

The NAP5 Report: a summary for patients and their families or carers

National Audit Projects

The National Audit Projects are a series of projects looking at serious but rare complications of anaesthesia (details about previous and upcoming projects are available [here](#)). The projects originated from and are co-ordinated by the [Royal College of Anaesthetists](#), sometimes in collaboration with other relevant organisations. NAP5 looked at Accidental Awareness during General Anaesthesia (AAGA) and was run in partnership with the [Association of Anaesthetists of Great Britain and Ireland](#). This was the first NAP project which included the Republic of Ireland, previous projects having been run solely in the UK.

In addition to exploring the topic of AAGA NAP5 also made recommendations to improve care of patients and for research into the subject.

Accidental awareness during general anaesthesia

AAGA in the simplest terms is when a patient expects to be unconscious during a procedure but is not. The range of patient experiences ranges from being completely awake, to a variety of less clear or complete sensations. Patients report many different experiences from feeling calm or detached to feeling distressing symptoms such as paralysis or even the pain of the operation. For some, the experience has no enduring effects, but for others it has a long lasting psychological impact.

NAP5 – THE RESULTS

Each year there are almost 2.8 million anaesthetics given in the UK NHS. NAP5 found that, as reported by patients, AAGA is rare: only about 1 patient in every 17,000-20,000 experienced some form of AAGA. Patients can therefore be reassured that AAGA is not something considered likely with a general anaesthetic – but should it occur, can also be reassured that it will be taken seriously and properly investigated.

Furthermore, NAP5 found that about 50% of patients who reported AAGA reported it in a neutral way and that any experience of AAGA was brief (generally of just a few minutes duration). Therefore, even when it arises, there is some reassurance that its effects can be limited.

However, about 50% of patients reported distress. Those who experienced distress were most likely to have experienced paralysis or pain while aware. The NAP5 report emphasised the importance of the anaesthetist talking to the patient to reassure them, both during a suspected episode of AAGA and afterwards. When this happened, it reduced the incidence and severity of longer lasting psychological distress.

NAP5 recommends that all reports of awareness and cases of suspected awareness should be taken seriously and where possible the anaesthetist who provided care at the time of AAGA should speak to the patient as soon as possible in a sympathetic way. A NAP5 Psychological Support Pathway or similar pathway should be used to support the patient as soon as possible after the experience.

Phase of anaesthesia

There are several phases of anaesthesia during which different amounts and different drugs are administered. The phases are 'induction' (anaesthesia before the operation), 'maintenance' (anaesthesia during surgery) and 'emergence' (the end of anaesthesia and waking up after surgery). About half of the cases of AAGA reported occurred during induction, when a combination of drugs is used to create an unconscious state in the patient. Patients who experienced AAGA at this stage were more likely to be having an **urgent or emergency procedure**. **Obesity** was also a risk factor for AAGA at this stage. Patients who have a **difficult airway** (a condition where it is found difficult to insert the breathing tube during anaesthesia) were also at a higher risk of AAGA. The time between induction and surgery is a period where there is much activity, such as the movement of the patient from the anaesthetic room to theatre, and positioning of the patient during surgery. NAP5 recommends that anaesthetists conduct a basic checklist (as an addition to an existing checklist already in place in all NHS hospitals) to prevent any distractions during this phase that result in failure to provide or continue the anaesthetic.

A third of cases of AAGA occurred during the maintenance phase of anaesthesia, after surgery has started. The underlying cause of these episodes was uncertain and many remained unexplained (i.e. the dose

and delivery of anaesthetic seemed sufficient for the circumstances). Since about 1 in 20 of the AAGA reports either had a family history of AAGA or a previous episode of AAGA, this raised the possibility that some patients are resistant to the effects of anaesthesia perhaps due to genetic factors. This needs further research.

The emergence phase of anaesthesia accounted for just under a fifth of the reports of AAGA. The majority of these, 85%, experienced paralysis as a distressing symptom of their AAGA. Muscle relaxants (or paralysing drugs) are included in around half of all general anaesthetics so patients can be greatly reassured that, if these drugs are not used, the risk of AAGA is extremely small indeed. NAP5 therefore has recommended better monitoring of the effect of these drugs and the use of specific drugs to reverse their effect before the patient is awoken from anaesthesia.

Overall, two thirds of the reports of AAGA described being able to recall events either before surgery started or after it finished. Reports of AAGA during surgery account for only one third of the cases reported.

Patient experiences and psychological consequences of AAGA

Because NAP5 is the largest ever study of AAGA we were able to examine a large number of cases of AAGA and explore the psychological impact of these cases.

