Perioperative Care in OSA Surgery

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Overview

- Estimate of Major Peri-Op Complications
- Risk Factors for Airway Complications
- Peri-Operative Planning
- Avoidance of Complications
Estimate of Peri-Op Complications

- Survey on UP3
- 72 respondents over 9 years
- 46 nasopharyngeal stenosis
- 42 palatal incompetence
- 16 fatalities, 7 “near fatalities”
  - 3/23 hemorrhage
  - 3/23 undetermined deaths
  - 17/23 airway loss

Fairbanks 1990
Estimate of Peri-Op Complications

• Review at U of W
• All patients from 1982 - 1987
  – Determine incidence
  – Identify risk factors
  – Recommendations for peri-op management

Esclamado 1989
Incidence of Complications

- Overall - 13% (18/135)
- Airway 77% (14/18)
  - Failed Intubation 7
  - Airway post-extubation 7
  - Post-op hemorrhage 4

Esclamado 1989
Risk Factors for Airway Complications

• Medical
• Surgical
• Anesthetic
## Medical Risk Factors

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<tr>
<td>N</td>
<td>117</td>
<td>18</td>
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<tr>
<td>Age (years)</td>
<td>50.7</td>
<td>42.7</td>
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<tr>
<td>Sex (F:M)</td>
<td>1:16</td>
<td>1:18</td>
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<tr>
<td>% IBW</td>
<td>145</td>
<td>155</td>
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<tr>
<td>Min O2 Sat</td>
<td>79</td>
<td>66</td>
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<tr>
<td>AI</td>
<td>57</td>
<td>75</td>
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<td>Arrhythmias</td>
<td>13</td>
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Co-Morbidity also not significant

Esclamado 1989
Surgical Risk Factors

• For UP3 +/- tonsillectomy, Septoplasty, Tracheotomy
• No difference based on procedure or concomitant nasal procedure

Esclamado 1989
Anesthetic

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<tr>
<td>Narcotic µg/min</td>
<td>2.7</td>
<td>9.5</td>
<td>&lt; .005</td>
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<tr>
<td>Narcotic µg/kg</td>
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<td>178</td>
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<td>Intubation comp.</td>
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Use of narcotics not influenced by IBW
Narcotics only a factor in extubation complications
Muscle relaxants not a factor

Esclamado 1989
Overall Risk Factors for Complications

• Severity of OSA
  – ROC curve analysis indicate a cut off of AI >70 and an O2 nadir <80% as rough estimators

• Obesity
  – Short, thick neck, macroglossia, redundant soft palate & oropharynx, inferiorly placed hyoid (Riley 1987)

• Intra-op narcotic dose

Esclamado 1989
Risk Factors for Complications - Epidemiology

• Analyzed 3130 patients from previous study
  – Comorbidity 2x risk for each ASA grade increase
  – 5x risk for UP3 + non-nasal OSA procedure (BOT, etc)

• Subset analysis of 43 with case controls
  Observe association of complications
  – AHI, BMI and co-morbidity also associated with complications
    • May not be independent
  – Tongue procedures independently associated with complications
  – LSAT not associated with complications

Kezirian Archives of OTO-HNS 2006
Airway Changes with Induction

• Loss of Genioglossus activity (Leiter 1984)
• Loss of hypoglossal nerve activity (Hwang 1983, Nishino 1984)

Because of these and other changes, the larynx opens, but moves anteriorly, while the tongue slips backwards.

An easy awake DL does not necessarily mean and easy asleep DL (Sivarajan 1990)
Incidence of Complications

- Review of 3130 patients s/p UP3 at VA hospitals
- Data gathered 1991 – 2001
- Serious complication rate 1.5%
- Fatality rate 0.2%

Kezirian Laryngoscope 2004
Pre-Operative Assessment

- Previous Anesthetics
- Routine Systems Review
  - Chest Pain
  - Palpitations
  - Shortness of Breath
  - GERD
- Aspirin, NSAIDS, ginko biloba, vitamin E
Pre-Operative Planning

- Optimize medical condition
  - Internist/Pulmonologist/Cardiologist
  - Hypertension, CAD, CHF, Arrhythmias
  - Chronic hypoxemia and high catecholamines

