or 0.25 mcg/kg and increases by 10 mcg until desired effect.
- Lockout of PCA q2 minutes, no basal rate
- All patients need supplemental O2
- Pediatricians present at delivery

Summary

- Significant bleeding disorders warrant a multidisciplinary approach with colleagues in obstetrics and hematology
- Decision of how to proceed in patients on anticoagulation must be individualized with risk/benefit
- Remifentanil represents a potential alternative for patients unable to receive neuraxial analgesia