Morbidity and Mortality of Airway Management

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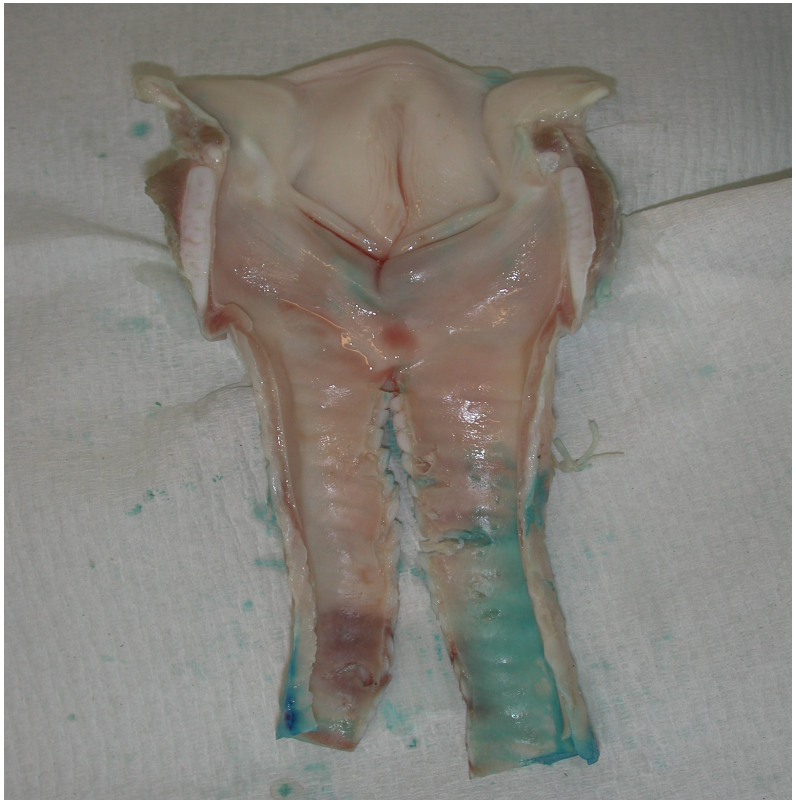
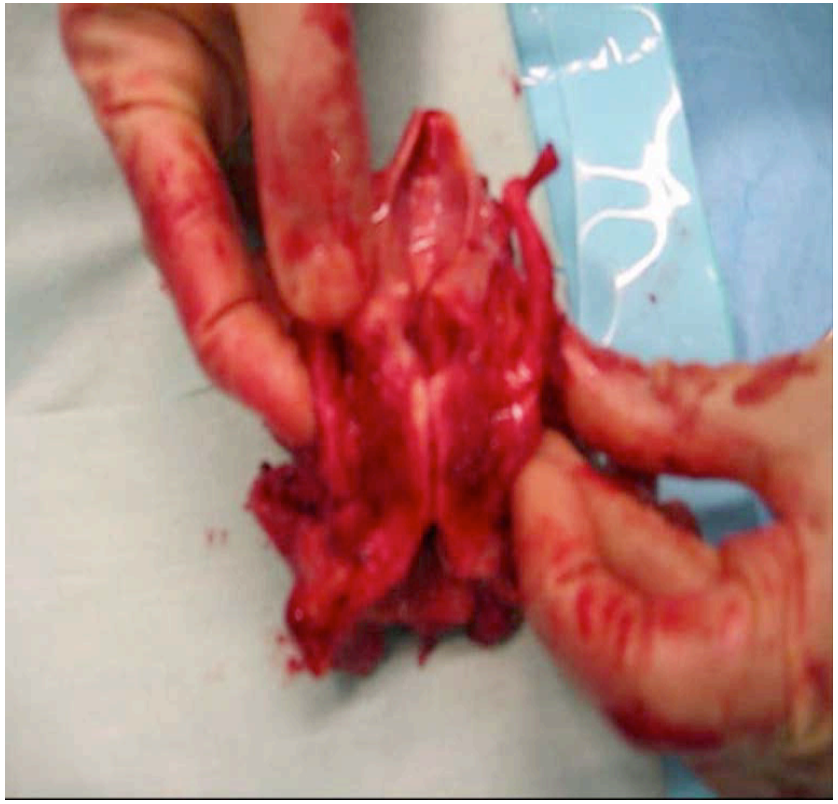
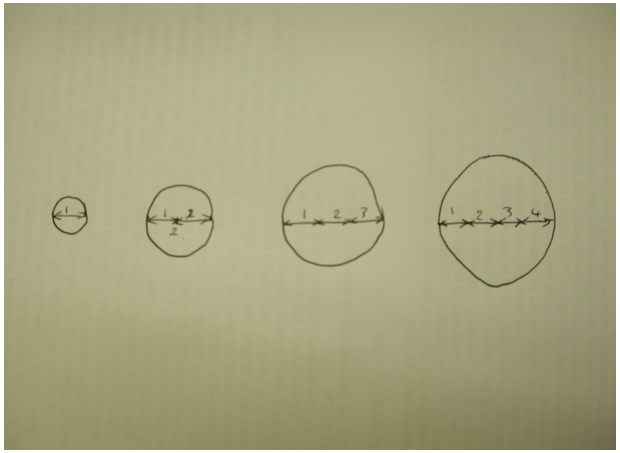
I have helped design the
A.P. Advance Videolaryngoscope
and received research funding from F&P Healthcare

There is one skill above all else that an anaesthetist is expected to exhibit and that is to maintain the airway impeccably

M. Rosen and I. P. Latto 1984



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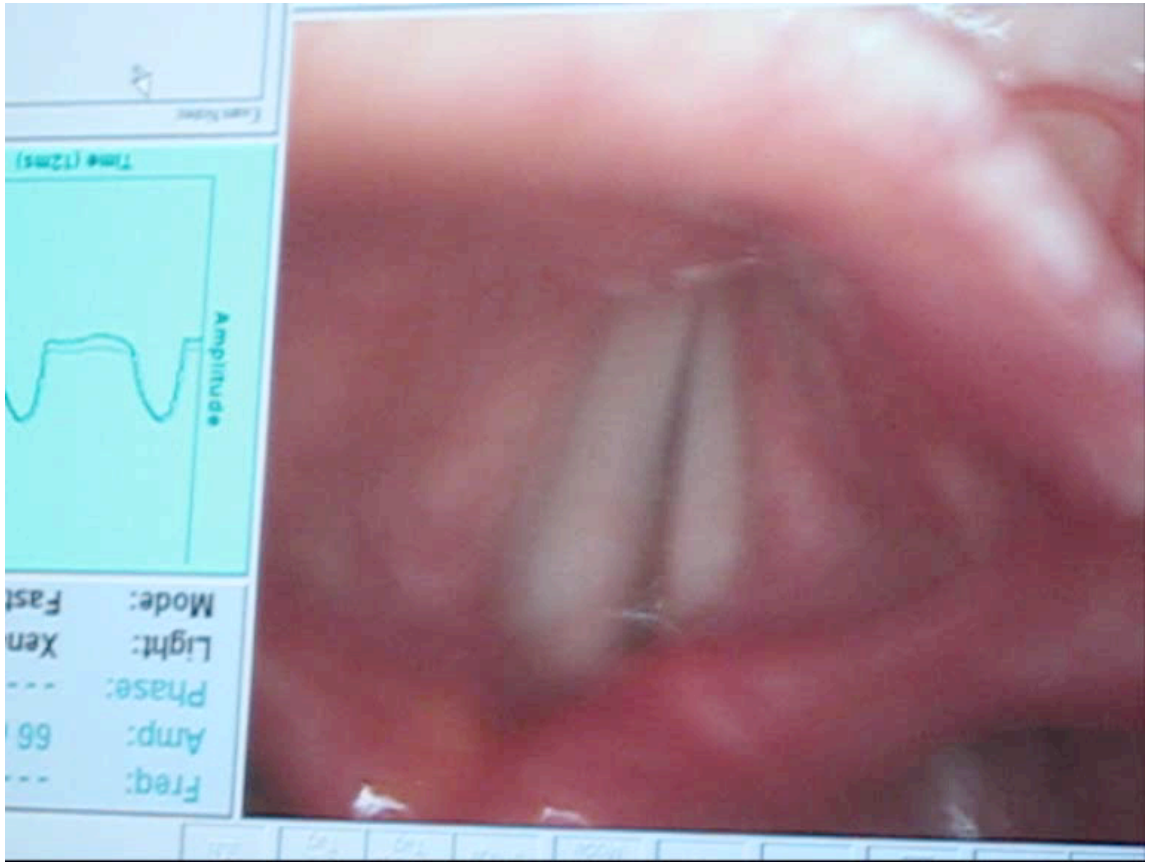
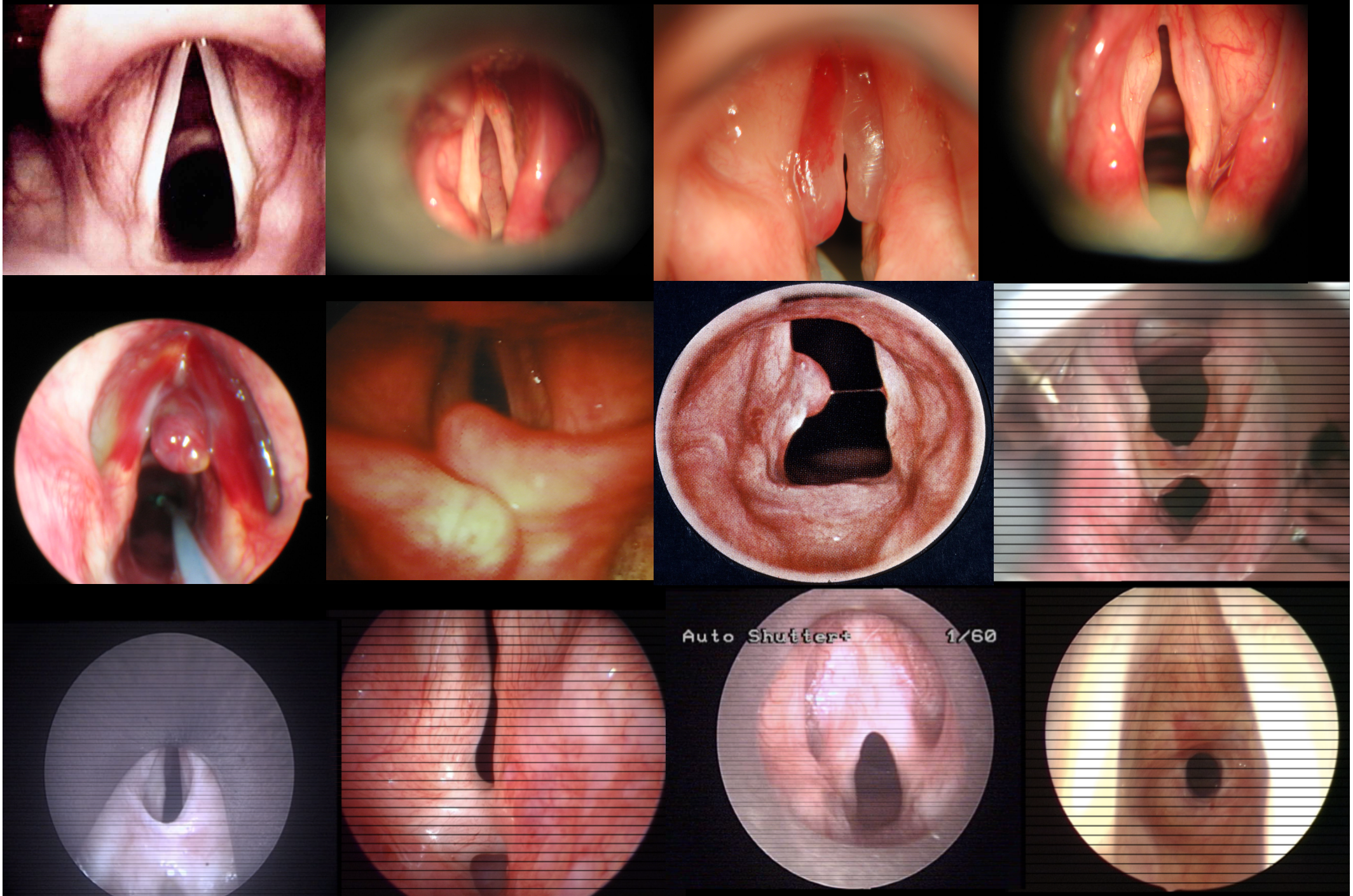
Iatrogenic Airway Damage