Approximately half of the patients who reported AAGA told us they had been distressed during their experience. The most common reason for distress was an inability to move or communicate. Pain during AAGA was much less common – it occurred in less than 1 in 5 reports of AAGA. There was evidence that when patients understood that paralysis was caused by anaesthetic drugs there was less distress. Distress caused by AAGA experiences that involved only a sensation of hearing or touch was less common but did occur. Again understanding of the temporary nature of events appeared to reduce distress.

Longer term psychological consequences occurred in about two of every five patients who reported AAGA. The symptoms varied from mild to severe. Symptoms included anxiety, nightmares and depression. In the most severe cases, symptoms included post-traumatic stress disorder. The study methods did not enable us to determine how long symptoms lasted but we hope to study this in the future.

An important finding of NAP5 was the association between the use of muscle relaxant (paralysing) drugs and unpleasant awareness experiences. There was a clear association between the use of these drugs and the risk

of AAGA occurring, distress when AAGA occurred and subsequent psychological consequences. One of the recommendations made by NAP5 was that anaesthetists should use caution when using these drugs, should monitor their use better and that in circumstances where the risk of AAGA is particularly high, this should be explained to the patient. Improved communication and patient understanding of the process of anaesthesia may decrease the psychological impact of AAGA when it occurs.

Some specific areas of focus for NAP5

NAP5 focussed on some particular types of surgery or anaesthetic techniques.

Cardiothoracic surgery

Patients undergoing cardiothoracic surgery were more likely to experience AAGA than those undergoing other surgeries. Anaesthetic drugs may lead to particular problems in patients with heart disease and so in some circumstances the dose of anaesthetic was intentionally reduced. Also, cardiothoracic surgery commonly employs the use of muscle relaxant drugs.

Obstetric anaesthesia

The vast majority of Caesarean sections operations are performed with a spinal anaesthetic and the mother intentionally awake. However, NAP5 has shown that when general anaesthesia is needed for Caesarean section, the risk of AAGA is increased. A combination of factors make this so: emergency situations, limited time between the start of anaesthesia and surgery, the need to use specific drugs and particularly the need to have the mother asleep yet the baby awake at the same time. Obesity and difficult airway management are also likely to contribute to risk in this patient group, along with the universal use of muscle relaxants for this surgery. Nevertheless, NAP5 has highlighted the issue of AAGA during Caesarean section and raised questions about the type of anaesthetic drugs and combinations currently used. It is hoped that changes in practice and increased focus on avoiding AAGA by obstetric anaesthetists will make AAGA much less likely.

Total intravenous anaesthesia

Sometimes, a special type of anaesthesia in which drugs are administered by intravenous infusion rather than by inhaled gases – total intravenous anaesthesia (TIVA) – is necessary or desirable to use. Recovery may be quicker after TIVA with less nausea or vomiting. NAP5 found that the incidence of AAGA was higher during TIVA and has therefore recommended that there is better training in using this technique, as well as improved standards for monitoring when this technique is used.

SEDATION

Sedation is distinct from *anaesthesia* – during anaesthesia the intention is that the patient is unconscious ('asleep'), while during *sedation* the intention is that the administered drugs make the patient drowsy, comfortable and control any unpleasant experiences but the patient remains conscious ('awake'). Sedation is used for procedures like endoscopy or where general anaesthesia may be risky.

NAP5 discovered that during intended sedation (by an anaesthetist or other doctor), patients may misinterpret their experience as AAGA.

The NAP5 Report recommends explaining to patients what they can expect when sedated and how this differs from general anaesthesia by giving written information well in advance of the procedure. The report provides a description of what being sedated feels like from the patient's perspective. It is hoped that with improved communication, reports of 'AAGA after sedation' will be dramatically reduced.

Consent for anaesthesia

Some patients may be understandably worried about being accidentally aware during surgery. Patients should now be provided with some written information about general anaesthesia before any operation, and information is also available from the Royal College website www.rcoa.ac.uk/patients-and-relatives/patient-information-publications. However, if a patient wishes to discuss the specific risks of AAGA further, the NAP5 Report provides clear guidance to anaesthetists regarding how to communicate accurate information about the risks of AAGA, how these risks can be minimised, and what happens if AAGA arises.

NAP5 - how the data was collected and analysed

The topic of accidental awareness during general anaesthesia was selected from a number of suggestions as it is a topic of interest to patients and to anaesthetists. The aim of NAP5 was to find out more about AAGA, to make recommendations on how the risk to patients could be reduced and to improve how it is treated when it occurs. Initial planning meetings decided how data would be collected and a Steering Panel was formed to review the reports the project received. There were two lay members on this Steering Panel.

