ANAESTHESIA, AWARENESS AND NAP5

G.Panesar

AWARENESS

Probably the most feared complication of anaesthesia from patients

Associated with psychological trauma, PTSD and lack of trust in the medical profession

Risk of lifelong sequale

Risk of medico legal complications for the anaesthetist

AWARENESS : TYPES

Implicit awareness

Patients are unable to recall events surrounding surgery

May alter behaviour and performance after the episode

Explicit awareness

Patients can remember events surrounding surgery

Memories may be recalled spontaneously or retrieved by questioning

Most distressing when associated with pain

INCIDENCE

NAP5 : Largest audit project to date regarding awareness

Key figures:

Incidence of AAGA Certain/probable or Possible : 1:19,600

Incidence of AAGA when NMB used : 1:8200

Incidence of AAGA when no NMB used : 1:35,900

"Most pessimistic incidence" <1 : 6000

INCIDENCE : SPECIAL GROUPS

Incidence of AAGA reports after sedation : 1: 15,500

Incidence of AAGA in cardiothoracic anaesthesia 1: 8600

Incidence of AAGA with Caesarean section : 1 : 670

Multifactorial reasons for increased incidence within these groups

RISK FACTORS FOR AWARENESS

The risk of awareness is a direct function of the depth of anaesthesia

This can be altered for 4 main reasons:

1. Inadequate dose selection
2. Problems with anaesthesia side effects
3. Lack of monitoring / detection of signs of awareness
4. Inadequate dose delivery

INADEQUATE DOSE SELECTION

Most commonly due to poor technique, e.g :

- Late commencement or omission of agent
- Inappropriate fixed dosing (RSI)

Dose requirement for volatile agent varies with age (+/-25%)

Dose requirement for TIVA has a (theoretically) greater variability

INADEQUATE DOSE SELECTION

Resistance

Pyrexia

Hyperthyroidism

Obesity

Anxiety

Tobacco smoking

Regular, heavy alcohol use

Recreational drug use

Chronic use of sedatives

Previous and repeated exposure to anaesthetic agents

Sensitivity

i.e. Reduction in MAC

Hypocapnia,

Pregnancy

Hypothyroidism,

Hypothermia,

Hypotension,

Increased atmospheric pressure

Increasing Age

PROBLEMS WITH ANAESTHETIC SIDE EFFECTS

Reduction in depth of anaesthesia to offset:

- Myocardial depression
- Vasodilation

Most commonly seen in emergency & trauma surgery or emergency LSCS

LACK OF DETECTION OF SIGNS OF AWARENESS

Signs consistent with sympathetic nervous system activation:

(In the paralysed patient)

- Tachycardia
- Hypertension
- Sweating
- Lacrimation
- Pupillary dilation

(in the non paralysed patient)

- Movement
- Grimacing
- Tachypnoea

MASKING OF CLINICAL SIGNS

Sign of awareness	Factors masking the sign
Tachycardia	Heart block, β-blockers, hypothyroidism, autonomic neuropathy (e.g. diabetes, renal failure)
Hypertension	Heart block, β-blockers, hypothyroidism, vasodilators, epidural analgesia, blood loss, autonomic neuropathy
Sweating	Anti-muscarinic drugs (e.g. atropine, glycopyrrolate)
Tear production	Anti-muscarinic drugs, eye tape/ointment
Movement/grimacing	Neuromuscular blocking agents, sheets covering the patient
Tachypnoea	Neuromuscular blocking agents
Pupillary dilatation and reactivity to light	Anti-muscarinic drugs, opioids, ocular pathology, eye tape/ointment

RECOGNISING AWARENESS

Generated through sympathetic activation

- Sweating
- Tachycardia
- Hypertension
- Tear formation
- Pupil dilatation and pupil reactivity to light

