Risk Assessment of obese patients undergoing sedation and GA

Airway / Respiration

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Plan

- Obesity epidemiology or Co-morbidities (X)
- Airway / respiration and obesity
Conscious Sedation and General anaesthesia Why?

Obesity/ASA Classification

What does Guidance say?

Brief review of Airway / Respiration

Difficult airway

THE FUTURE

How does obesity affects airway / respiration?

Sleep apnoea
Conscious Sedation and General Anaesthesia

- Anxiety
- Examination
- Degree of treatment required
- Poor working conditions
- Examination Under Anaesthesia
- Refer for GA
Guidelines for treatment in dentistry

- Guidelines don’t mention obesity at all other than indirectly except in very rare cases
The Provision of Oral Health Care under General Anaesthesia In Special Care Dentistry

- Preoperatively
- discipline

“There should be system in place to implement the local obesity strategy so that the dental team, in liaison with other health professionals, including health promotion specialist, can manage obesity as part of a multi-disciplinary team”

British Society of Disability and Oral Health 2009
Obesity and children

- Obesity is associated with other medical problems and can impair effective breathing during deep sedation.

- The doses of all drugs, except vapours and gases, should be calculated or adjusted according to the body weight.

- In obese children drug doses should be calculated according to an estimated ideal body weight.

Sedation for diagnostic and therapeutic procedures in children and young people
Commissioned by the National Institute for Health and Clinical Excellence
<table>
<thead>
<tr>
<th>ASA Class</th>
<th>Preoperative condition</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Healthy patient, no abnormalities</td>
<td>No organic, physiological, or psychiatric disorders, excluding the extremes of age. Healthy with good exercise tolerance</td>
</tr>
<tr>
<td>P2</td>
<td>Patient with controlled systemic disease, not severe</td>
<td>No functional limitations. Well controlled disease, in a single organ system; controlled arterial hypertension or diabetes without systemic involvement; smoker without COPD; mild obesity; pregnancy; psychiatric disease managed with psychoactive medication</td>
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<tr>
<td>P3</td>
<td>Patient with severe systemic disease</td>
<td>Some functional limitation. Controlled disease in more than one organ system or in a main system. No immediate risk of death. CHF; stable angina pectoris; prolonged history of myocardial infarction; poorly controlled hypertension; morbid obesity; chronic renal failure; bronchospastic disease with intermittent symptoms; acute psychiatric disorder</td>
</tr>
<tr>
<td>P4</td>
<td>Patient with severe systemic disease and constant risk of death</td>
<td>Has at least one serious poorly controlled disease or in the final stages of disease. Possible risk of death. Unstable angina pectoris. Symptomatic COPD, symptomatic CHF. Hepatorenal failure</td>
</tr>
<tr>
<td>P5</td>
<td>Dying patient. Patient not expected to survive if the surgery is not performed</td>
<td>Patient not expected to survive for more than 24 hours if the surgery is not performed. Imminent risk of death. Multiple organ failure; septicemia with hemodynamic instability; hypothermia; poorly controlled coagulopathy</td>
</tr>
<tr>
<td>P6</td>
<td>Patient declared brain-dead, organs will removed for transplantation purpose</td>
<td></td>
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COPD = chronic obstructive pulmonary disease; CHF = congestive heart failure.
Recent events


Overweight or obese

• 61% of adults
• 22% of 5-12 year olds
Temple Street Hospital and the Irish Nutrition and Dietetic Institute

State funding is close to zero

19 % boys and 18% of girls from professional households are overweight or obese

29% of boys and 38% of girls from semi- and unskilled backgrounds are overweight or obese

Ireland ranks in 5th place among 27 EU countries for childhood obesity,
Obesity and BMI

**WHO** - abnormal or excessive fat accumulation that may impair health

- **BMI**
- **Waist-Hip ratio**
Problems with BMI kg/m$^2$
Methods of measuring body fat %

• Air Displacement Plethysmography (ADP)
• Near-infrared interactance
• Dual energy X-ray absorptiometry (DXA)

C Nordqvist, “What is a Healthy Weight? Medical News Today
<http://www.medicalnewstoday.com/articles/241371.php>
Obesity in children

- Difficult to use BMI
- US a percentile values of BMI
  - 85<sup>th</sup> overweight
  - 95<sup>th</sup> obese
Disability and obesity

- Adults with ID residing in the United States in smaller, less supervised settings have a significantly higher rate of obesity compared to other countries and those living in larger and more supervised settings.

