Case Presentations

- Case presentations—all anesthesiologist at some point will be involved in these cases
- Review some database
- Closed claims
- More cases

Is this just an academic problem

Survey from the community shows otherwise

Case 1

- Radiologist placed a PEG in IR with sedation for woman with a huge laryngeal mass
- Patient went apneic
- Anesthesia called late—can't ventilate/can't intubate. Sux was wearing off
- To OR for awake trach
Case 2
- 400 + lbs patient arrives by ambulance to ED
- Combitube in place
- ER doc gives 10 mg of vecuronium-pulls Combitube
- Unable to intubate or ventilate
- Patient had old trach scar
- Anesthesia finally called-blood everywhere, can't visualize anything
- Cut neck at old scar of trach and placed ETT

Case 3
- Called to ED for restrained prisoner with bilateral mandibular and orbital fractures.
- Uncooperative, combative, bloody mouth from unknown source, spitting blood.
- Given ketamine-no help
- Proposal/sux-can't see anything due to blood
- Some air getting in with masking
- Placed intubating LMA-able to ventilate
- Placed ETT thru LMA balloon, placed small ETT
- Switched to larger tube with tube exchanger

Case 4
- Anesthesiologist to radiology to help with patient that was desaturation during MRI
- 80 yo was given fentanyl, versed and phenergan
- Narcan and flumazenil given-still obtunded
- Large mass was noted on neck-no one else noticed
- Patient decompensating-DL done
- Friable large tumor eating through VC, epiglottis and tongue, can't pass ETT
- Masked to OR for emergent trach

Case 5
- Called to floor for patient in respiratory distress
- Patient with traumatic brain injury
- Propofol given difficult to ventilate with mask
- DL done-piece of hot dog stick occluding VC
- Removed with McGills-improved
- Similar situation with other foreign bodies

Case 6
- 12 mo old in ED after sibling gave him a dog biscuit-in respiratory distress, desaturating
- ED had multiple failed intubation attempts
- Sux and roc given-difficult to mask-low sats
- Baby vomiting
- Anesthesia called-belly size of a volleyball
- Passed OG-suctioned stomach
- Easy mask to high 90's, easy DL and tube placement

Case 7
- Anesthesia called to COR 0
- Walked in room-blood everywhere
- Placed yankauer for suction, no help
- Kept yankauer going-boogie with hockey stick placed until felt tracheal rings
- Advanced boogie, placed ETT over
Case 8
- Called to GI-patient became apneic during EGD
- GI unable to ventilate or intubate
- Patient cyanotic and bloody
- Anesthesia goes to head of bed and asks "can we use her trach?"

Case 9
- GI accidentally extubated a known difficult airway patient
- ICU doc and RT tried to reintubate unsuccessfully
- ICU doc tries to FO intubate-unsuccessful
- Anesthesiology finally called
- Grade 2 view with glidescope but bloody
- Yankauer used to suction and placed accidentally through VC
- Passed 9 Fr cook exchange catheter through yankauer
- ETT placed over cook catheter

Emergent Intubations Outside the OR is a Predictor of Airway Complications

Limited Literature On This Topic

REVIEW AVAILABLE ARTICLES

Failed Intubations
- 1 in 2000 in elective cases
- 1 in 300 in OB RSI
- Up to 1 in 50 in ED/ICU

Can't intubate Can't Ventilate (CICV)
- Fewer than 1 in 5000 in elective GA
- Requiring emergency surgical airway (ESA) less than 1 in 50,000 in OR cases
- In ED-CICV requiring ESA 1 in 200
Results of Airway Disasters

- Majority led to death or permanent neurological injury
- ICU 61%
- ED 31%
- OR 14%
- Failure to use capnography contributed to 74% of deaths or permanent neurological injury

Difficult Airways

- Reports 8-12% difficult intubation in the emergent setting versus 5.8% during elective intubations in the OR.
- A 7-fold higher complication rate when encountering difficult airways outside the OR

Surgical Airway

- In two thirds of the claims where an airway emergency occurred a surgical airway was obtained but it was too late to avoid a bad outcome
- A surgical airway to be a successful option it must be instituted early
- Prompt action has been shown to save lives