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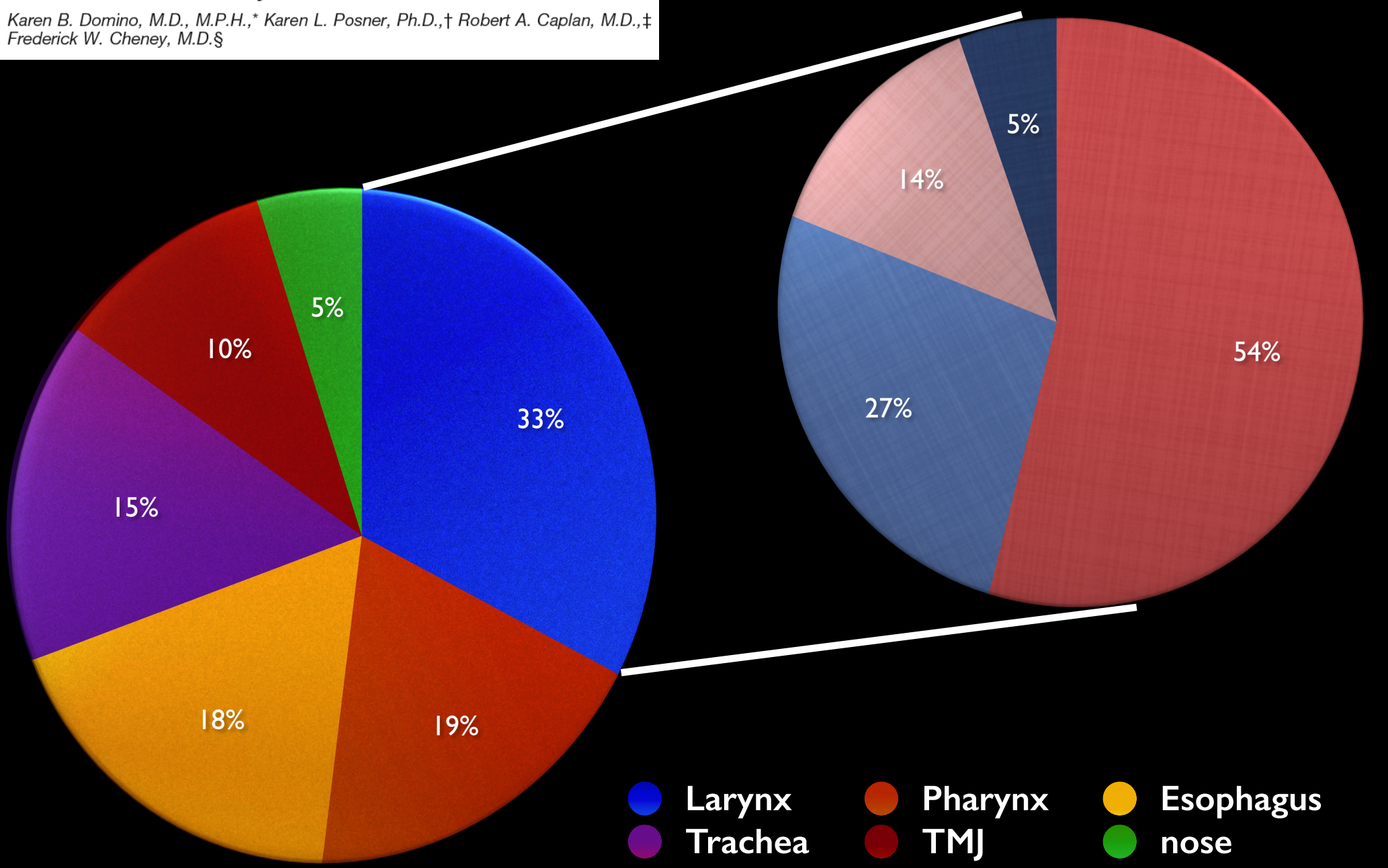
Anesthesiology
1999; 91:1703–11

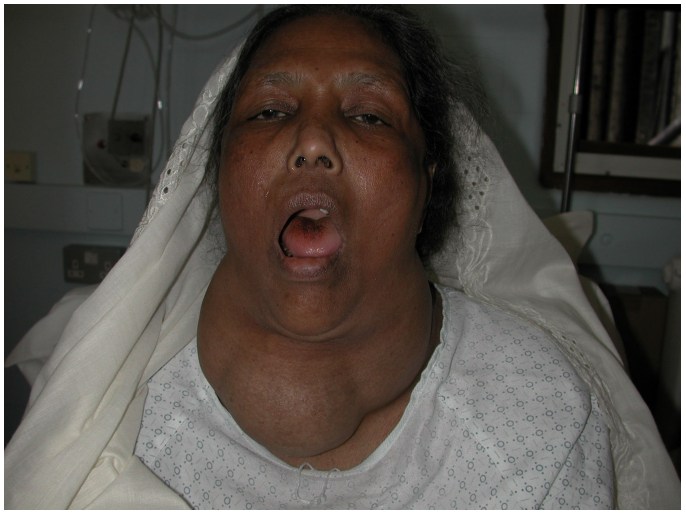
Airway Injury during Anesthesia

A Closed Claims Analysis

Karen B. Domino, M.D., M.P.H., Karen L. Posner, Ph.D.,† Robert A. Caplan, M.D.,‡ Frederick W. Cheney, M.D.§*

