NAP5

Mike Sury

APA-ASM

May 2015
National Audit Projects usually study an important anaesthesia-related topic of low incidence. Topics will be important to patients and anaesthetists, and be incompletely studied in incidence or nature.

The Health Services Research Centre is responsible for the management of the NAPs and is overseen by RCoA Council.

Details about NAPs 1-6 can be found below. NAPs 1-3 were run solely by the RCoA. NAP4 was run by the RCoA, in partnership with the Difficult Airway Society. NAP5 is currently being run in partnership with the Association of Anaesthetists of Great Britain and Ireland.

**NAP1 and NAP2**
Supervisory role of consultant anaesthetists (NAP1) & Place of mortality and morbidity review meetings (NAP2)

**NAP3**
Major complications of central neuraxial block in the United Kingdom

**NAP4**
Major complications of airway management in the United Kingdom

**NAP5**
Accidental awareness during general anaesthesia in the United Kingdom

**NAP6**
Perioperative anaphylaxis. Information coming soon.
Accidental Awareness during General Anaesthesia in the United Kingdom and Ireland

Report and findings
September 2014
• There are 300 departments of anaesthesia in the UK
The state of UK anaesthesia: a survey of National Health Service activity in 2013
NAP5

• Spontaneous reports
• A procedure managed by an anaesthetist
  – Includes outside rooms
  – Emergency department
  – ICU
How many reports?

- Of 300 reports
  - 141 were class A or B

- A = certain
- B = probable
- C = sedation
- D = ICU
- E = unassessable
- F = unlikely
- G = other
- SO = statement only
<table>
<thead>
<tr>
<th>Age range (years)</th>
<th>All classes</th>
<th>Class A or B (Certain/probable)</th>
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<td>141</td>
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</table>
Recommendations

• The paucity of AAGA cases involving children reported to NAP5 means it is unjustified to make specific recommendations about prevention and management of AAGA in this group.
Common/Important situations

- Induction
- Emergence
- TIVA
- Cardiovascular collapse
- Drug swops
- Sedation
Induction

• 50% of reports
• Causative/contributory factors were:
  – thiopental
Induction

• 50% of reports
• Causative/contributory factors were:
  – thiopental,
  – obesity,
  – rapid sequence induction (RSI),
  – prolonged airway management
Induction

- drug omission on transfer (‘Mind the gap’)
ANAESTHETIC COMPONENTS OF THE WHO CHECKLIST: AC-WHO

- **A: Airway**
  - Is the airway (anaesthetic) management plan clear?
  - Is the airway secure?

- **B: Breathing**
  - Is the circuit intact and connected?
  - Is the correct gas mix on (O₂ %)?
  - Is there adequate lung ventilation?
  - Is it suitably monitored?

- **C: Circulation**
  - Is the venous access appropriate and secure?
  - Is the circulation suitably monitored?

- **D: Drugs**
  - Is there suitable supply of anaesthetic?
  - Is it suitably monitored?
  - Are emergency, reserve and other drugs available?

- **E: Effective team**
  - Are suitably trained staff present and identified?
  - Has the management plan been communicated?
EXPONENTIAL DECAY IN INDUCTION AGENT

'MIN D THE GAP' POTENTIAL

RISE IN VOLATILE CONCENTRATION

MINIMUM ANAESTHETIC CONCENTRATION TO PREVENT AAGA

aneesthetic effect (arbitrary units)

time (arbitrary units)
Emergence

• 18%

• almost all experienced distressing residual paralysis from unmonitored blockade
Almost a quarter of episodes of AAGA were reported to occur during emergence or in recovery.
## NHS GA Activity

<table>
<thead>
<tr>
<th>Airway device</th>
<th>Caseload</th>
<th>(%)</th>
<th>Removed awake</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>8,300</td>
<td>0.3%</td>
<td></td>
</tr>
<tr>
<td>Oxygen mask or nasal specs</td>
<td>11,400</td>
<td>0.4%</td>
<td></td>
</tr>
<tr>
<td>Face Mask (+/- Guedel airway)</td>
<td>77,300</td>
<td>3.0%</td>
<td></td>
</tr>
<tr>
<td>Supraglottic airway</td>
<td>1,319,100</td>
<td>51.3%</td>
<td>84.5%</td>
</tr>
<tr>
<td>Tracheal tube</td>
<td>1,147,300</td>
<td>44.6%</td>
<td>83.2%</td>
</tr>
<tr>
<td>Tracheostomy</td>
<td>10,700</td>
<td>0.4%</td>
<td></td>
</tr>
</tbody>
</table>
TIVA

• Transfers to ICU/Radiology
• poor & non-standard techniques
• ? monitoring
<table>
<thead>
<tr>
<th></th>
<th>No NMB</th>
<th>% using DOA</th>
<th>NMB</th>
<th>% using DOA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volatile agent</td>
<td>1,357,600</td>
<td>1.1%</td>
<td>1,095,100</td>
<td>3.5%</td>
</tr>
<tr>
<td>TIVA</td>
<td>95,200</td>
<td>7.8%</td>
<td>109,100</td>
<td>23.4%</td>
</tr>
</tbody>
</table>
Cardiovascular instability

• Do not turn anaesthesia off
• Except............
Accidental paralysis from drug error

- accounted for 10% of reports and caused identical effects.
- “Such cases abounded with latent and organisational factors”
Preventable?

• 7% of NAP5 reports had no obvious explanation
Reports from patients not intended to be asleep

- Nearly 20% of all A&B reports
- Long term effects were as severe as after AAGA
- Contributory factors were communication and consent.

