Royal College of Anaesthetists

Difficult Airway Society

Tayside Mastery Learning Programme

Supraglottic Airway Devices

Authors: Eleanor Waters, Rhona Younger (Dundee)

LEARNING OUTCOMES

By reviewing this pack, a trainee should gain an understanding of the following:

1. the use and function of a supraglottic airway (SGA) device.
2. the differences in SGA types and be aware of different models of SGA.
3. insertion technique.

INTRODUCTION TO SUPRAGLOTTIC AIRWAY DEVICES

The first supraglottic airway (SGA) device was introduced to anaesthetic practice in 1988, enabling hands-free airway maintenance without the need for tracheal intubation. Prior to this, the patient was either intubated or a face mask was held on the patients face for a prolonged period of time.

There are broadly two types of SGA: first generation (classic LMA, Unique, AuraOnce, AuraStraight) and second generation (e.g. i-Gel, LMA Pro-Seal, LMA-Supreme, AuraGain). The main difference between the two being that the second generation has:

- a gastric lumen that allows for drainage of gastric fluids or secretions.
- an integrated bite block to prevent damage/obstruction on emergence.

Second generation SGAs are generally associated with providing better oropharyngeal leak pressures (OLPs) or "seal" within the airway and thus provide better separation of respiratory and gastric systems. The higher the seal pressure, the more protected the airway is in terms of potential contamination from the gastric system.

Other modes of classifying SGAs are to use the terms cuffed or uncuffed. The i-Gel (Intersurgical) is the only example of an uncuffed SGA at present. All others have a cuff that requires inflation with air to provide an adjustable seal within the airway. SGAs are now more widely used than tracheal tubes in general anaesthesia, but it is of upmost importance to understand their limitations.

INDICATIONS

- GA cases where it is deemed an ETT is unnecessary. This is more likely when muscle paralysis or assisted ventilation are not required.
- GA cases where the patient is fasted and the aspiration risk has been determined as low.
- Common examples include peripheral surgery in patients who are not obese; minor abdominal surgery where muscle relaxation is not needed; cases undertaken in the supine, lateral or "legs-up" position.
- Advanced use includes SGA with positive pressure ventilation and/or paralysis (not recommended for trainees).
- Airway rescue device following failed intubation/cardiac arrest.

CONTRAINDICATIONS

There are few true absolute contraindications. SGAs should not be used in cases in which the anaesthetist feels that there is a significant risk of aspiration. These include:

- history of gastric reflux or hiatus hernia.
- intra-abdominal pathology.
- pregnancy.
- recent major trauma or administration of opiates.
- morbid obesity.
- autonomic dysfunction associated with diabetes (gastroparesis).

Other relative contraindications are the position of the patient under GA (i.e. prone); the surgery being performed (e.g. most head and neck surgery); and the predicted need for respiratory support requiring pressures that may not be readily be achieved through an SGA without exceeding the OLP.

EQUIPMENT

- An appropriately sized SGA device for the patient about to be anaesthetised.
- Availability of an alternative SGA size or design in event of failure of first device.
- Availability of an endotracheal tube and associated intubation equipment in event of failure of SGA.
- Syringe for cuff inflation.
- Lubricant gel.
- Fixation tape or tie.
- Cuff-pressure monitoring device.

A guide for choosing the size of SGA device to use

Choosing which size of SGA to use is guided by patient weight (see table below). It is worth noting that the size guide may vary slightly depending on which specific SGA is used (e.g. i-Gel compared to classic LMA); you will find this information either on the device itself or its packaging. This is useful to guide but is not absolute in its accuracy of what will provide the best airway.

SGA size (approx.)	Size of patient (ideal body weight)	Cuff inflation volume if applicable
3	30–50 kg	Up to 20 ml
4	50–70 kg	Up to 30 ml
5	70–100 kg	Up to 40 ml

NB: paediatric sizes not covered here.

COMMUNICATION WITH PATIENT

No communication with the patient is required.

PREPARATION AND PROCEDURE

1. Patient consent
    - Patient would normally be consented for general anaesthesia. Specific details of airway management are often not discussed, but it is important to mention the process, common complications and significant risks.
2. Assistance/monitoring/positioning
    - Ensure trained assistance, full monitoring, patient positioning and pre-oxygenation as per standard practice.

