Epidural Blood Patch for Post-dural Puncture Headache

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Wake Forest University Division of Obstetric Anesthesia

- Forsyth Medical Center
- Started 1977
- 9 Full time OB anesthesiologists
- 11 nurse anesthetists
- 4-5 residents/month
- 2 SRNAs
- 2 technicians

Forsyth Medical Center Women’s Center Stats 2006

<table>
<thead>
<tr>
<th>Total Deliveries</th>
<th>6,655</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal</td>
<td>4,899 (74%)</td>
</tr>
<tr>
<td>C/S</td>
<td>1,756 (26%)</td>
</tr>
<tr>
<td># GYN procedures</td>
<td>3,203</td>
</tr>
</tbody>
</table>

FHM Women’s Center 2006

<table>
<thead>
<tr>
<th>Vaginal Delivery</th>
<th>Total # 4,899</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Reg Analgesia</td>
<td>3,991 (81.5%)</td>
</tr>
<tr>
<td>Epidural</td>
<td>2,595 (65%)</td>
</tr>
<tr>
<td>Combined spinal- epidural (CSE)</td>
<td>1,396 (35%)</td>
</tr>
</tbody>
</table>

Complications will occur,
They must be recognized and treated.
Finding patient complications

Dr. Terry Bogard - WFU OB Anesthesia
Quality Assurance Coordinator

Having no complications… Means you aren’t looking for them!!

Wake Forest University Complications Assessment
Epidural Blood Patch for Post-dural Puncture Headache

Wake Forest University Wet tap and Blood Patch

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEA + CSE</td>
<td>4489</td>
<td>4485</td>
<td>4797</td>
</tr>
<tr>
<td>Wet tap (%)</td>
<td>78 (1.7%)</td>
<td>61 (1.4%)</td>
<td>86 (1.8%)</td>
</tr>
<tr>
<td>Blood patch</td>
<td>34</td>
<td>24</td>
<td>50</td>
</tr>
</tbody>
</table>

* WFU Data from Dr. Terry Bogard – QA Chart Review

Accidental Dural Puncture The “Wet Tap”

Headache risk during pregnancy 50-70%

Spinal Needle & PDPH

- Q22 -10%
- Q25 -6%
- Q27 -2%
- Pencil Point 22-24 -1-2%
- Pencil Point 25-29 <1%


Pain Characteristics Dural Puncture Headache

- Onset 24-72 hours after dural puncture
- Bilateral frontal and/or occipital headache ± throbbing
- Can radiate to neck & shoulders
- Worse: sitting, standing, or head movement
- Improved: supine position
- Other symptoms: blurred vision, diplopia, photophobia, N/V, vertigo, tinnitus, decreased hearing
Cranial Nerve Symptoms

- Headache usually frontal: trigeminal nerve
- Diplopia: traction on abducens nerve
- Auditory Symptoms: 8th nerve dysfunction
- Dizziness, nausea, vomiting: Interfere of endolymph circulation in the semicircular canal related to CSF pressure

Treatment Options Dural Puncture Headache

- Conservative
  - Bedrest
  - Fluid hydration
  - Caffeine
  - Oral pain medication

- Experimental
  - Sumatriptan
  - Theophylline
  - ACTH

*NONE as effective as epidural blood patch*

Origin of Epidural Blood Patch

- Birth of an Idea: Dr. James Gormley (1915-97) RAPM 2004;29:136-63
  - Series of 7 pts (including self)
  - 2-3ml autologous blood as spinal needle withdrawn
  - Success 100%  -> Published in Current Comments section of Anesthesiology 1960.

- Dr. Anthony DiGiovanni (EBP as we know)
  - 1960 - severe PDPH with many SAB attempts for VD
  - 10ml autologous blood EBP success
  - Dr. Burdett Dunbar and Dr D.-> 41/45 HA relief with EBP

- SOAP 1974 Prospective EBP study
  - presented by Dr. Gerald Ostheimer
  - > 183 pts, showing 98% efficacy and safety

Epidural Blood Patch

- Success Rate:
  - 80-90% - initial
Epidural Blood Patch for Post-dural Puncture Headache

- 60-75% - long term
- Varies with reports

- Factors:
  - Size of dural puncture (17 g vs 25 g)
  - Volume of blood injected - controversial
  - Definition of success (complete, partial, initial, long term)
  - Timing of blood patch - controversial

Epidural Blood Patch Literature

- Success Rate: (80-90% early, 60-75% long term)
  - Williams. IJOA 1999;8:105-9

- Volume (15-20ml often quoted from Crawford)

Epidural Blood Patch Timing

- Usually recommend waiting 24-48 hrs
  - Headache may resolve without treatment
  - Allows confirmation of diagnosis
  - Literature supports waiting
      - 71% failure <24hr vs 4% >24hr
    - Williams. IJOA 1999;8:105-9
      - Recurrence higher if EBP < 48hr
    - Safa-Tisseront. Anesthesiology 2001;95:334-9
      - 504 pts - 75% complete relief, 18% partial, 7% no relief
      - EBP done < 3 days → 2.6 X odds ratio for failure

Exception: severe HA with cranial nerve impairment
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Prophylactic Blood Patch