*Failures of communication were the cause of almost 90% of reports of 'AAGA' after sedation*
<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Remember?</th>
<th>Risk related to sedation drugs?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not sedated; awake</td>
<td>I am awake, possibly anxious. There may be some mild discomfort (depending on what I am having done)</td>
<td>Everything</td>
<td>Nearly zero</td>
</tr>
<tr>
<td>Minimal sedation</td>
<td>I am awake and calm. There may be some mild or brief discomfort</td>
<td>Probably everything</td>
<td>Very low risk</td>
</tr>
<tr>
<td>Moderate sedation</td>
<td>I am sleepy and calm but remain in control. I may feel some mild discomfort</td>
<td>I might remember some things</td>
<td>Low risk</td>
</tr>
<tr>
<td>Deep sedation</td>
<td>I am asleep. I will not be in control</td>
<td>Probably very little</td>
<td>Higher risk. My breathing may slow when I am asleep – and I may need help to breathe – a tube might be inserted into my nose, mouth or (rarely) windpipe. I will need oxygen and special monitoring</td>
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<tr>
<td>Anaesthesia</td>
<td>I am deeply ‘asleep’ and unable to respond</td>
<td>Very unlikely to remember anything</td>
<td>Higher risk (but the presence of an anaesthetist increases safety). My breathing may slow or stop and my blood pressure and heart rate may fall. I will need a specialist doctor to look after my breathing and support my blood pressure and heart rate I will need oxygen and special monitoring and equipment</td>
</tr>
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</table>
Preventing the psychological consequences of AAGA

• Before
  – “if you waken you might not be able to move .......... this is reversible, I will look after you .....”

• During
  – Reassure the patient if you think they are awake
Managing AAGA: suggested pathway

**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 NAPS 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
NAP5 Executive Summary

• The largest study of AAGA
  – 141 reports
• 141 reports
• Wide range of experiences/sensations
• 50% reported distress linked to paralysis
• Prevention & mitigation

http://nap5.org.uk/NAP5report
And for children?
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Two major findings

1. very few children themselves reported AAGA
Two major findings

1. very few children themselves reported AAGA
2. patients can delay reporting an AAGA event that occurred as a child for many years.
A patient now in their 70s remembered “people doing things” in his mouth during a tonsillectomy at the age of ~12 yrs.
A now ~50-year-old was fearful of anaesthesia because of being “awake and screaming throughout” during a tonsillectomy aged about 5 years.
Incidence?
<table>
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<tr>
<th>Authors</th>
<th>Incidence</th>
<th>Number</th>
</tr>
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<tbody>
<tr>
<td>Davidson et al., 2008</td>
<td>0.2%</td>
<td>1 of 500</td>
</tr>
<tr>
<td>Blusse Van Oud-Albas et al., 2008</td>
<td>0.6%</td>
<td>6 of 928</td>
</tr>
<tr>
<td>Davidson et al., 2005</td>
<td>0.8%</td>
<td>7 of 864</td>
</tr>
<tr>
<td>Malviya et al., 2009</td>
<td>0.8%</td>
<td>14 of 1784</td>
</tr>
<tr>
<td>Lopez and Habre, 2009</td>
<td>1.2%</td>
<td>5 of 410</td>
</tr>
</tbody>
</table>

| Aggregate: from Davidson et al., 2011 (95% CI) | 0.74% (0.29-1.19%) | 33 out of 4486 |
? Missing reports

- If 0.74% is the true rate of AAGA, there should be approximately 3,700 children per year in the UK with recall of events during general anaesthesia.
4 Learning Points

a) Spontaneous reporting of AAGA is very rare and may be delayed until adulthood.

b) Children’s reports can be as reliable as those from adults.

c) Children should be believed and treated sympathetically.

d) Serious long term psychological harm and anxiety states are rare, but do occur.
2.8m GA cases per year
(overall incidence = 1:20,000)
Incidence: depends on circumstances

<table>
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<th>Description</th>
<th>Activity Survey estimate, n</th>
<th>Incidence</th>
<th>%</th>
</tr>
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<tr>
<td>Incidence of any report of AAGA made by a patient (n=471)* [429–515]</td>
<td>2,766,600</td>
<td>1: 6,500</td>
<td>0.015</td>
</tr>
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<td>Incidence of AAGA Certain/probable (n = 111) [91–133]</td>
<td>2,766,600</td>
<td>1: 25,000</td>
<td>0.004</td>
</tr>
<tr>
<td>Incidence of AAGA Certain/probable or Possible (n = 141) [118–166]</td>
<td>2,766,600</td>
<td>1: 19,600</td>
<td>0.005</td>
</tr>
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<td>Incidence of AAGA when NMB used** (n = 155) [131-181]</td>
<td>1,272,700</td>
<td>1: 8,200</td>
<td>0.012</td>
</tr>
<tr>
<td>Incidence of AAGA when no NMB used** (n = 11) [5–19]</td>
<td>1,494,00</td>
<td>1: 135,900</td>
<td>0.001</td>
</tr>
<tr>
<td>Incidence of AAGA reports after sedation by anaesthetists (n = 20) [12–30]</td>
<td>308,800</td>
<td>1: 15,500</td>
<td>0.006</td>
</tr>
<tr>
<td>Incidence of AAGA with Caesarean section (n = 12) [6–20]</td>
<td>8,000</td>
<td>1: 670</td>
<td>0.150</td>
</tr>
<tr>
<td>Incidence of AAGA in cardiothoracic anaesthesia (n = 8) [3–15]</td>
<td>68,600</td>
<td>1: 8,600</td>
<td>0.012</td>
</tr>
<tr>
<td>Incidence of AAGA in paediatric anaesthesia (n = 8) [3–15]</td>
<td>488,500</td>
<td>1: 61,100</td>
<td>0.002</td>
</tr>
</tbody>
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