3. Equipment
    - Choose size and type of SGA to be used and communicate this to your assistant following assessment of the patient and their aspiration risk.
    - Visual inspection: check for external damage, look through the airway tube to ensure its patency and that no foreign bodies are present that would lead to airway obstruction.
    - Inflation/deflation check for cuffed SGA: inflate the cuff. It should remain inflated with no herniations of cuff or pilot balloon. Fully deflate the cuff, if it re-inflates this indicates a leak or pilot valve failure. The SGA cuff should be fully deflated for insertion.
    - The posterior surface of the SGA should be lubricated with a lubricating gel prior to insertion.
    - Ensure that you have an alternative size and/or type of SGA device available to the one you are inserting.
4. Procedure

    - Carry out pre-oxygenation and basic airway management prior to insertion of SGA.

    - Anaesthetise patient.

    - Prior to insertion, assess adequacy of anaesthesia; the patient should be unresponsive, have a relaxed jaw and not respond to a jaw thrust.

    - Holding the SGA: grasp in the dominant hand, holding it like you would a pen (see **Fig 1**).

    - Place your non-dominant hand on the patient's occiput in order to maintain the correct head/neck position throughout insertion.

    - Gently open the patient's mouth and, taking care of dentition and soft tissues, insert the SGA past the teeth, advancing the bowl of the SGA up against the hard palate

    - Advance the SGA using gentle but continuous pressure upwards and backwards (onto the hard palate, then the soft palate and posterior pharyngeal wall) until definitive resistance is felt.

    - NB: It is helpful if an assistant initially opens the mouth slightly when inserting the SGA into the mouth, then applies jaw thrust to increase the posterior pharyngeal space.

    - The correct position is when the SGA stops advancing and the cuff lies above the larynx with the airway orifice facing anteriorly into the glottis

    - If a cuff is present, your assistant will inflate it and you will see the SGA rise out of the mouth by 0.5-1.5cm as it adjusts it resting position within the airway. Pressure should be less than 60cmH_20. Note: The i-Gel has no inflatable cuff. Although the patient positioning and hard palate guiding technique is similar to that described, downward pressure on the device is applied more proximally until 'hold-up' is felt. Clearly, with no inflation, there is no confirmatory 'rise'.