- Blood injected prior to onset of headache
- Some evidence of benefit
  - BJA 1988;61:340-42
  - J Clin Anesth 1993;5:42-45
- Benefit recently challenged
- Generally not favored:
  - Treatment should be based on problem
  - Catheter tip location unknown
  - Risks: infection, failure

Epidural Blood Patch Literature

- Timing (generally suggest wait 24-48hrs)
  - Williams. IJOA 1999;8:105-9
  - Safa-Tisseront. Anesthesiology 2001;95:334-9
- Prophylactic EBP (generally suggest no)
  - Scavone. Anesthesiology 2004;101:1422-7
  - Williams. IJOA 1999;8:105-9
  - Lowenwirt. Anesthesiology 1988;88:A3

Epidural Blood Patch Contraindications

- Patient refusal
  - Fear
  - Religious preference (Jehovah’s witness)
- Coagulopathy
- Localized or systemic infection (fever)
- New onset hypertension (pre-eclampsia)

Clinical Case – June 8, 2007

- 33 year old G5P4 in labor
- 4 cm dilation requests epidural analgesia
- “wet tap” L2-3; Tuohy needle removed
- Epidural sited at L3-4
- Spinal and iv test dose
• Intermittent 5 ml bolus: 0.25% bupivacaine + 5µg/ml fentanyl + 1:200,000 epinephrine
• Catheter removed after delivery

**Clinical Case – June 10, 2007**

• 2 days later patient called complaining of postural headache
• Onset 1 day ago as frontal throbbing HA – now involves entire head
• Pain score: 9/10 upright vs 3/10 supine
• No other symptoms
• Oral medication, fluids & caffeine ineffective
• Wants epidural blood patch

**Clinical Case – June 10, 2007**

• **Risks & benefits discussed:** back pain, leg pain, failure of technique, dural puncture, bleeding, infection, nerve damage
• Pt desires to proceed
• Vital signs: BP 123/67, HR 87, no fever
• Sedation: not recommended
• Left lateral position for patient comfort

**Clinical Case – June 10, 2007**

• Preparation: 2 people preferred
• Identify venous access sites
• Sterile technique important:
  - Skin prep – Which is best?
    - Clorhexadiene gluconate + 70% alcohol
    - Betadiene solution
  - Sterile gloves
  - Hat
  - Mask
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Issues

- How much blood to inject?
  - Studies lacking
  - Treat to patient symptoms of uncomfortable low back or leg pressure
  - Target volume - 20 ml*
  - Range 15-25 ml

- Which interspace to use?
  - At or below the site of dural puncture


The Extent of Blood Spread After Epidural Blood Patch

Blood spread cephalad > caudal

Brit J of Anaesth 71 1993

Clinical Case – June 10, 2007

- Epidural blood patch at L2-3
  - LOR to air
  - 22 ml blood injected
  - Pt reports mild aching low back + R leg
Epidural Blood Patch for Post-dural Puncture Headache

- Patient supine for 1 hour
- To sitting position – Headache NONE
- Cautioned: No lifting, bending or straining for 48 hours

Performance Pearls

- Injection of 20 ml
  91% success rate in the short term
  61% success rate in the long term
  majority recur within 48 hours
- Supine position after patch:
  Only 30 mins => 40% recurrence rate
  1 hour => 20% recurrence rate
  2 or more hours => no recurrence


Clinical Case - June 11, 2007 Follow-up

- 0930
  - Mild non-postural headache
  - Patient resting
- 1600
  - severe postural headache returns

What now ??

Repeat Blood Patch

<table>
<thead>
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<th>WFU stats</th>
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<th>2006</th>
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<tbody>
<tr>
<td>EBP x 2</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>EBP x 3</td>
<td>1</td>
<td>0</td>
<td>1</td>
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</table>

- Accepted in the literature
- More typical in the setting of accidental Touhy needle dural puncture

Repeat Blood Patch

- Pt returns to hospital
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- Left lateral position
- Skin prep/drape
- L3-4 LOR air
- 30 ml blood drawn & injected
- Pt reports “fullness” in back & hips

• Following procedure & next day – Headache gone
• Patient doing well. No problems but mild back/hip pain. Improved with ibuprofen. No further care.

Epidural Blood Patch Complications

• Backache (35-100%)
  - localized
  - generalized
• Neckache
• Radicular pain or parasthesias in lower extremities (12%)
• Mild fever (5%)

The “Occult” Wet Tap

Postural HA can occur after multiple attempts at epidural or spinal placement, even if no cerebrospinal fluid is seen!

Wake Forest University OB Anesthesia Complication Files

<table>
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<th>“Occult” wet tap</th>
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<tr>
<td></td>
<td>14</td>
<td>11</td>
<td>17</td>
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Headache after Delivery Differential Diagnosis

- Non specific headache
- Migraine
- Caffeine withdrawal
- Lactation headache
- Sinusitis
- Pneumocephalus
Epidural Blood Patch for Post-dural Puncture Headache

- Hypertension
- Pre-eclampsia
- Meningitis
- Cortical venous thrombosis
- Intracranial bleeding
- Brain tumor

Post-Dural Puncture Headache is a diagnosis of exclusion

Post Dural Puncture Headache Before blood patch...

...After blood patch

Gracias – Thank you