By the use of depth of anaesthesia monitoring

- BIS
- Narcotrend
- aaEPx

BRICE QUESTIONNAIRE

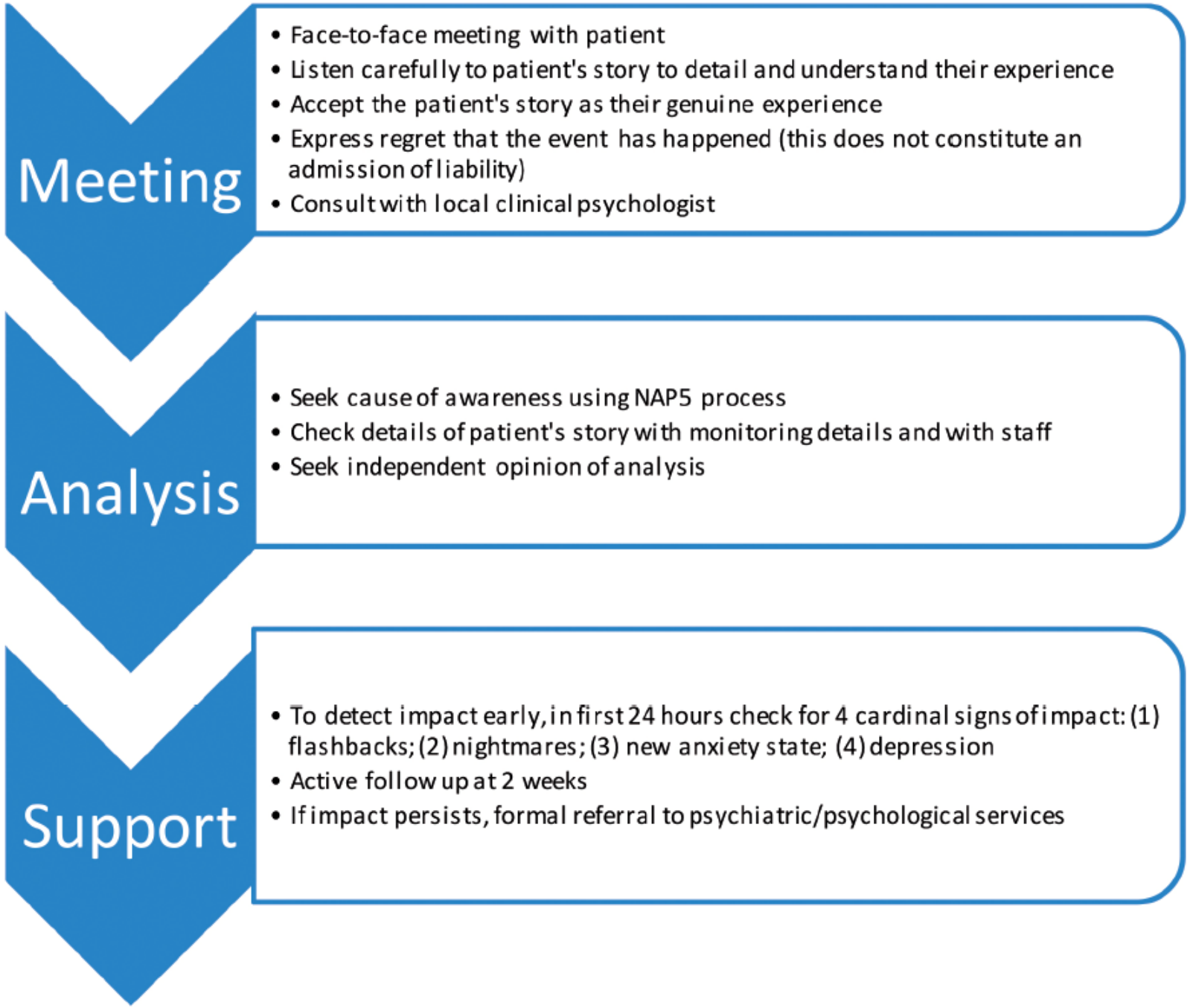
(1) What was the last thing you remembered happening before you went to sleep?

(2) What is the first thing you remember happening on waking?

(3) Did you dream or have any other experiences whilst you were asleep?

(4) What was the worst thing about your operation?

(5) What was the next worst?


Meeting
• Face-to-face meeting with patient
• Listen carefully to patient's story to detail and understand their experience
• Accept the patient's story as their genuine experience
• Express regret that the event has happened (this does not constitute an admission of liability)
• Consult with local clinical psychologist
Analysis
• Seek cause of awareness using NAP5 process
• Check details of patient's story with monitoring details and with staff
• Seek independent opinion of analysis
Support
• To detect impact early, in first 24 hours check for 4 cardinal signs of impact: (1) flashbacks; (2) nightmares; (3) new anxiety state; (4) depression
• Active follow up at 2 weeks
• If impact persists, formal referral to psychiatric/psychological services

CLASSIFYING AWARENESS

Class 0	No accidental awareness during general anaesthesia
Class 1	Isolated auditory perceptions
Class 2	Tactile perceptions (with or without auditory)
Class 3	Pain (with or without tactile or auditory)
Class 4	Paralysis (with or without tactile or auditory)
Class 5	Paralysis and pain (with or without tactile or auditory)