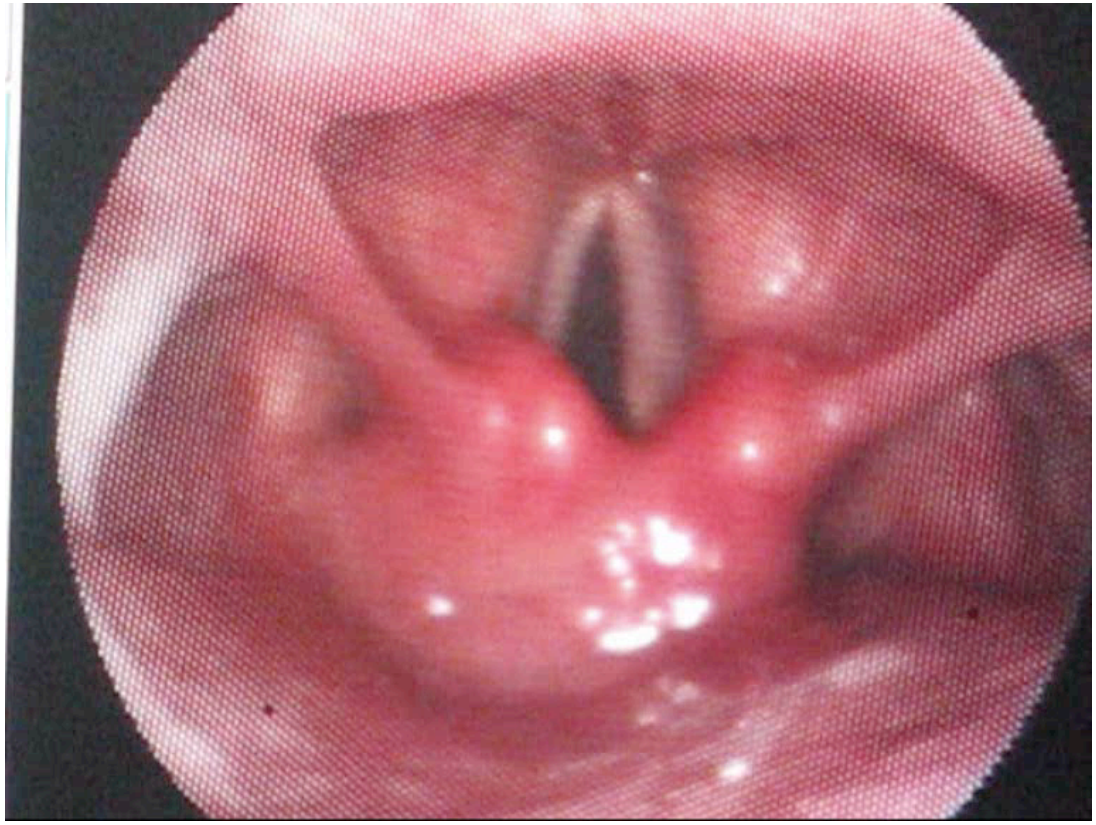


Domino KB, Posner KL, Caplan RA, Cheney FW.
Airway injury during Anesthesia.
Anesthesiology 1999: 1703-11



80% Routine (non difficult) tracheal intubation

85% short term tracheal intubation



Kikura M, Suzuki K, Itagaki T, Takada T, Sato S Age and comorbidity as risk factors for vocal cord paralysis associated with tracheal intubation British Journal of Anaesthesia 2007;98;524-30