- These differences support the theory that the environment appears to exert a powerful influence on obesity in this population.

Airway -why

- Airway must be secured at all times
- Sedative drugs affect the airway
- Intubation can be difficult

Anaesthetists are responsible for the airway with GA
AIRWAY

RESPIRATION
Background - airway
Definitions: Lung volume or capacity

- Tidal volume (TV, VT): The volume of air that moves in and out of the lungs during quiet breathing (6-7 mL/kg in both children and adults)

- Inspiratory reserve volume (IRV): The maximal inspiration of air beyond the volume of a quiet inspiration

- Expiratory reserve volume (ERV): The maximal expiration of air beyond the volume of a passive end expiration

- Residual volume (RV): The amount of air that remains in the lung after forced maximal expiration
Definitions: Lung volume or capacity

- Inspiratory capacity (IC). The largest volume of air that can be inspired after a passive expiration

- Vital capacity (VC). The maximum volume of air expired after maximal inspiration

- Functional residual capacity (FRC). The volume of gas remaining in the lungs at passive end expiration (25-35 mL/kg in children and 30-40 mL/kg in adults)

- Total lung capacity (TLC). The maximum amount of air the lungs can hold and the sum of the VC and RV (60-65 mL/kg in children and 80-85 mL/kg in adults)
How does obesity affect airway?

- Biological consequences
  - Cardiovascular system
  - Gastrointestinal system
  - Respiratory system
Cardiovascular system

- ↑ cardiovascular risk
- Left ventricular dysfunction
- If ↑BP with hypervolemia ↑ risk of congestive heart failure
- Cardiac dysrhythmias
- Supine position ↑ cardiac workload
Gastrointestinal system

- ↑ abdominal pressure
- ↑ risk of gastric regurgitation
- Fat face and cheeks
- Short neck
- Limited flexion of cervical spine and atlanto-axial fat
- Mouth opening restricted
  - Submental fat
  - Fleshy cheeks
  - Large tongue
Respiratory system

- Restrictive lung disease
- Obstructive sleep apnea
- Excess weight to thoracic cage and abdomen
- Decreases FRC, ERV
- Morbidity obese decrease VC, TLC
- Small airway closure can occur
Respiratory system

- Mismatch ventilation-to perfusion
- 50% ↓ FRC in obese patients supine position
- ↑ O₂ consumption
- 5% of obese subjects develop obstructive sleep apnoea
- Obesity hypoventilation syndrome
Changing lung volumes
The effect of change in position and sedation/anesthesia on various lung volumes in non-obese and morbidity obese patients. Figure adapted from Ogunnaike BO, Whitten CW. Anesthesia and Obesity.

Sleep apnoea

Major signs and symptoms of sleep apnoea

- Loud and chronic snoring
- Choking, snorting, or gasping during sleep
- Long pauses in breathing
- Daytime sleepiness, no matter how much time you spend in bed
Sleep apnoea

Other common signs and symptoms of sleep apnoea:

- Waking up with a dry mouth or sore throat
- Morning headaches
- Restless or fitful sleep
- Insomnia or night-time awakenings
- Waking up feeling out of breath
- Forgetfulness and difficulty concentrating
- Moodiness, irritability, or depression
Apnoea and Sedation

- Upper airway collapse
- Decreased pharyngeal tone
- Blockage
- Reduced ventilation and oxygenation
- Hypoxia and hypercapnia
- Inhibits arousal response associated with each incidents of apnoea
GA with obstructive sleep apnoea