SEVERITY	Revised definitions for NAP5
None 0	No harm occurred
Low 1	Resolved or likely to resolve with no or minimal professional intervention. No consequences for daily living, minimal or no continuing anxiety about future healthcare.
Moderate 2	Moderate anxiety about future anaesthesia or related healthcare. Symptoms may have some impact on daily living. Patient has sought or would likely benefit from professional intervention.
Severe 3	Striking or long-term psychological effects that have required or might benefit from professional intervention or treatment: severe anxiety about future healthcare and/or impact on daily living. Recurrent nightmares or adverse thoughts or ideations about events. This may also result in formal complaint or legal action.
Death 4	Caused death

SEVERITY	Definitions for NAP5
A. Certain/ probable AAGA	A report of AAGA in a 'surgical setting' in which the detail of the patient story is judged consistent with AAGA, especially where supported by case notes or where report detail is verified.
B. Possible AAGA	A report of AAGA in a 'surgical setting' in which details are judged to be consistent with AAGA or the circumstances might have reasonably led to AAGA, but otherwise the report lacks a degree of verifiability or detail. Where uncertain whether a report described AAGA the case should be classified as possible rather than excluded.
C. Sedation	A report of AAGA where the intended level of consciousness was sedation.
D. ICU	A report of AAGA from a patient in, or under the care of the intensive care unit, who underwent a specific procedure during which general anaesthesia was intended.
E. Unassessable	A report, where there was simply too little detail submitted to make any classification possible.
F. Unlikely	Details of the patient story are deemed unlikely, or judged to have occurred outside of the period of anaesthesia or sedation.
G. Drug error	Syringe swaps and drug errors leading to brief awake paralysis.
SO Statement only	A patient statement describing AAGA, but there were no case notes available to verify, refute or examine that claim further.

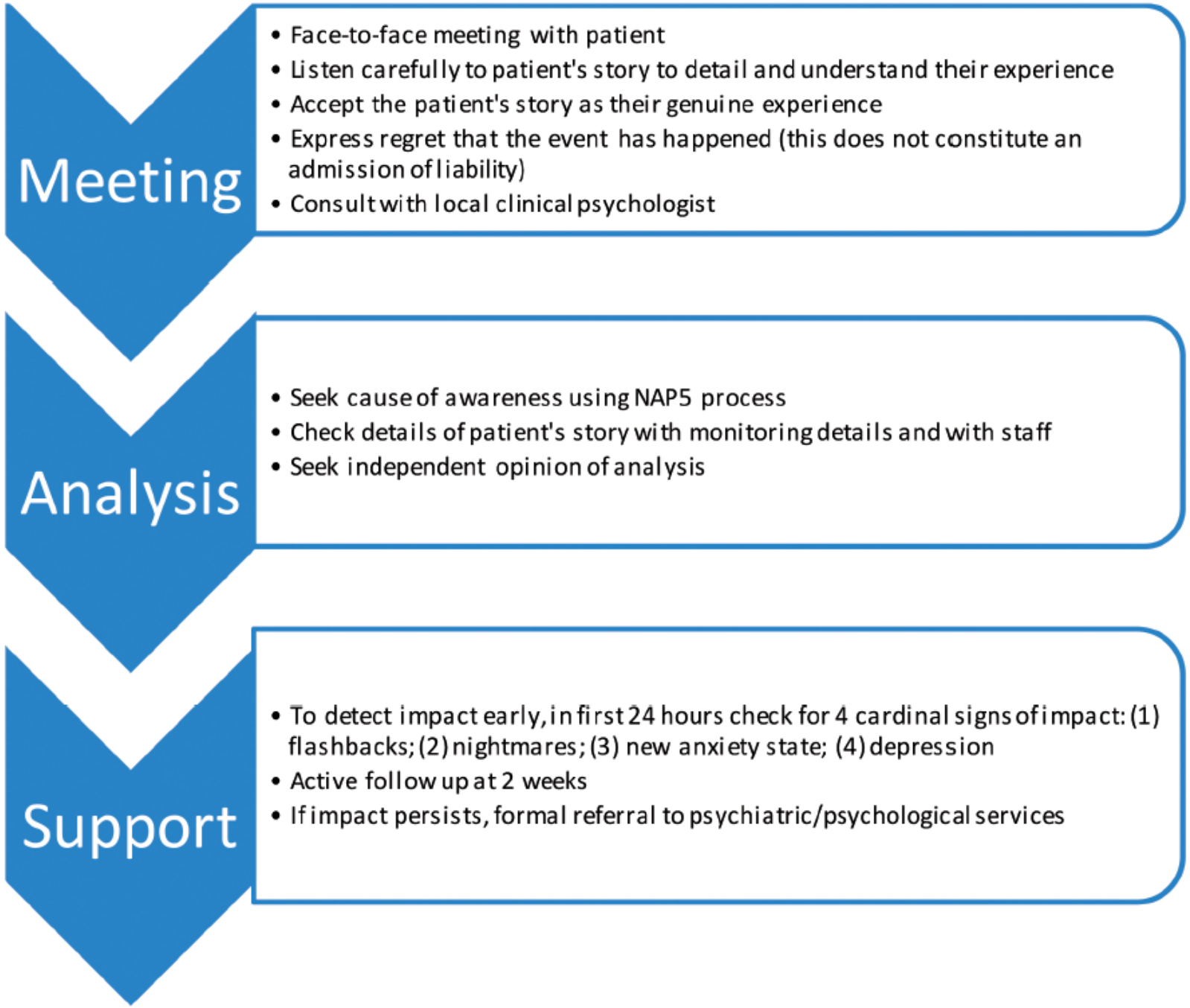
High quality: Where the report of AAGA is, or could easily be, confirmed by other evidence.