The first part of NAP5 was to carry out a Baseline Survey, this survey asked anaesthetists about the number of cases of AAGA known to them in the previous year and about what monitoring was available and used in their hospital.

Anyone could make a report of AAGA to NAP5. The majority of reports came from anaesthetic departments but GPs, psychologists and other hospital staff were also advised on how to report cases of AAGA. A network of anaesthetists (one in each NHS hospital in the UK and all hospitals in Ireland) was recruited to report any cases of AAGA in their hospital. When patients attend for an operation, they are seen by an anaesthetist beforehand. During this consultation the anaesthetist asks about their medical history, including experiences of previous operations. Some reports of AAGA came from these consultations. Other AAGA reports took place soon after operations.

Once the report was made it was assessed against some basic criteria (inclusion criteria):

1. The patient made a report of being aware for a period of time when they expected to be unconscious
2. This report was the first time the experience had been reported within the healthcare system
3. The report could refer to an experience that had happened at any time, but the report had to be made between the 1 June 2012 – 31 May 2013.
4. The report had to relate to an experience of awareness when an anaesthetist or other doctor was present, this could include procedures outside of the operating theatre, such as resuscitation when an anaesthetist was present
5. Only reports of AAGA that occurred in public hospitals were included.

The last criterion was included for practical reasons: the project was not funded or authorised for inclusion of non-NHS hospitals. If the report met all of these criteria it was reviewed by the Steering Panel. All cases were anonymised and were reviewed in person to ensure that the reports were only viewed by the Steering Panel. The Panel divided into small groups to discuss each case and then discussed the cases as a larger group. The Panel grouped the cases into the following categories:

1. Certain/probable AAGA – the patient in question had definitely or most likely experienced AAGA
2. Possible AAGA – from the information provided, the Panel could not confirm that the report was AAGA but thought that given the experience reported and other details in the report, it was possible that the patient had experienced AAGA
3. Sedation – while the patient expected to be unconscious, the anaesthetist/other doctor had not intended the patient to be unconscious
4. Intensive Care Unit (ICU) – reports from patients who were treated in ICU, with treatment which included general anaesthesia

5. Unassessable – reports that were missing information which the panel required to classify the experience as AAGA or not
6. Unlikely – reports that were thought to have occurred outside of the period where the patient would be expected to be anaesthetised or which the Panel thought were unlikely to represent AAGA
7. Drug error and miscellaneous – cases that were caused by errors with the administration of drugs and other cases that could not be classified elsewhere
8. Statement only – reports provided by patients but did not have accompanying notes and therefore could not be examined further – these were usually historical cases, including some dating back to the beginning of the NHS in 1948.

The Panel also looked at the degree of evidence provided by the documentation ranging from high to implausible. The Panel reviewed the report to assess what might have caused the patient's experience of AAGA and to assess preventability. The impact of the experience on the patient was also reviewed taking into account the immediate effect (experience during the event) and the longer term effects (longer term psychological effects).

Following the year of data collection, an 'Activity Survey' was carried out to find out how many anaesthetics are given each year as well as other information about patient characteristics and what type of drugs are used in each anaesthetic. This survey, carried out during September 2013 in the UK, collected data on 20,000 general anaesthetics and this was then used to estimate annual activity.

Will NAP5 change anything?

NAP5 has raised the profile of AAGA both in the UK and internationally. In order to ensure lessons are learnt from this project, NAP5 has made recommendations for clinical practice and for research. These are available at <http://nap5.org.uk/NAP5home#pt>. There are projects now underway to ensure that the recommendations made by NAP5 are used to reduce the frequency of AAGA and manage it better when it occurs. NAP5 also produced a standardised 'Anaesthesia Awareness Support Pack' that we have recommended for use whenever a patient reports AAGA. We anticipate this will improve the care given to such patients. The NAP5 Anaesthesia Awareness Support Pack can be found at www.nationalauditprojects.org.uk/NAP5-Anaesthesia-Awareness-Pathway#pt.

SUMMARY

Some of the information and statistics above may seem very frightening. However, it is important to understand that NAP5 set out to study events that are important but rare. As a result of NAP5, we understand the type of events that patients who report AAGA have experienced much better than before. Reports of AAGA are very uncommon and the vast majority of patients will never experience AAGA. As NAP5 has increased the understanding of AAGA among anaesthetists there are now better tools to prevent AAGA and to manage it when it does occur.

If you are concerned you may have experienced AAGA you should inform someone – whether it be an anaesthetist or another healthcare worker you trust. You can expect to be treated with understanding and compassion.