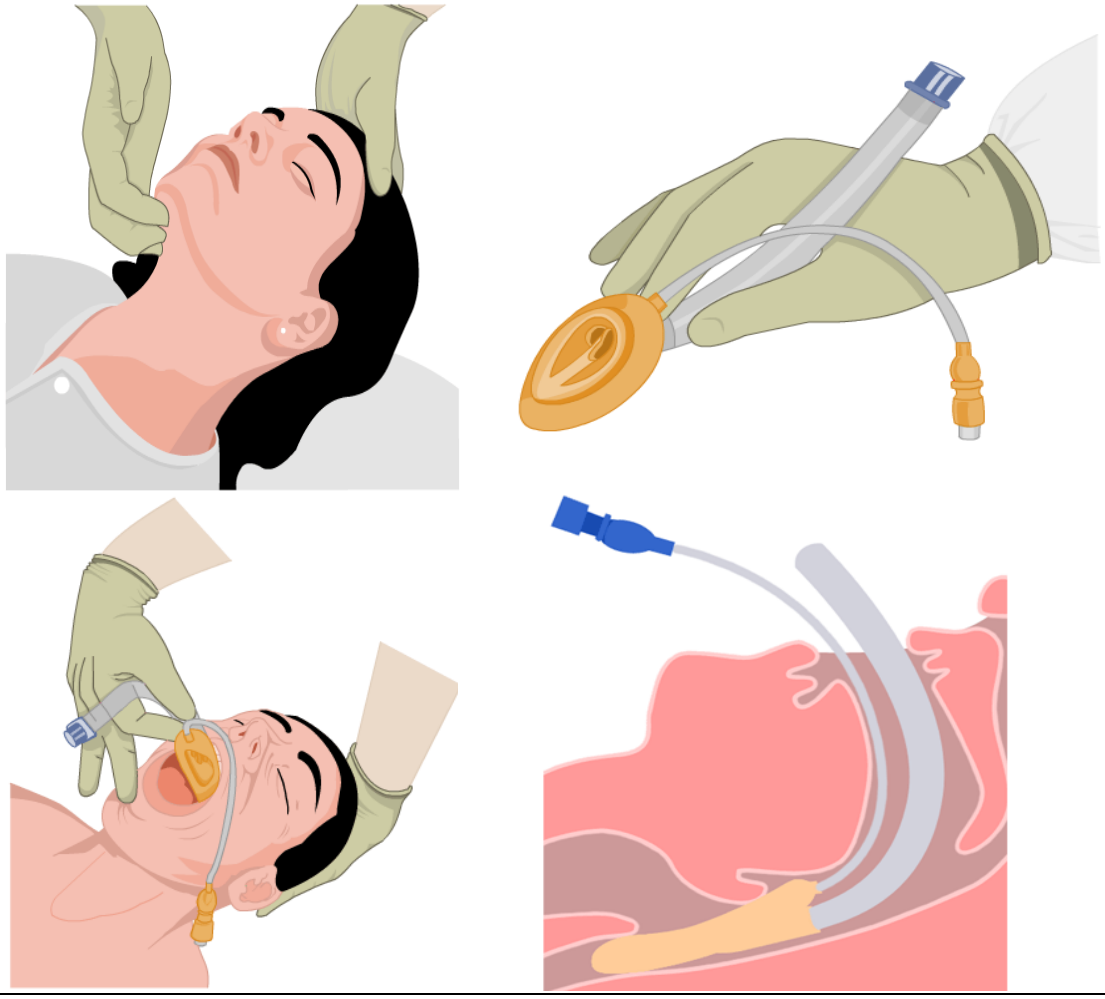

Fig 1: Insertion of an SGA.

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5. Assess and adjust
    - Connect the anaesthetic tubing and gently ventilate under low pressure by hand to confirm successful placement of the SGA by checking for: adequate chest rise and fall, presence of $ETCO_2$ with a square-wave capnography tracing and the absence of audible leaks at pressures equating to just greater than that required to produce tidal volume ventilation.
    - With the second-generation SGA, an additional check should be undertaken relating to the gastric port which, if correctly placed, should be in communication with the oesophagus. On application of a small amount of lubricating gel to the port you should see minimal movement, or gentle up-and-down movements, which indicates a satisfactory position of the SGA (as airway pressure changes are translated to the gastric system). However, gel ejection with gentle positive pressure ventilation indicates a clear break in the seal separating the respiratory and gastric systems, and is indicative of poor SGA positioning within the airway.
    - Equally, entrainment of gel with inspiration during spontaneous respiration signifies malposition of the device. All devices should have seal assessed with gentle positive pressure to adequately assess OLP in case of a need for positive pressure ventilation.
6. Secure the device

- Hold the SGA in position until it is secured in place with tape or a tie.
- If a cuff has been inflated on the SGA device the cuff pressure should be checked to ensure that it is not overinflated.
- Vigilance is required throughout the procedure to ensure that the SGA is performing as you require it to. This is especially important during positive pressure ventilation and, hence, SGA use in this regard is considered an advanced technique.

SGA checklist Date:

Trainee name: Tutor:

Step	1st attempt	2nd attempt
Pre-procedure		
Assessment of patient and airway		
Ensures trained assistant & senior supervision		
Confirm airway plan with anaesthetic assistant		
Inspection & preparation of SGA		
Perform WHO sign in		
Full monitoring including capnography		
Ensures patent IV cannula		
Optimise patient position		
Pre-oxygenation until ETO_2 > 0.8		
Procedure		
Support airway using simple manoeuvres		
Support ventilation using bag mask ventilation		
Assess adequacy of anaesthesia		
Holds and inserts SGA correctly		
Inflate cuff if present		
Attaches ventilator tubing to SGA		
Confirms ventilation with gentle positive pressure – chest rising, $ETCO_2$, no audible leak		
Hold SGA in place until secured		
Secure SGA with tie or tape		
Check gastric port if 2nd generation SGA used		
Check cuff pressure if applicable		
Post-procedure		
Documentation of airway management		
Throughout		
Appropriate communication with assistant & patient		
Aware of patient condition / vital signs		
Shows understanding of adequate anaesthetic and maintenance of anaesthesia		

Comments: