ANAESTHESIA FOR LIVER SURGERY

This seminar is organised in conjunction with the Liver Intensive Care Group of Europe

Wednesday 18th October 2006
ANAESTHESIA FOR LIVER SURGERY
Analgesia: Role and Safety of Epidural Analgesia

Dr Philip Bayly
Freeman Hospital, Newcastle

Wednesday 18th October 2006
Safety and efficacy of epidurals: What are the issues?

• Are epidurals better?
  – Pain relief
  – Outcome

• Are epidurals generally safe?

• Are there special issues for liver resection?
AUTHORS' CONCLUSIONS:

CEA is superior to opioid PCA in relieving postoperative pain for up to 72 hours in patients undergoing intra-abdominal surgery,

... associated with a higher incidence of pruritus.
Yeager et al
Epidural anesthesia and analgesia in high risk surgical patients. Anesthesiology 1987; 66; 729-36

<table>
<thead>
<tr>
<th></th>
<th>GA + Epi N=28</th>
<th>GA alone n=25</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mortality</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morbidity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular failure</td>
<td>4</td>
<td>13</td>
<td>0.007</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>3</td>
<td>8</td>
<td>NS</td>
</tr>
<tr>
<td>Major infections</td>
<td>2</td>
<td>10</td>
<td>0.007</td>
</tr>
<tr>
<td>Re-operation</td>
<td>1</td>
<td>3</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Complication rate</strong></td>
<td>9/28</td>
<td>19/25</td>
<td>0.002</td>
</tr>
</tbody>
</table>
What are the possible mechanisms?

- Direct effects on the CVS
- Effect of analgesia on respiratory function
- Modification of the hormonal stress response
- Effects of epidurals on coagulation
Direct effects on the CVS

• Sivarajan et al 1978:
  Thoracic epidural anaesthesia (TEA) reduces myocardial oxygen demand.
Direct effects on the CVS

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• **Vik-Mo et al 1978:**
  TEA reverses the ST changes produced by experimental coronary occlusion in dogs.
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- **Baron et al 1987**: Epidural anaesthesia to T9 improved global and regional LV function.
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- **Baron et al 1987:** Epidural anaesthesia to T9 improved global and regional LV function.
- **Blomberg et al 1989:**
  TEA relieved chest pain in patients with unstable angina, and improved ST depression.
Effect of epidural anaesthesia on coagulation

• Tuman, 1991:
  – All vascular patients are hypercoagulable
  – Surgery increases hypercoagulability
  – This increase abolished by epidurals.
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• Rosenfeld, 1993:
  – Fibrinolysis impaired (↑ in PAI-1) seen with surgery under GA, not seen with epidural.
### Recent outcome studies

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Cardiac Morbidity p</th>
<th>Respiratory Morbidity p</th>
<th>Mortality p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beattie 2001 (Meta-analysis)</td>
<td>1173</td>
<td>0.049</td>
<td></td>
<td>0.091</td>
</tr>
<tr>
<td>Park 2001</td>
<td>1021</td>
<td>0.03</td>
<td>&lt;0.01</td>
<td>0.96</td>
</tr>
<tr>
<td>Rigg 2002</td>
<td>915</td>
<td>NS</td>
<td>0.02</td>
<td>0.67</td>
</tr>
</tbody>
</table>
Sample size

Suppose an operation has 3% mortality
A new technique reduces risk by 20%
NNT to save one life = 167

To show significance at the p=0.05 level, **3130** patients required *in each group*
Rodgers et al. BMJ 2000

141 studies
9559 patients

Effect of neuraxial blockade (NB) on postoperative mortality, by surgical group, type of neuraxial blockade, and use of general anaesthesia.

Diamonds denote 95% confidence intervals for odds ratios of combined trial results.

The vertical dashed line represents the overall pooled result.
Rodgers et al

Effects of neuraxial blockade (NB) on postoperative complications.

Diamonds denote 95% confidence intervals for odds ratios of combined trial results.
At 3 and 6 weeks post discharge after colonic surgery, epidural analgesia enhances:

- functional exercise capacity (6 min walk test)
- health-related quality of life (SF 36)

Also:

- Lower pain and fatigue scores
- Better mobilisation, eating more
Epidural local anaesthetics versus opioid-based analgesic regimens on postoperative gastrointestinal paralysis, PONV and pain after abdominal surgery.


REVIEWER'S CONCLUSIONS:

Epidural local anaesthetics
... reduce gastrointestinal paralysis compared with systemic or epidural opioids.
What are the risks of epidurals?

