Managing morbid obesity in pregnancy - what the obstetric anaesthetist needs to know

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Obesity In Pregnancy

- Definitions
- The size of the problem
- Labour Analgesia
- Anaesthetic implications
- Post op considerations
A High BMI
## BMI Definitions WHO

<table>
<thead>
<tr>
<th>BMI (Kg/m²)</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>Underweight</td>
</tr>
<tr>
<td>20-24.9</td>
<td>Ideal</td>
</tr>
<tr>
<td>25-29.9</td>
<td>Overweight</td>
</tr>
<tr>
<td>30-34.9</td>
<td>Simple Obesity</td>
</tr>
<tr>
<td>35-39.9</td>
<td>Severe Obesity</td>
</tr>
<tr>
<td>40-49.9</td>
<td>Morbid obesity</td>
</tr>
<tr>
<td>50-59.9</td>
<td>Super Morbid obesity</td>
</tr>
<tr>
<td>60-69.9</td>
<td>Super Super Morbid Obesity</td>
</tr>
<tr>
<td>&gt;70</td>
<td>Hyper Morbid obesity</td>
</tr>
</tbody>
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World Health Organization. Global Database on Body Mass Index (BMI), 2009
A falling BMI?
Obesity and Maternal Mortality

- CEMACH 2003 – 2005: 52% of women dying were overweight or obese. Of 6 direct deaths due to anaesthesia 4 were obese, 2 morbidly.

- CEMACE 2006-2008: 49% of women who died from were overweight or obese. Of 7 direct anaesthetic deaths 2 women were obese.

- Therefore 45% of direct anaesthetic deaths were in obese parturients.
Management of Women with Obesity in Pregnancy

8.1. What specific risk assessments are required for women with maternal obesity?

Pregnant women with a booking BMI 40 should have an antenatal consultation with an obstetric anaesthetist, so that potential difficulties with venous access, regional or general anaesthesia can be identified. An anaesthetic management plan for labour and delivery should be discussed and documented in the medical records.
Pregbesity Respiratory Pathophysiology

- Excess metabolically active adipose + ↑ workload on supportive muscle + gravid uterus

- ↑ O2 consumption - 60% with pregnancy 25% with obesity

- Coupled with Reduced FRC (20% at term with pregnancy alone) 10% worse when supine

- Further 1% drop for each BMI unit >30

- Leads to very rapid desaturation 1-2 mins

Benumof et al Anesthesiology; 1997 Oct;87(4):979-82
Avoid GA where possible

- Increased risks of death from failed intubation / ventilation and aspiration
  - CEMACE reports
  - National Audit Project (NAP4) – 40% of major airway complications in obese
  - ASA closed claims studies
  - Evidence from other reports and studies\(^2,3\)
    - Incidences of failed intubation as high as 33\(^1\)

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Labour and delivery in obesity

• Increased chance of requiring anaesthesia because:

  • Increase in failed induction rate\(^1\)
  • Increase in failure to progress 1st stage\(^1\)
  • Increase in fetal macrosomia and shoulder dystocia\(^1\)
  • Decrease in successful VBAC\(^1\)
  • Increase CS rate (inc Em LSCS). One NY centre reported a CS rate of 47% in the morbidly obese\(^2\)
  • OR 3.5 for CS and OR 6.35 for GA in CMACE 2005-2008

Labour epidural in obesity

- Anaesthetic considerations for advising early epidural

  - Increase in time taken and numbers of attempts required to place epidurals or spinals (75%>1 attempt, 15%>3 attempts) \(^1\)

  - Higher initial epidural failure rate (up to 42% vs 6 %) \(^2\)

  - Increase in epidural catheter displacement (keep checking)

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1) Hood et al. Anesthesiology 1993;79:1210–8
Epidural Placement

- Landmarks are obscured
- The sitting position is preferred
- The line joining the occiput or prominence of C7 and the gluteal cleft used to approximate the position of the midline
- The distance from the skin to the epidural space is shorter by about 0.5 cm in the sitting position\(^1\)
- Use a standard epidural needle – few patients have an epidural space deeper than 8cm\(^1\)
- Secure the catheter in the sitting upright or lateral position\(^2\)

2) Hamilton et al Anesthesiology: April 1997 - Volume 86 - Issue 4 - p 778–784
Figure 11.1 Approach to epidural catheter insertion in the morbidly obese parturient. With the patient in the sitting position, insert the epidural needle in the midline perpendicular to the skin at a point anchored horizontally by the first skin crease above the gluteal fold and vertically by an imaginary line drawn from the C7 spinous process to the gluteal fold.
Lumbar Spine Ultrasonography

- In case of difficult epidural placement ultrasound imaging should be considered.

- Often difficult to identify the shadow of spinal process in obese.