  Imaizumi 1980

- Secure monitored bed
  - Pulse ox; Telemetry for selected patients

- Arrange post-op CPAP
  - May have patient bring in home unit
Operative

- Plan method of securing airway with anesthesiologist
- Have contingency plan ready
- Careful titration of sedative agents during the case
- Recheck oral cavity edema prior to extubation
  - especially if multilevel surgery is done
- Have a doctor at intubation and extubation who is prepared to secure a surgical airway if needed
Securing the airway

- Oral if appropriate (Fujita I or II (a))
  - Establish ventilation prior to paralysis if possible
- Awake, fiberoptic nasal
  - Adequate topical anesthesia is critical
- Laryngeal Mask Airway
  - Special configuration for intubation through LMA
- Tracheotomy
  - Awake or post intubation
- Other methods
Awakening

- Full reversal of muscle relaxants
- Extubate when patient is awake and reflexes are restored - avoid “deep extubation”
  - May delay extubation 24 - 48 hours
  - Steroids may be given to decrease edema
  - Faux conscious state (Rafferty 1980)
- Have nasal trumpet and oral airway available
- Tracheotomy tray should be immediately available
Post-operative

- ICU monitoring?
- Pulse ox monitoring?
- Cardiac monitoring?
- Intensive BP monitoring?
Acute Effects of UP3

- RDI remains relatively stable at POD 2
  - AI generally decreased, HI increased
- Significant increase in a-a gradient during wakefullness
- Recommend
  - Monitoring of O2 post-op
  - No prophylactic tracheotomy
  - CPAP if RDI persistently high

Sanders 1988
Post-operative

• 125 surgical procedures
  – 71 with multilevel surgery
  – mean RDI 38, BMI 29
• No need for monitoring
  – most common issue was BP control
  – 1 patient with airway obstruction immediately post op
  – no bleeding during hospitalization
• Cannot determine high risk patients pre-op

Terris 1998
Post-operative

- 38 patients
  - 31 with UP3 alone
  - mean RDI 66, BMI 29
- RDI > 100, BMI > 35 at high risk
- “Step down unit monitoring” is appropriate with O2 monitoring

Ulnick 2000
Post-Operative

- 117 patients s/p UP3 w/ or w/o other procedures
- Respiratory events in up to 11%
- Hemorrhage in up to 14%
  - Immediately post op or after ~3 days
- Virtually all complications occurred w/in 3 hours
- Suggest that same day surgery can be considered

Spiegel Oto-HNS 2005
Post-Operative Resources Used

- 42 patients s/p UP3
- AHI 47; Desat nadir 76%
- No major complications

- Hospital resource utilization examined
  - PO intake 305 cc in first 12 hours
  - Average nursing care needed level 3 (1-4 scale)
  - Average IV narcotic doses 8.9
  - Hospitalization justified for comfort/pain control

Rodriguez-Bruno 2005
Complications of Surgical Treatment

- Airway complications represent up to 3/4 of immediate post-op UP3 complications
  
- Mortality most commonly caused by perioperative airway loss
  
- For airway compromise from edema with wakefulness, tracheotomy or intubation is needed
  
- Cardiac monitoring with O2 saturations < 60%

Fairbanks 1990

Sheppard 1985
Avoidance of Complications

- Awake or fiberoptic intubation if significant airway risk
- Minimize intraoperative narcotics
  - Esclamado 1989
- Extubate when fully awake and reversed
  - May keep intubated and extubate within 24 hours

- EKG monitor w/ dysrhythmias or O2 sat<60%
  - Sheppard 1985
- CPAP post-op in patients w/ exacerbation
- Pulse oximetry in all patients
  - Powell 1988
Anesthesia in Non-OSA Patients

- Pose same risks for intubation as in OSA case
- Should be run low on narcotic if possible
- Extubation risk more than non-OSA patient, but without airway edema issues related to upper airway surgery
Conclusions

• Surgery for OSA poses special risks to the patient related to the disease state and anatomy
• These risks can generally be managed successfully through recognition of the issues and through taking appropriate precautions
• Post operative monitoring should be tailored to the individual patient and disease severity
• Hospitalization may be warranted for IV fluids, pain control, nausea control
Peri-Operative Considerations in Obstructive Sleep Apnea

BIBLIOGRAPHY