- Hypotension

- Dural puncture
  - headache

- Failure of analgesia
What are the risks of epidurals?

- Failure of analgesia
- Dural puncture
  - headache
- Hypotension

- Neurological damage
  - haematoma
  - abscess
  - cauda equina syndrome
  - direct damage to cord
  - meningitis
    - purulent
    - chemical
Anesthesiology 2004; 101:950-9

Severe Neurological Complications after Central Neuraxial Blockade in Sweden 1990-1999

Vibeke Moen, MD, Nils Dahlgren, MD, PhD, Lars Irestedt, MD, PhD

1 260 000  spinals
450 000  epidurals
  – 200 000  obs
  – 250 000  non-obs
Severe Neurological Complications after Central Neuraxial Blockade in Sweden 1990-1999
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<table>
<thead>
<tr>
<th>Complication</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal Haematoma</td>
<td>1:12 500</td>
</tr>
<tr>
<td>Epidural abscess</td>
<td>1:22 500</td>
</tr>
<tr>
<td>Cauda equina syndrome</td>
<td>1:31 000</td>
</tr>
<tr>
<td>Traumatic cord lesion</td>
<td>1:56 000</td>
</tr>
<tr>
<td>Others: meningitis, subdural, paraparesis</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1:7258</td>
</tr>
</tbody>
</table>

- 1 260 000 spinals
- 450 000 epidurals
  - 200 000 obs
  - 250 000 non-obs
Spinal Haematomas

- 25 in 450,000 patients (21 epidurals, 4 CSE)
  - 11/25: coagulopathy, or short time from heparin/ LMWH
    - 5: block placed within 2 hrs of LMWH
    - 3: catheter removed within 2 hrs of LMWH
  - Difficult to site in ~ 1/3 of cases
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  – 5: severe back pain
  – 18: reduced movement, lower limbs
  – 6: sensory loss only
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  - 6h -3 days (med 24h): 4/20
  - 2 weeks: 1/20
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Outcome: 6 / 33 recovered
Anaesthetic Management of the Patient Receiving Low Molecular Weight Heparin:

**Preoperative LMWH**

- The anti-Xa level is not predictive of the risk of bleeding and is, therefore, not helpful.

- The presence of blood during needle and catheter placement does not necessitate postponement of surgery.
  - However, initiation of LMWH therapy in this setting should be delayed for 24 hours postoperatively.

- … needle placement should occur at least 10-12 hours after the LMWH dose.

- Neuraxial techniques should be avoided in patients administered a dose of LMWH two hours preoperatively
Anaesthetic Management of the Patient Receiving Low Molecular Weight Heparin:

*Postoperative LMWH* (Single daily dosing.)

- The first postoperative LMWH dose should be administered 6-8 hours postoperatively.
- The second postoperative dose should occur no sooner than 24 hours after the first dose.
- The catheter should be removed a minimum of 10-12 hours after the last dose of LMWH. Subsequent LMWH dosing should occur a minimum of 2 hours after catheter removal.
From: Stamenkovic D, Bellamy M

Data from 123 patients
From: Stamenkovic D, Bellamy M

Data from 123 patients
Epidural Catheter and Increased Prothrombin Time After Right Lobe Hepatectomy for Living Donor Transplantation

Figure 1. Postoperative prolongation of the prothrombin time (PT) in five patients after donor right lobectomy. Values at time zero were the first measurements taken in the postanesthesia care unit. All patients had normal PT values preoperatively.
Altered Hematologic Profiles Following Donor Right Hepatectomy and Implications for Perioperative Analgesic Management

Roman Schumann,² Luis Zabala,¹ Michael Angelis,² Iwona Bonney,¹ Hocine Tighiouart,³ and Daniel B. Carr¹

Figure 1. Perioperative values for the international normalized ratio (INR) in 8 patients. Values in means ± standard deviation (SD). INR reference range: 0.9–1.1. Baseline = preoperatively, 0 = day of operation.

Figure 2. Perioperative platelet counts in 8 patients. Values in means ± standard deviation (SD). Platelet reference range: 150–400 K/μL. Baseline = preoperatively, 0 = day of operation.
Monitoring of coagulation

Thrombelastography
Conclusions

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  – give excellent pain relief
  – reduce cardiac and respiratory morbidity
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• Ensure INR <1.5, platelets > 80 000
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• Ensure INR <1.5, platelets > 80 000
• Check clotting BEFORE CATHETER REMOVAL
• Delay catheter removal, or consider FFP
Family planning advice
Use rear entrance
Thromboelastography