- Instead, symmetry of paraspinous muscles can be used.
CSE for Labour

• CSE
  • ?Lower epidural failure rate\(^1\)
  • Untested epidural catheter

• CSA
  • Predictable reliable – tight control of level/block
  • Lower risk of PDPH in obese\(^2\)
  • Lower risk of PDPH after CSA\(^3\)
  • Lower risk of PDPH with bevel parallel to spinal axis\(^4\)
  • Risk of inadvertent injection

Larger needles may be required
Anaesthesia Technical Considerations

- Patient should position themselves on table in OR
- Positioning – must have correct table/extensions
- Table to hold 350kg - most 180-230kg
- Avoid aortocaval compression\(^1\)
- Pad all areas well to avoid pressure injuries
- Venous access difficult – USS – Central line
- Blood pressure cuff (3:1) / Arterial line
- Hoists / hover mattresses post-op
- Large teds / flowtrons (use 2)

1) Tseuda 1979, Drennick 1988, Cohen 2002
Which Regional Anaesthesia for LSCS?

- SAB can be unpredictable – increased cephalad spread due to reduced CSF\(^1\). Consider reduced dose

- Surgery in these patients may be prolonged requiring additional anaesthesia\(^2\)

- Epidural alone may fail in up to 25% due to difficulty in blocking sacral roots and visceral pain upon bladder stimulation\(^3\)

- CSE is regional of choice

- “Unproven” epidural may fail (?CSA)

- Meticulous block assessment prior to incision

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GA Airway Assessment

- Mallampati score etc
  Add in

- Neck circumference:
  5% chance difficult intubation if > 40cm but 35% chance if > 60cm

- Good indicator of potential difficult airway

**Ramped Position For Intubation**

**Figure 1.** In the operating-room, patients in Group 1 were placed supine and had a 7-cm headrest placed underneath their occiput.

**Figure 2.** Patients in Group 2 had folded blankets placed under their upper body, head and neck until horizontal alignment between the sternal notch space and the external auditory meatus was achieved.

Ramping With Blankets and Cushions
Oxford HELP Pillow
Oxford HELP Pillow
Drug dosing Pharmacokinetics

- Total body weight (TBW)
- Ideal body weight in (IBW)
  - Height in cm - 100 for men
  - Height in cm - 105 for women
- Lean body mass
  \[ LBW_{2005} (Kg) + 9270 \times WT(kg)/8780 + 244 \times BMI(kg/m^2) \]
- “Corrected” body weight
- CBW40% = IBW + 40% excess
Actual Dosing

- **Huge Interindividual Variability Titrate Where Possible**

- **TBW**  
  Suxamethonium

- **IBW (or ?LBW)**  
  Paracetamol, Diclofenac, Non depolarizing Muscle relaxants

- **LBW**  
  Thiopentone, Propofol, opioids

Inhalational Agents

- Desirable agents
  - Low blood-gas solubility (rapid onset/offset)
  - Low oil-gas solubility (less fat accumulation – leading to shorter elimination half life)
- Desflurane—higher SPO2% in recovery¹ / Sevoflurane

GA if you have to: Induction (Intubate!)

- Usual antacid prophylaxis\(^5\)
- Any doubt – awake fibreoptic intubation
- Anticipate difficult intubation\(^1\)
- Prepare for difficult mask ventilation\(^2\)
- De-nitrogenation 15-25 degrees RT with PEEP\(^3\)
- 8 Deep breaths\(^4\)
- **Rapid desaturation (faster than 10Kg child)**
- Experienced assistance. 2 anaesthetists.
- Enough staff nearby to turn the patient!
- Auscultation difficult (CO2, Wee device)

Videolaryngoscopes (Airtraq)
Anesthetic Considerations: Postoperative

- Extubate fully awake/reversed/semi upright\(^1\)
- NSAIDS
- Neuraxial block/Peripheral (TAP)/Local infiltration
  - Opioid sparing – improve respiratory morbidity
- PCA (im route unpredictable)
  - Dose based on IBW

Post partum morbidity

- **Increased frequency of**
  - Haemorrhage – consider cross match
  - Endometritis – prophylactic antibiotics
  - Wound Infection – prophylactic antibiotics
  - DVT and PE – use mech compression, early mob and LMWH at least 7 days post delivery
  - Respiratory – analgesia and monitoring depression

Thromboprophylaxis dosing

- The RCOG Clinical Green Top Guideline No. 37 gives the following weight-specific dosage advice:

  - 91-130kg
    - 60 mg Enoxaparin
    - 7500 units Dalteparin
    - 7000 units Tinzaparin

  - 131-170Kg
    - 80 mg Enoxaparin
    - 10000 units Dalteparin
    - 9000 units Tinzaparin

  - >170Kg
    - 0.6 mg/kg/day Enoxaparin
    - 75 units/kg/day Dalteparin;
    - 75 units/kg/day Tinzaparin
In Summary

- Obesity rates soaring in UK (and worldwide)
- Anaesthetic and obstetric challenges require considerable extra planning.
- Increased Obstetric Interventions
- Increased risk of difficulty with intubation and ventilation and higher aspiration risk
- Early placement of epidural catheter may overcome the need for GA
“Inside every fat person (on the labour ward) is a little person trying to get out”

Cyril Connelly 1903-1974