Circumstantial: Where the report of AAGA is supported only by clinical suspicion or circumstance.

Plausible: Where other evidence was available, but this does not shed further light on the matter.

Unconfirmed: Cases where there was no evidence other than the patient report.

Implausible: Where there is no evidence other than the patient story and where this is judged implausible.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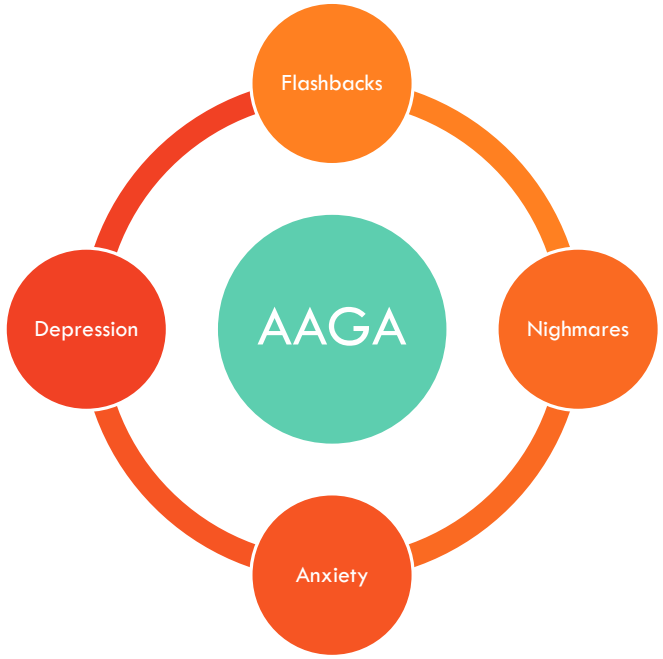
FOLLOWUP

Process is open and patient led

Initial assessment at 24 hours

Follow-up review at 2 weeks:

- Time to allow reflection
- Patient has time to interpret events and draw conclusions
- Impact of awareness may manifest



Persistent psychological impact needs input from a psychologist or psychiatrist

PTSD-type reactions should be treated with either trauma-focussed Cognitive Behavioural Therapy or Eye-Movement Desensitisation and Reprocessing

NAP 5 KEY POINT SUMMARIES

Patient characteristics

- Children under-represented : why?
- Young/middle aged adults over represented
- Increased risk in females (?obs)
- Increased risk in the obese

- Majority of cases ASA 1&2

Operative characteristics

- Increased risk in obstetrics (x10)
- Increased risk in cardiothoracics (x2.5)

Two specialities appear under represented / carry lower risk:

- Plastics
- T&O spinal surgery

The largest cohort of cases is by far within the “general” category of surgery

NAP 5 KEY POINT SUMMARIES

Phase of anaesthesia

Induction and emergence both "at risk" times for AAGA

Maintenance only accounts for 34% of AAGA cases

Induction is riskier than emergence

Lack of opiate use, RSI, difficult airway management and obesity all make AAGA more likely