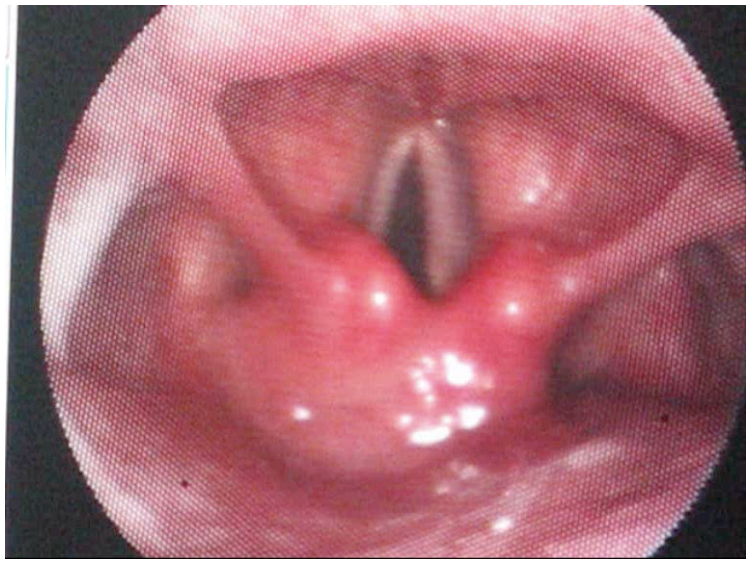
31,241 Prospective consecutive surgery

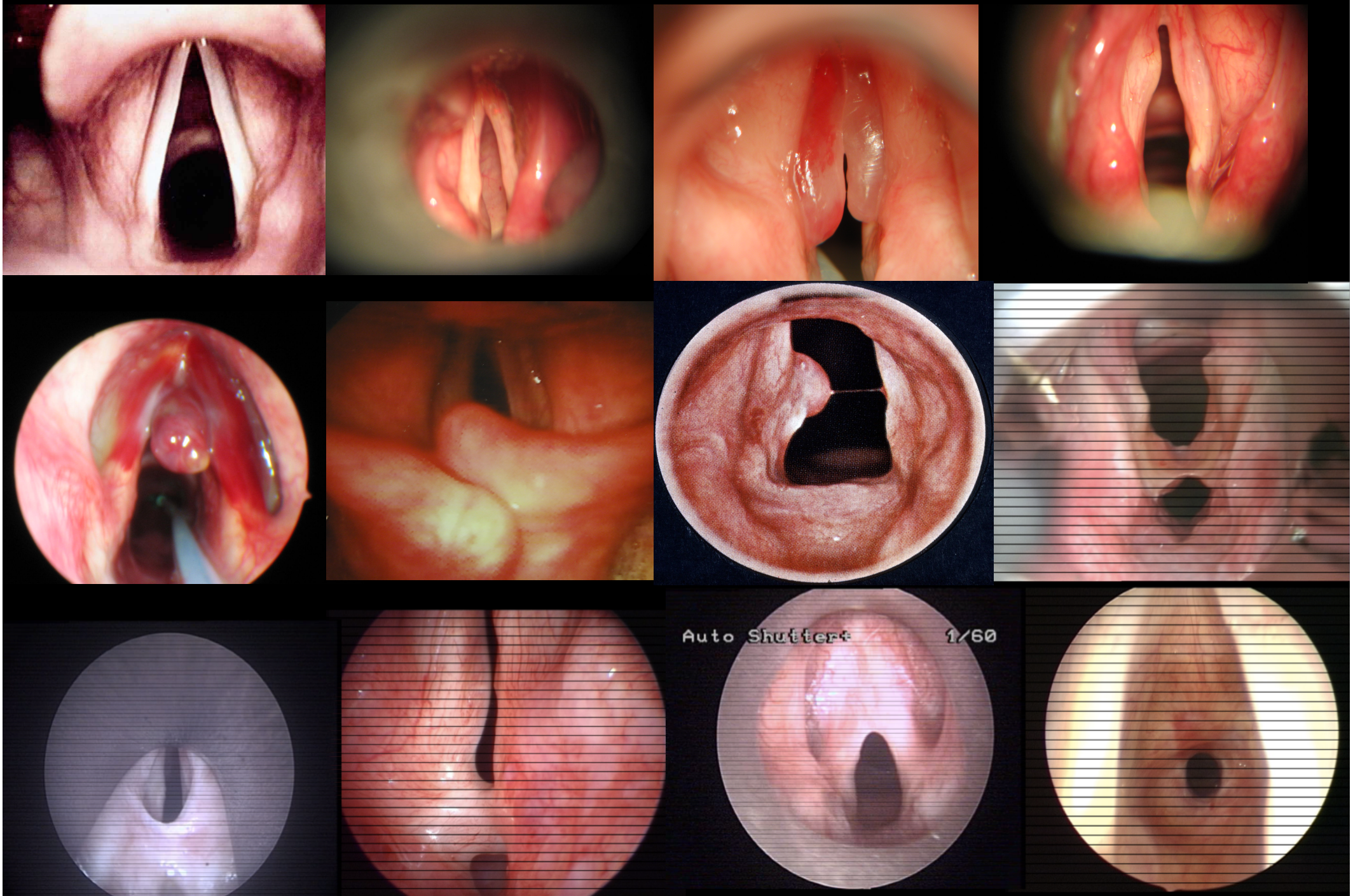
24 vocal cord paralysis

Female 7, male 7.5 – 8

Cuff pressure < 20 mm Hg

All Intubated at first attempt – None difficult

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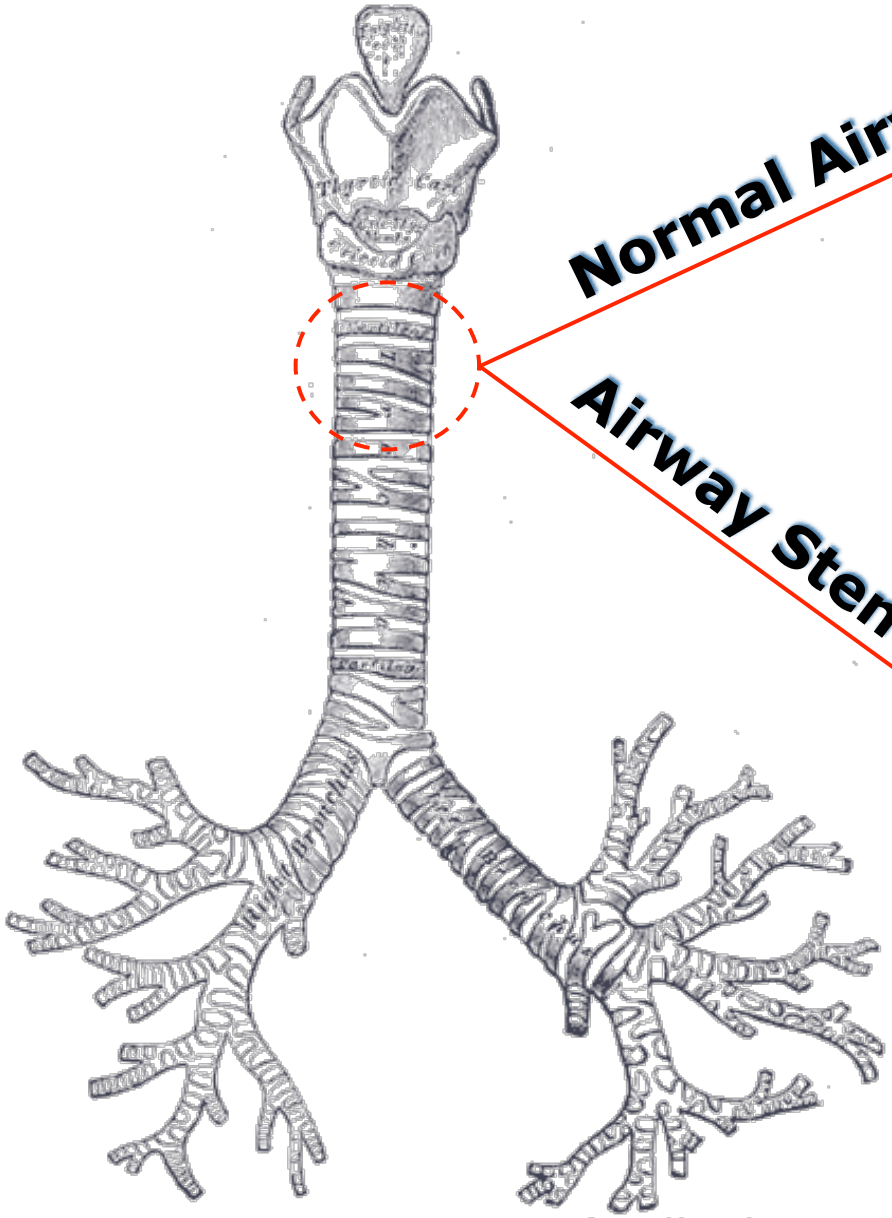
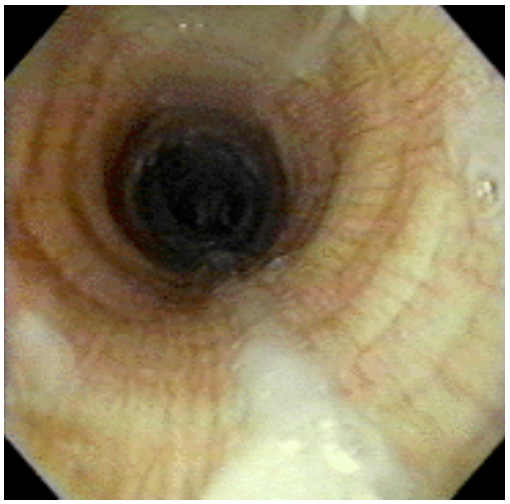
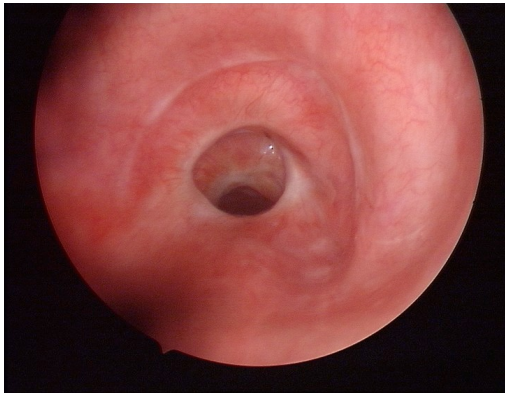
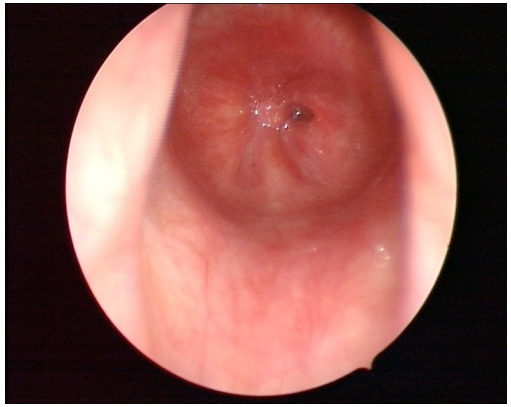