Challenges for Providers

- Unique inherent challenges outside the OR
- Providers often must act quickly
- Providers are unfamiliar with the patient
- Limited time for assessment
- Lack of resources-equipment and training

Emergent

- Patients are usually hypoxic
- Hemodynamically unstable
- Full Stomachs
- Lacking optimal resuscitation equipment

Complications

- Aspiration 2-4%
- Esophageal intubation 1.6-9%
- Oropharyngeal trauma 0.5-7%
- Higher complications in training centers
Anesthesiologist Calls for Emergent Airways

- ICU ~60%
- Floor ~39%
- ED ~1%, most manage airways themselves and ONLY call anesthesia when too late!!!

Reasons

- Respiratory distress alone ~52%
- Cardiac arrest ~45%
- Airway protection ~2%
- Other ~2%

Drugs

- Induction agents- Etomidate 57%, Propofol 18%
- Muscle relaxant used in 72% with succinylcholine 60%

Equipment Used

- DL
- LMA
- Light Wand
- Bougie
- Video assisted laryngoscope
- Fiberoptic-awake or asleep
- Retrograde wire
- Surgical airway

Self Extubation

- Hemodynamic instability
- Multiple attempts at reintubation due to difficulties
- Significant morbidity and mortality

Aspiration

- More frequent on floor than ICU
- NPO status-most full stomachs
- Equipment available-suction, resuscitation equipment and oxygen
- Training of staff-higher in ICU
- ICU recognizes earlier decompensation
Causes???

- Late identification of problems-awareness
- Lack of necessary equipment
- Lack of experienced personnel
- Poor planning
- Poor communication
- CAPNOGRAPHY

Awareness

- Human factors
- Reduce human error
- Improve human performance which enhances safety
- Anticipate problems and prevent them
- Situational awareness

Case 10-Example

- 5 am call for emergent intubation
- On route, changed to Cor zero
- Patient PEA, apneic-chest compressions, bag/mask ventilation, vomit
- Difficult DL due to vomit-get tube in. All we see with glidescope is green vomit flowing out of esophagus
- COR for 40 minutes about to call off
- ACLS protocol-consider narcan, "he did get a fair amount of Dilaudid..."
- Two doses of narcan-NSR, patient awake pointing to chest pain...

Case 11

- Called to Cor 0
- Patient can't be intubated due to inability to open mouth
- Push succinylcholine-still can't open mouth
- How long has the patient been like this??

Prevention???

- Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society-NAP4
- Recommendations for a checklist for all remote site emergency airway management
- Checklist has been shown to reduce complications rates
- Concept from success in the aviation industry

Rigor Mortis!!!
Lack of awareness
Emergency Rapid Induction Checklist

- Airway equipment with difficult airway cart
- Capnography-carbon dioxide detector filters
- Resuscitation drugs
- Place in all remote areas involved with critically ill patients

Improves patient safety
- Reduces mortality
- Reduces complications
- Doesn’t take any longer
- Less discrepancy with inexperience vs experienced

Train all ICU and ED staff-assign someone per shift to be responsible and attend airway emergencies/cardiac arrests
- Check daily
- Keep stocked
- Keep photo of all equipment and drugs needed for restocking

Annex A: RSI Checklist

Annex B: Airway management / emergency drugs bags

Drugs Bag Inventory
Adult Advanced Airway Bag Inventory

- RSI checklist (external)
- Self-inflating (Ambu) bag-valve-mask (loose, main compartment)

**Intubation, “Plan A” Kit** (main compartment)
- Waters (Mapleson C) Circuit
- Face mask size 4 + 5
- ETT Size 5.0 + 7.0 + 8.0
- Yankauer sucker
- Suction catheter
- Section tubing
- 2x laryngoscope handles + batteries
- Macintosh blade size 3 + 4
- 20ml syringe, tube tie + tape, KY jelly
- Adult Esacap filter

**Difficult Intubation Kit:**

- Stylet
- Gum-elastic bougie 15Ch
- Magill’s forceps (top-flap)
- Scissors (top-flap)
- Airtrac adult male + female (blue + green)
- Cook airway exchange catheter (side pouch)

**Failed Intubation, “Plan C” Kit:**

- OP Airways (green, orange, red)
- NP Airways (Size 6,7,8)
- i-gel (Size 3,4,5)

**Remote Site Airway Emergencies**

- Are among the most difficult and associated with the highest risks
- Delays or complications are very detrimental and potentially avoidable
- Mainly due to lack of available appropriate drugs, equipment or trained staff

**Off Site Closed Claims**

- A quarter involved tube changes
- Almost half were non surgical patients
- Post op patients need for reintubation were for neck swelling causing respiratory compromise-post: neck fusion, thyroidectomy, central line...