Lack of bodyweight dosing or "dosing by ampoule" worryingly common

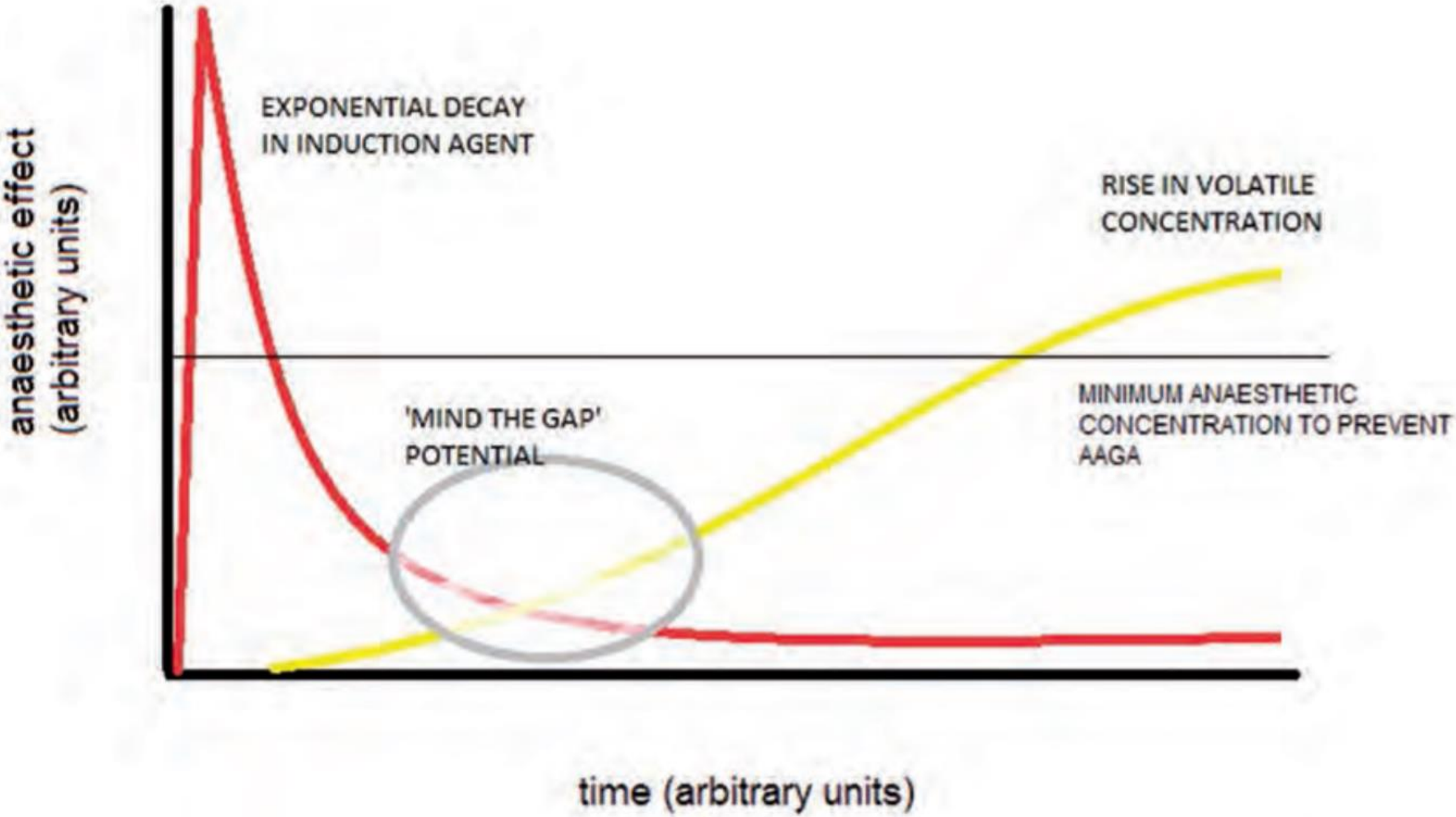
Anaesthetic techniques

Use of NMB massively increases risk : 93% of reports

Lack of use of a nerve stimulator increases risk

"The combination of using NMB, not monitoring its effect, and not reversing it together seemed to incur a risk for AAGA"

Thiopentone overrepresented massively*


anaesthetic effect
(arbitrary units)
EXPONENTIAL DECAY
IN INDUCTION AGENT
RISE IN VOLATILE
CONCENTRATION
'MIND THE GAP'
POTENTIAL
MINIMUM ANAESTHETIC
CONCENTRATION TO PREVENT
AAGA
time (arbitrary units)

NAP 5 KEY POINT SUMMARIES

Anaesthetic technique

All non propofol induction agents are over represented

No riskier volatiles

TIVA over-represented

N2O no overall difference

BIS (bizarrely) over represented

? Proportion of patients with inherent risk
?5 fold chance of repeat AAGA

In around 5% of cases there is some kind of family history

ENDING THOUGHTS

Massive audit project

Essential knowledge for both CRQ and Viva

Actually quite interesting

Probably the thing you should learn how not to do!

Management of AAGA is a key role within any department

NAP 5 laid a universal best practice framework