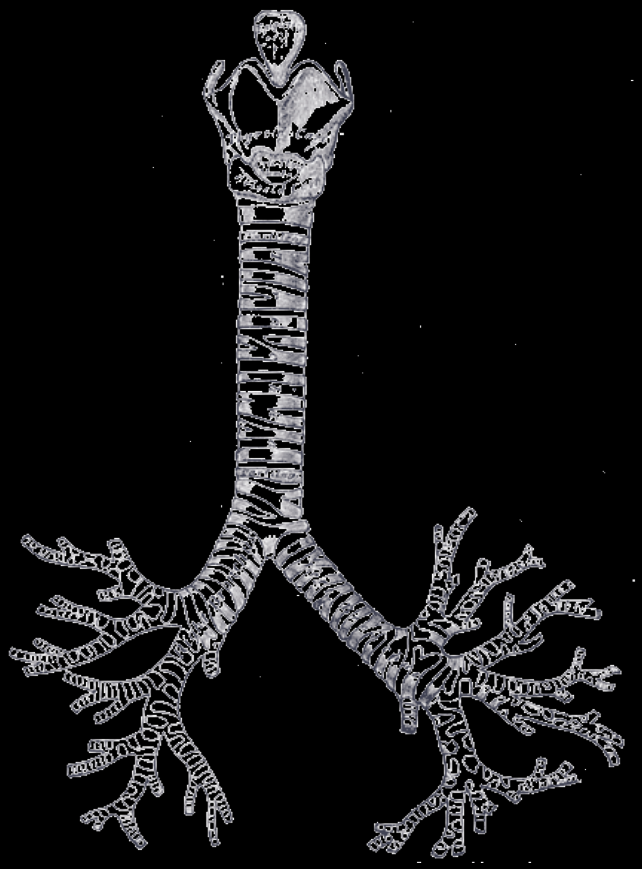
Normal Airway

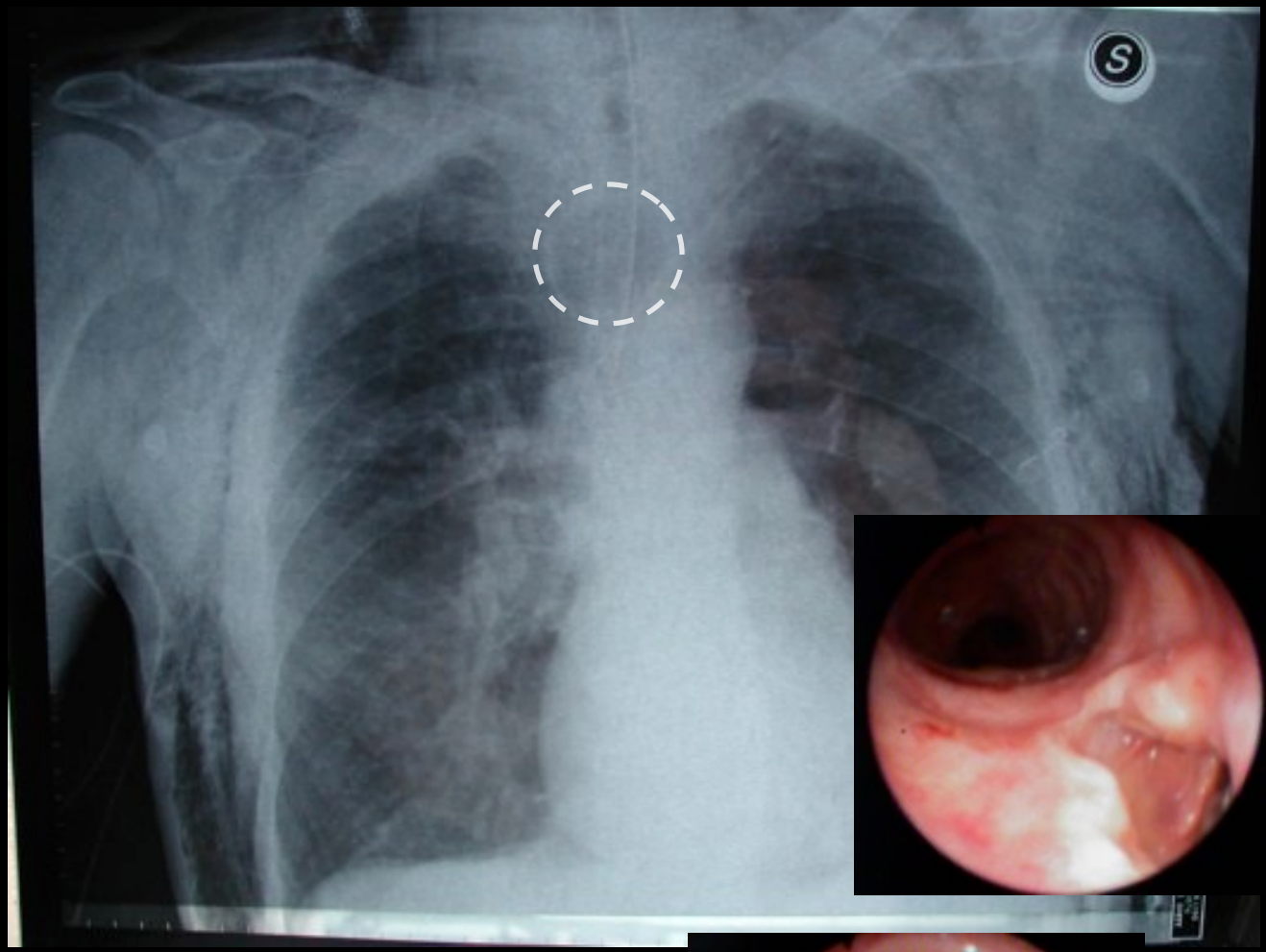
Airway Stenosis

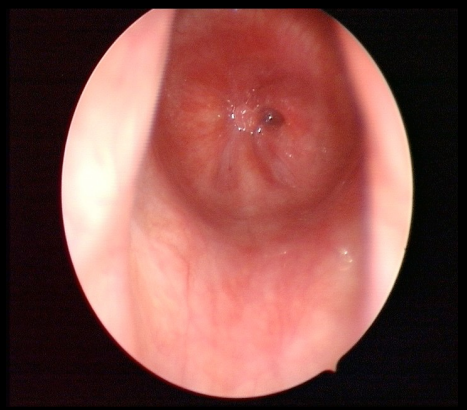


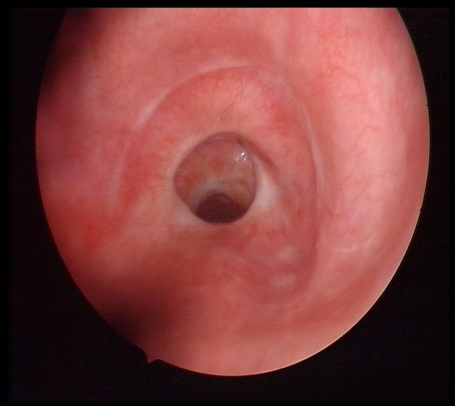


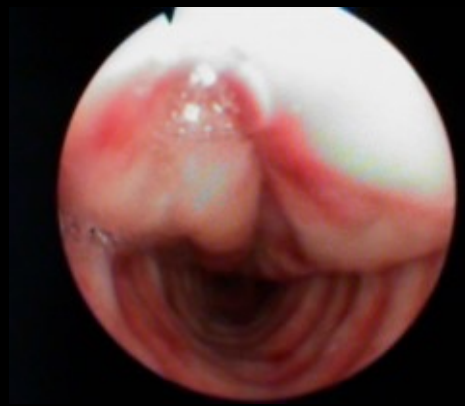


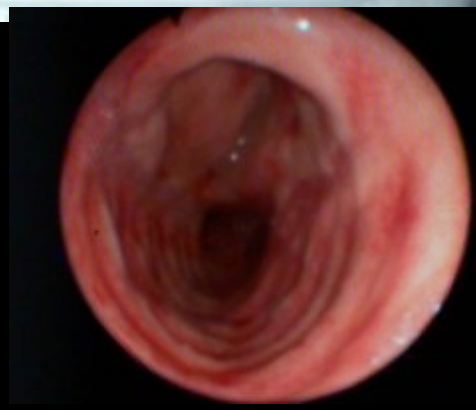












Adult Laryngotracheal Stenosis

Projected Population Incidence

Overall incidence: 286 cases per year (UK)

Postintubation incidence: 194 cases per year (UK)

Nouraei R, Patel A, Howard DJ, Sandhu GS. Estimating the population incidence of adult postintubation laryngotracheal stenosis. *Journal of Clinical Otolaryngology* 2007

Fatal tracheal injury at intubation

YORKSHIRE Evening Post

Tuesday, 6th October 2009

Family to sue after Pudsey woman's hospital death

HEALTH bosses in Leeds are facing legal action from the family of a woman who died following surgery at Leeds General Infirmary.

Christine Tunnicliffe, 63, underwent an exploratory operation after going into LGI complaining of stomach pains.

The mum-of-four was rushed into intensive care straight after the procedure and placed on a ventilator.

But it was not until the following morning that medics discovered she had a six-centimetre tear to her trachea, or windpipe. Mrs Tunnicliffe, from Pudsey, died 10 days later.

They say they are "astounded" that the tear in her windpipe went undiscovered for more than 12 hours after her operation.

The family claims that, during the op, an anaesthetist had to make three attempts to intubate her.

THE SCOTTISH Sun
Wednesday, November 11, 2009

Fatal LMA problem

Boy, 6, had heart attack at dentist

By DAVE FINLAY

Published: Today

A MUM is suing for £2.5million after her son had a heart attack as he had nine teeth out.

Ryan Gallacher, six, is said to have ended up with "significant brain damage" after suffering a cardiac arrest while under general anaesthetic.

His mum Anne Marie is claiming compensation on behalf of her son over the incident at Townhead Health Centre, Glasgow, in March 2002.

Ryan had a tube-like device fitted to protect his airway during the procedure.

But it was removed while he was still deeply anaesthetised. Asthmatic Ryan developed breathing problems and suffered a cardiac arrest before he was resuscitated.

Fatal laryngospasm

Donegal Democrat

IRISHTIMES.com

Saturday, October 24, 2009

A FIVE-YEAR-OLD boy who suffered a spasm at the conclusion of a simple medical test in a Sligo hospital died two days later, an inquest has heard.

Jessey Acheampong (5) of Glen Park, Foxhills, Letterkenny, Co Donegal, underwent an auditory brainstem evoked response (ABR) to investigate deafness, snoring and delayed speech at Sligo General Hospital on August 22nd, 2007.

The non–invasive procedure, under general anaesthetic and which lasted 50 minutes, was uneventful and the boy's vital signs remained stable throughout.

At the end of the procedure, locum anaesthetist Dr [redacted] decided to insert a gastric tube to remove gas from the child's stomach, (which was dilated due to the use of a face mask to put him to sleep), to minimise the chances of his vomiting.

Saturday 04.04.2009 | London

Mirror.co.uk
NEWS

Devastating mistakes by doctors during birth led to mum's death

Sam Matthew 3/04/2009

Following this week's inquest, husband Peter tells why he'll never let Finn forget his mum

Peter now knows an anaesthetist had made three bungled attempts to put a tube into his wife's airway to give her oxygen and finally thought he had succeeded. He was wrong. Finn was delivered but Jo's heart had stopped. It was then a second anaesthetist made a fourth attempt to insert the tube but again did so incorrectly.

Begging his wife to wake up, Peter Lockham gently laid baby Finn next to his mum, hoping his cries would bring her back to them.

Fatal post-op laryngospasm and aspiration in recovery

Hereford Times

Tuesday, 13 October 2009

Herefordshire man died after hernia operation

7:00am Tuesday 13th October 2009

Comments (0) Have your say »

A MAN died from complications following an operation to reduce a hernia, an inquest was told.

Michael Newby was admitted to Hereford County Hospital in November last year complaining of severe abdominal pain.

Tests revealed that the 47- year-old suffered from an incarcerated hernia which needed an operation because of the risk of bowel strangulation.

But Mr Newby, from Dernside Close, Wellington, soon deteriorated following a post-operation anaesthetic.

[redacted] said Mr Newby, who had been vomiting before arriving at the hospital on November 24, became wheezy and suffered exaggerated chest movements which, he said, was a sign of a blockage.

He then suffered a laryngeal spasm and was physically sick. He was taken to the hospital's intensive care unit but later died.

Giving a narrative verdict, assistant deputy coroner for Herefordshire Roland Wooderson said Mr Newby died following the aspiration of gastric contents following the reversal of anaesthesia.

The coroner said the hospital was not to blame for Mr Newby's death.

Tracheostomy blockage

GEORGINA O'HALLORAN

A MAN died in hospital following heart surgery after doctors had difficulty managing a tube used to help him to breathe, an inquest has heard. The coroner recorded a verdict of medical misadventure.