1. Preoperative aspects
   - Recognition of obstructive sleep apnoea
   - Assessment tracheal intubation

2. Perioperative aspects
   - Premedication
   - Intubation technique
GA with obstructive sleep apnea

- Postoperative aspects
  - Extubation the difficult airway
  - Respiratory depression (arrest)
  - Obstruction of the upper airway

Risks of general anaesthesia in people with obstructive sleep apnoea

den Heder, C et al BMJ 2004;329:955
Obstructive sleep apnoea syndrome and obesity in children

- 13%-16%
- Degree relates to degree of obesity
- Blood pressure elevated
- Cardiovascular co-morbidities
- Metabolic consequences
- Postoperative respiratory complications
- Psychosocial consequences
- Long term issues

STOP questionnaire


Department of Psychiatry, University of Toronto, Toronto Western Hospital, University, Health Network, Toronto, Ontario, Canada.
STOP-BANG

- High index of suspicion of obstructive sleep apnoea
- Various patho-physiological changes in obesity
- Sensitivity to various sedative drugs
- Answer yes to 3 or more STOP-BANG
- Answer yes to 2 or more STOP
S = Snoring
T=Tiredness
O = Observed
P=Pressure
A=age>50
N = Neck circumference $> 40$ cm
G=Gender male
STOPBANG
Refer for General anaesthesia

- An awareness of a possible problem
- Information for the anaesthetist
- Pre-assessment clinics
Difficult Intubation
Assign 1 point for each of the following LEMON criteria (maximum of 10 points)

≥ 5 predicts a difficult intubation
L=Look externally

- Facial trauma, large incisors, beard or moustache, large tongue

4 points
What’s going on behind that!
E=Evaluate the “3-3-2” rule

- Inter-incisor distance <3 fingerbreadths
- Hyoid/mental distance <3 fingerbreadths
- Thyroid-to-mouth distance <2 fingerbreadths

3 points
“3-3-2” rule
M=Mallampati

- Mallampati score $\geq 3$

1 point
O=Obstruction

Presence of any condition that could cause an obstructed airway

- Epiglottitis
- Peritonsillar abscess
- Trauma

1 point
N=Neck mobility

- Limited neck mobility

1 point
4th National Audit Project
RCoA and The Difficult Airway Society

Major complications of airway management in the UK
NAP4 Report and findings
March 2011
Elaine Bromiley

- Husband Martin Bromiley
- Aviation
- Clinical Human Factors Group
Issues raised

- Even when risk factors relatively low
- Unanticipated emergencies
- Mentally prepared and trained to deal with the various human factors
Human Clinical Factors

- Judgement
- Communication
- Equipment standardisation
- Systemic issues
Moderate sedation

- >70 years
- BMI 35> 35 kg/m2
- Obstructive Sleep apnea
- ASA Class ≥ 3
- Difficult airway
- Chronic opioid used
- Drug/Alcohol abuse
Case studies

- Conscious Sedation 3-5 mg iv midazolam
- Px very mildly sedated
- As px closed eyes SpO₂ fell quickly to below 92% from 98%
- On asking the patient a question ....
- Immediate response and SpO₂ rose again to 99%
- Very evident in the post-operative period when resting
Case 1

- One patient has several of the signs of sleep apnoea
  - Always tired
  - Hard to function
  - Obesity

- Referred to GMP
Case 2

- Not overweight
- Advised he had a CPAP machine
- Ask!
Guidance from dental staff?

- Fear of offending the patient
- Appearing judgemental
- Lack of px acceptance
- Lack of suitability qualified staff

Has to be done.....
What has to be done....

Personal......
What are we to do?

Academy of Medical Royal Colleges (AoMRC) 2013

- Taxes on surgery soft drinks
- Watershed for advertising unhealthy foods
- Nutritional standards hospital and schools
- Developments for obese patients
- Training for health professionals
What is the future?

- Awareness
- Preoperative assessment
- Better training as teams
- Discharge criteria sleep apnoea
- Not in a supine position
What is the future?

- CPAP machines during recovery
- Capnography
- Individualise treatment plans
Guidelines which are not restrictive but which raise the barriers and facilitate treatment
Thank you for listening...