**Claims for care off site were all associated with death/BD versus OR disasters have less morbidity and mortality**

- Poor outcome due to the lack of operating room resources-standard airway management equipment and no immediate availability of healthcare providers skilled in airway management.
- There was no difference in the proportion of payments made, or the median payment between perioperative and outside location claims.
Difficult Airway Claims

- Perioperative Claims 87%
- Outside locations 13%
- Worst outcomes outside locations

Case 12

- Emergent intubation in patient is severe respiratory distress
- Tachypneic
- Sat on 6l nasal cannula 74%
- Sitting straight up in bed

Quick History

- 63 yo AFF
- Obese-70”, 156 kg; BMI 50
- Severe pulmonary HTN
- CHF
- COPD
- CVA: residual
- Gout

Home medications

- Advair 2 puffs BID
- HCTZ 12.5mg PO q day
- Lisinopril 5mg PO q day
- Magnesium Hydroxide 400mg PO BID
- Fentanyl patch 25mcg/hr transdermal

PRN Medications

- Acetaminophen
- Albuterol
- NTG
- Oxycodone

Table 2: Outcomes and Liability in Difficult Airway Claims (n = 179)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Perioperative (n = 156)</th>
<th>Outside Location (n = 38)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>71 (46%)**</td>
<td>20 (85%)**</td>
</tr>
<tr>
<td>Brain damage</td>
<td>19 (12%)**</td>
<td>3 (13%)**</td>
</tr>
<tr>
<td>Airway injury</td>
<td>50 (32%)**</td>
<td>8 (55%)**</td>
</tr>
<tr>
<td>Pneumothorax</td>
<td>7 (4%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Aspiration pneumonia</td>
<td>3 (2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Nerve injury</td>
<td>3 (2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Emotional distress</td>
<td>3 (2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>5 hgt</td>
<td>1 (1%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Awareness during surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than appropriate anesthetic care</td>
<td>74 (47%)</td>
<td>10 (43%)</td>
</tr>
<tr>
<td>Payment made</td>
<td>99 (60%)</td>
<td>13 (57%)</td>
</tr>
<tr>
<td>Dollars, median (range)</td>
<td>$2,340-$8,540,000</td>
<td>$49,000-$2,010,000</td>
</tr>
</tbody>
</table>
TTE
- RV severely dilated with moderately reduced systolic function
- Dilated IVC with interatrial septum bowing, increase RAP
- PAP systolic-65mmHg
- LV cavity small with nl EF>55%

Admission
- Sepsis of unknown origin
- CHF exacerbation
- Altered mental status

Labs
- K 5.9
- Cr 1.39
- WBC 28
- H/H 8.6/29.7

Concerns
- Difficult intubation-obesity, unable to do complete exam due to uncooperative
- Difficult bag/mask and quick desaturation-obesity, COPD, CHF, inability to lay flat-no reserve
- Can't pre-oxygenate-altered mental status refusing mask. Decreased FRC
- Can't use succinylcholine due to high K, history of CVA with unknown residual issues
- Non depolarizer-unknown NPO status, concern for ventilation/intubation

What was done
- Was able to get a non rebreather mask
- Precedex started 0.5ug/kg/hr increases to 1ug/kg/hr using assumed ideal body weight
- Layed patient down
- Awake DL a with Mac 4, quick view of closed VC, unable to pass ETT-coughing
- Felt a bit more comfortable added 2 mg Versed
- Another DL ETT placed as VC opened
- +ETCO2, BBSE
Conclusion

- Hospital needs a solid plan
- Train necessary personnel
- Have proper equipment
- Call anesthesia early