Remifentanil for labour pain: 
Analgesic panacea or time to draw breath? 
Successes and disasters 

Neil Muchatuta 
St Michael’s Hospital, Bristol
Hot topics...
Hot topics...

More hot topics...
Hot topics...

More hot topics...

Even more hot topics!
Hot topics...

More hot topics...

Even more hot topics!
THE GOOD

THE BAD

AND THE UGLY
The Good...
The ideal labour analgesic
Remifentanil

Rapid onset
$\tau_{1/2}$ 3–6 minutes
Analgesic $\tau_{1/2}$ 6 minutes
$V_D$ 100 mL/kg

Non-specific esterases
Fetal & neonatal effects

Maternal artery $\rightarrow$ Umbilical vein $= 88\%$

Umbilical vein $\rightarrow$ Umbilical artery $= 29\%$

Kan 1998
Fetal & neonatal effects

Blair 2002
Thurlow 2002
Volmanen 2002
Blair 2005
Volmanen 2008
Evron 2005
Volikas 2005
Balki 2007
Volmanen 2011
Shen 2013
Konefał 2013
Analgesic efficacy

Reduction in VAS for pain at 1 hr

Blair: 50  Thurlow: 48  Volmanen: 15  Blair: 64  Evron: 35  Volikas: 46
Remifentanil vs Pethidine

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Remifentanil</th>
<th>Meperidine</th>
<th>Mean Difference</th>
<th>IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>Volikas and Male¹¹</td>
<td>28.5</td>
<td>28.5</td>
<td>9</td>
<td>51.5</td>
</tr>
<tr>
<td>Blair et al.¹⁶</td>
<td>73</td>
<td>37</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Douma et al.¹⁹</td>
<td>45.6</td>
<td>24</td>
<td>52</td>
<td>66.1</td>
</tr>
<tr>
<td>Shahriari and Khooshideh¹⁸</td>
<td>23.5</td>
<td>8.7</td>
<td>20</td>
<td>54</td>
</tr>
<tr>
<td>Evron et al.¹⁰</td>
<td>35.8</td>
<td>10.2</td>
<td>43</td>
<td>58.8</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td></td>
<td>145</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 23.49; Chi² = 9.79, df = 4 (P = 0.04); I² = 59%
Test for overall effect: Z = 7.61 (P < 0.00001)
Remifentanil vs Nitrous oxide

Reduction in VAS by 15 mm

Adding N$_2$O improves remifentanil analgesia

Volmanen 2008
Remifentanil vs Epidural

Reduction in NRS at 30-60 min

- Volmanen
- Solek-Pastuska El-Kerdawy
- Douma
- Tveit
- Stocki
Remifentanil vs Epidural

No difference in satisfaction scores

Volmanen 2008
Douma 2011
Tveit 2012
Stocki 2013
Satisfaction scores: the new black?
Epidural:
Still the gold standard?
The Bad...
<table>
<thead>
<tr>
<th></th>
<th>Bolus dose</th>
<th>Epidural conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blair 2002</td>
<td>0.25–0.5 mcg/kg</td>
<td>10%</td>
</tr>
<tr>
<td>Thurlow 2002</td>
<td>0.2 mcg/kg</td>
<td>39%</td>
</tr>
<tr>
<td>Volmanen</td>
<td>0.4 mcg/kg</td>
<td>Not recorded</td>
</tr>
<tr>
<td>Blair 2005</td>
<td>40 mcg</td>
<td>10%</td>
</tr>
<tr>
<td>Evron</td>
<td>0.27–0.93 mcg/kg</td>
<td>9%</td>
</tr>
<tr>
<td>Volikas 2005</td>
<td>0.5 mcg/kg</td>
<td>10%</td>
</tr>
<tr>
<td>Balki 2007</td>
<td>0.25 mcg/kg (plus infusion)</td>
<td>5%</td>
</tr>
</tbody>
</table>
Background infusion?

Analgesia **no better, desaturation** more likely
Blair 2001

Trend to **better analgesia; sedation**
Balki 2007

**Apnoea**
Waring 2007

**Less effective analgesia**
Shen 2013
Timing of bolus
Timing of bolus

70 sec

2.5 mins

(4 in 10)
Timing of bolus

- 70 sec
- 2.5 mins
- (4 in 10)
bolus 1

70 sec

Volmanen 2011
bolus 1

140 sec

70 sec

Volmanen 2011
Hyperalgesia?

Balki 2007
32% of women in studies had some degree of respiratory depression

Van de Velde 2008
The Ugly...
Since 2012...

Case Report

Respiratory arrest in an obstetric patient using remifentanil patient-controlled analgesia

J. C. Bonner and W. McGlynn

1 Specialist Registrar, 2 Consultant Anaesthetist, Ninewells Hospital, Dundee, UK

CASE REPORT

Emergency bedside cesarean delivery: lessons learned in teamwork and patient safety

Michelle A O Kinney, Carl H Rose, Kyle D Traynor, Eric Deutsch, Hafsa U Memon, Staci Tanouye, Katherine W Akerat and James R Hebel

Respiratory arrest with remifentanil patient-controlled analgesia – another case

We would like to describe a case very similar to that of Bonner and McGlynn involving a respiratory arrest within five minutes of commencing remifentanil patient-controlled analgesia (PCA) for labour analgesia [1].
40 mcg bolus
2 minute lockout
Intra-uterine death
Other opioids
Midwife left room
40 mcg
40 mcg

2 min
40 mcg   40 mcg

2 min  2 min
40 mcg 40 mcg 40 mcg

2 min 2 min
40 mcg  40 mcg  40 mcg
2 min     2 min

= 0.38–0.5 mcg/kg/min

60-80 kg
Lockout period

Percentage effect

Time (min)

Babenco 2000
Lockout period

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Percentage effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>60</td>
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<tr>
<td>3</td>
<td>150</td>
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<tr>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>

Babenco 2000
Lockout period

Time (min)

Percentage effect

Babenco 2000
Apnoeas

23% had apnoea events
½ after 2 hours

Stocki 2013
23% had apnoea events
½ after 2 hours

Stocki 2013
‘1:1’
Midwife
Dead space

1 ml = extra dose
‘Must we press on until a young mother dies?’
top 10 recommendations
Protocols & Training
One to One
Continuous
Respiratory rate
Sedation score
4 hrs
Intra-uterine death
Capnography?
Lowest effective dose

Longest effective lockout time
Do we want to keep remifentanil available for labour analgesia?
We can’t go on like this.
I’ll cut the deficit, not the NHS.