James Waugh (75), Castle Avenue, Thomastown, Co Kilkenny, underwent triple bypass surgery at St James's Hospital at the end of April 2008.

Doctors had difficulty in weaning Mr Waugh off the ventilator, and a tracheotomy, a surgical procedure on the neck to open a direct airway through an incision in the windpipe, was performed and a tracheotomy tube inserted.

On May 18th, nurses found it difficult to ventilate Mr Waugh and attempts were made to reposition the tube, Dublin City Coroner's Court heard.

There appeared to have been some blockage of the tube, but no obvious obstruction was seen.

An endotracheal tube was inserted to help the air reach his lungs. This was technically difficult as he suffered muscle spasms in the neck and was deprived of oxygen. He suffered a heart attack and died.

"The difficulty in managing the airway caused respiratory failure," coroner Dr Brian Farrell said.

IRISHTIMES.com

Tuesday, June 23, 2009

The Difficult Airway Society

The Royal College of Anaesthetists

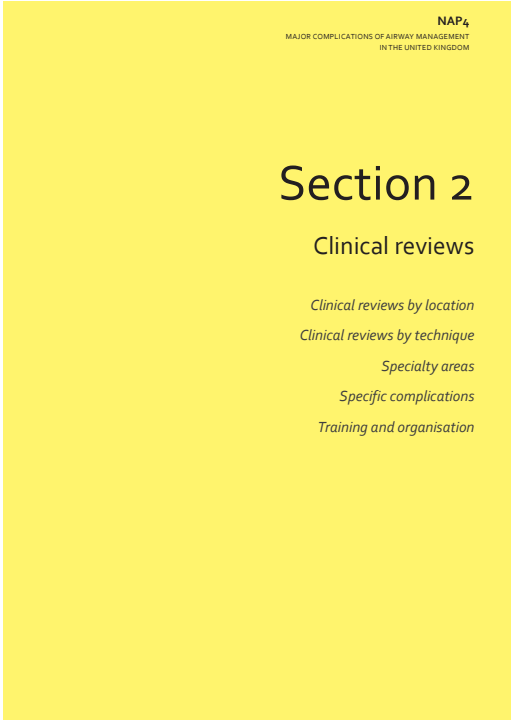
The Intensive Care Society

The College of Emergency Medicine

NHS
National Patient Safety Agency
Patient Safety Division

The National Patient Safety Agency
Patient Safety Division

Major Complications of Airway Management NAP4



National Audit Project 4

Investigate the major complications of airway management in UK anaesthetic practice

Calculate the incidence of serious complications

Learn from adverse events and look for themes

Major Complications of Airway Management

Death

Brain damage

Emergency surgical airway

ICU admission





















NAP4 2 Phases

Snapshot

A snapshot of practice

Over a 2 week period

During 2008/2009

Provides denominator

Case submission

Study of complications

Over one year

01/09/2008 - 31/08/2009

Provides numerator

$$\frac{\text{Number of complications}}{\text{Number of Airway Interventions}}$$

Incidence

$$\frac{\text{Number of complications}}{\text{Number of Airway Interventions}}$$

Incidence

Number of complications

2,900,000

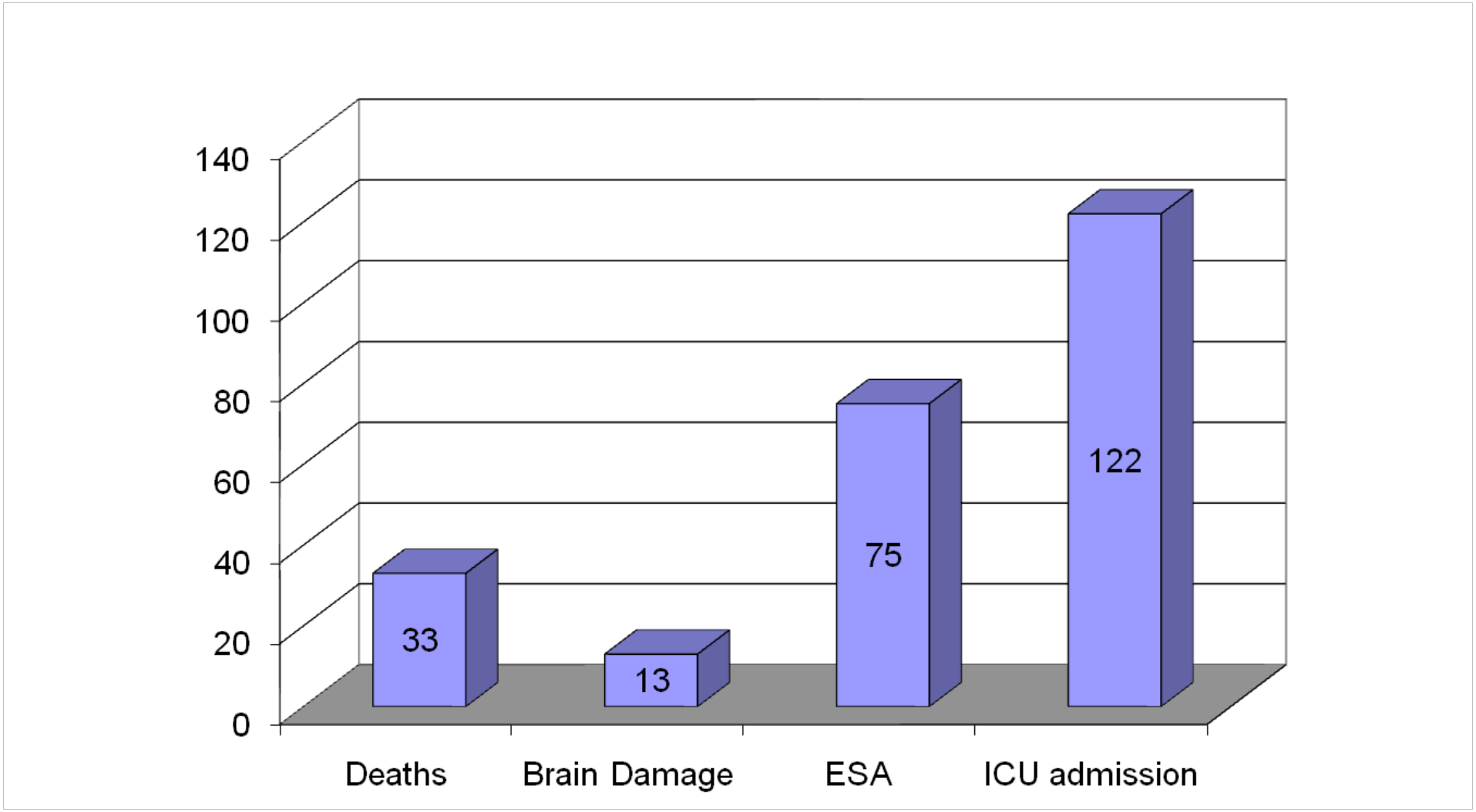
Airway Events

287 cases submitted

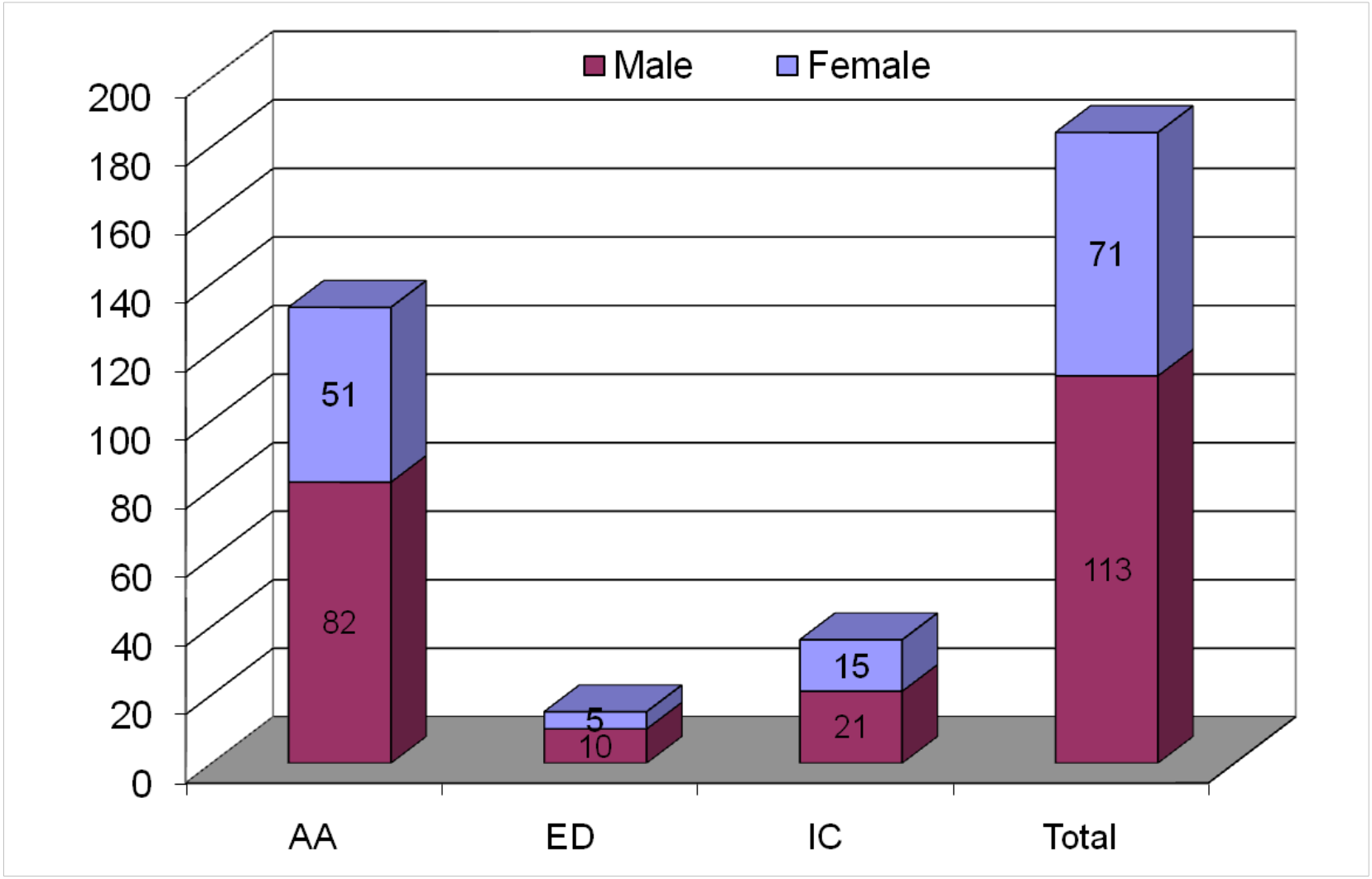
207 reviewed

184 reports

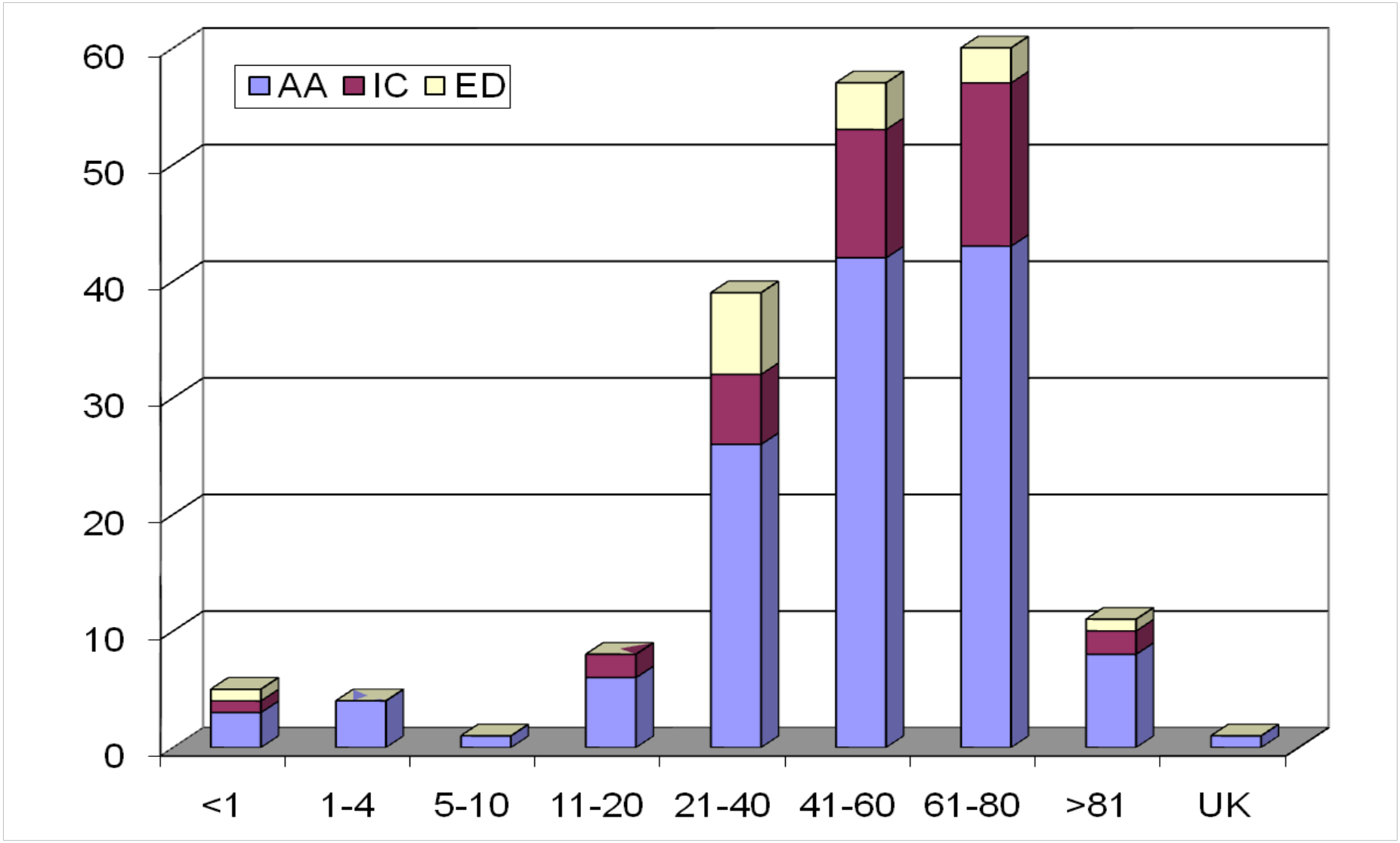
184 Reports by Inclusion Criteria



Demographic Data



Age



SAD / Aspiration / Obesity

Numerical Analysis

SAD 56% of all UK general anaesthetics

90% cLMA or LM's

10% i-gel or Proseal LMA

34 cases where SAD was primary airway

Of these 17 were aspiration

Of the Non-aspiration events

2 deaths

Devices Used

	Non-aspiration reports	Aspiration reports
disposable Laryngeal mask	7	3
classic LMA	6	8
'laryngeal mask'	1	3
flexible LMA	0	1
ProSeal LMA	2	0
i-gel	0	2

Anaesthesia Events - 16 cases

generally young (10/16 < 40years)

healthy (14/16 ASA 1-2)

'urgent' procedure (7/16 'urgent')

Obesity (11/15 73%)

compared to 31% outside this group

None of the patients who aspirated during use of a SAD weighed >100kg

Discussion

The common themes in complications arising during SAD use.

- Poor patient selection
- Poor operation selection
- Inexpert use

Recommendations

Laryngeal mask anaesthesia is a fundamental skill

Same attention to detail as intubation
patient selection
indications
contraindications
insertion
confirmation correct position
maintenance
removal and recovery

Aspiration - Tube

Warner MA, Warner ME, Weber JG. Clinical significance of pulmonary aspiration during the perioperative period. *Anesthesiology* 1993; **78**: 56–62

214,000 patients

1:4,000 elective

1:900 emergencies

Aspiration - Classic LMA

Brimacombe JR, Berry A. The incidence of aspiration associated with the laryngeal mask airway: a meta-analysis of published literature. *J Clin Anesth* 1995; **7**: 297–305

Verghese C, Brimacombe J. Survey of laryngeal mask airway usage in 11,910 patients: safety and efficacy for conventional and non-conventional usage. *Anesth Analg* 1996; **82**: 129–33

Keller C, Brimacombe J, Bittersohl J, Lirk P, von Goedecke A. Aspiration and the laryngeal mask airway: three cases and a review of the literature. *Br J Anaesth* 2004; **93**: 579–82

Aspiration

1:11,000

50% reduction need 1.3 million patients per group

Aspiration

Asai T. Who is at increased risk of pulmonary aspiration? *Br J Anaesth* 2004; **93**: 497–500

Patient factors

Operation factors

Anaesthesia factors

Device factors

Headline

Aspiration was the commonest cause of death in anaesthesia cases reported to NAP4 (>20% of reported cases)

Aspiration of gastric contents accounted for 50% of anaesthesia-related deaths. Many who survived did so only after a prolonged time on ICU.

Aspiration of blood clots led to two cardiac arrests including one death.

There was incomplete assessment of aspiration risk and failure to alter anaesthetic technique when aspiration risk was present.

An excess of the cases involved emergency surgery and trainee anaesthetists.

There were clear examples of aspiration occurring at induction when classical indications for RSI were present and it was not used.

Many aspirations occurred during maintenance with a standard LM.

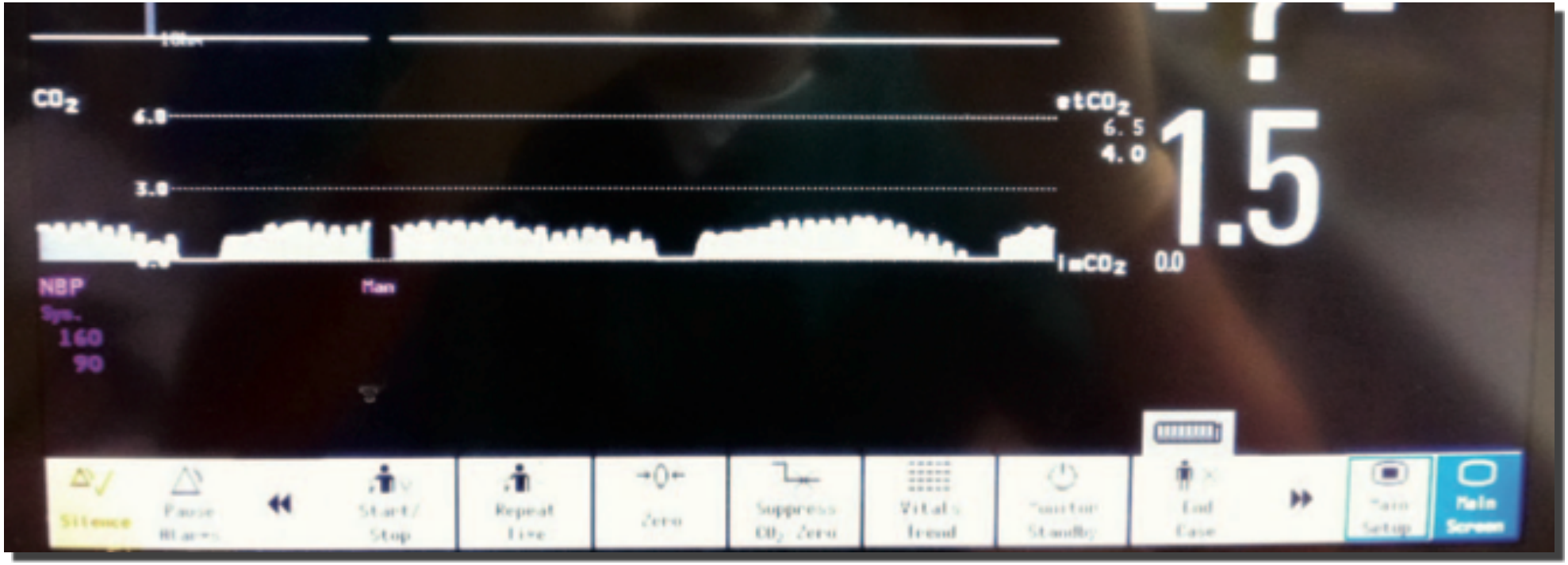
There was failure to identify risk and a failure to use available precautions to reduce the risk of such events: e.g. RSI for higher risk cases and the use of 2nd generation SADs for patients at lower risk.

Aspiration and its prevention should remain major concerns for all anaesthetists.

Unrecognised Oesophageal Intubation - Recommendations

Capnography should be used during all intubations, irrespective of location

Training in capnography interpretation, in particular abnormal but not flat trace during low cardiac output states and CPR


CO2
4.8
3.8
etCO2
6.5
4.0
1.5
0.0
iCO2
NBP
Sys.
160
90
Silence
Pause
Start/
Stop
Repeat
Zero
Suppress
Vitals
Suction
Standby
End
Case
Main
Screen

CHAPTER 18
Head and neck pathology

NAP4

MAJOR COMPLICATIONS OF AIRWAY MANAGEMENT
IN THE UNITED KINGDOM

DIRECT LARYNGOSCOPY

Deterioration in the airway following single or repeated attempts at direct laryngoscopy

Following induction of anaesthesia and attempts at direct laryngoscopy the airway deteriorated with increasing difficulty in ventilation in 13 patients.

With repeated attempts the airway became impossible to ventilate in 15 patients. All these 15 patients subsequently required a surgical airway.

CHAPTER 18
Head and neck pathology

NAP4
MAJOR COMPLICATIONS OF AIRWAY MANAGEMENT
IN THE UNITED KINGDOM

FLEXIBLE FIBREOPTIC TECHNIQUES

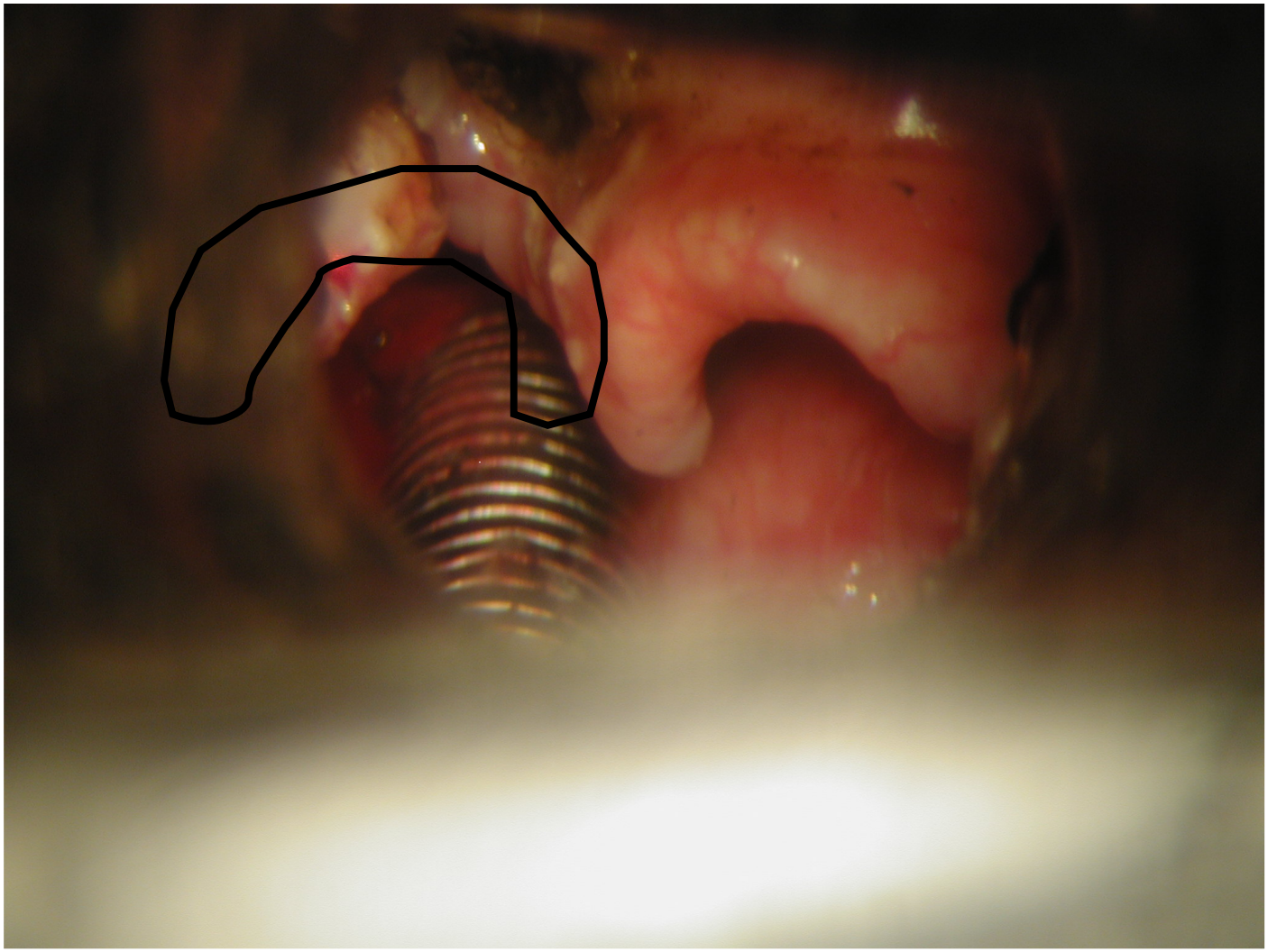
23 Attempts to use flexible fibreoptic techniques

9 successful

14 failed (4 awake, 10 asleep) - surgical airway required

Awake failure - inability to identify glottic inlet, pass the scope or pass the tube

Fibreoptic Intubation anatomical distortion



CHAPTER 18
Head and neck pathology

NAP4

MAJOR COMPLICATIONS OF AIRWAY MANAGEMENT
IN THE UNITED KINGDOM

NEEDLE CRICOTHYROTOMY OFTEN FAILS

27 uses of cannula cricothyroidotomy in head and neck patients

12 successful (small and large bore devices)

15 failed (misplaced, unable to place, fracture, kinking, dislodgement, barotrauma)

NAP4

"Where facemask or laryngeal mask anaesthesia is complicated by failed ventilation and increasing hypoxia the anaesthetist should consider early administration of further anaesthetic agent and or a muscle relaxant to exclude and treat laryngospasm"

NAP4

"no anaesthetist should allow airway obstruction and hypoxia to develop to the stage where an emergency surgical airway is necessary without having administered a muscle relaxant"

The most compelling educational effort for the anesthesia community should be to reduce the frequency and severity of complications related to managing the airway

Prof J Benumof 1995

SAVE THE DATE

28-30 November, Edinburgh, Scotland

Difficult Airway Society, Annual Scientific Meeting 2018

DAS

Difficult Airway Society
Annual Scientific Meeting

das2018@abbey.ie www.das2018.co.uk


WAMM
WORLD AIRWAY MANAGEMENT MEETING
AMSTERDAM 2019
13–16 November
www.wamm2019.com