“Chewing gum in the airway”

Problem reported in CIRRNET

“A five-year-old child attended outpatient circumcision. Induction of anaesthesia using sevoflurane, followed by intravenous access and placing of a laryngeal mask. Ventilation was initially without complications, but when the head was placed in a different position, the CO2 signal was suddenly lost. An attempt was made to reposition the laryngeal mask, to no avail. It was then removed. There was a piece of chewing gum on the tip of that LMA. There followed a laryngoscopic examination for more pieces of chewing gum possibly left in the airway. This was followed by anaesthesia without complications with a now clear laryngeal mask”.

More cases from the literature

“A 16-year-old boy was admitted by the ambulance service with suspected multiple trauma as an outpatient following a motorbike accident. His injuries included a thoracic contusion, abdominal trauma and severe head injury. The initial treatment at the accident scene involved intubation to be followed by placing a gastric tube. A springy resistance prevented the moving forward of the gastric tube via the oesophageal sphincter into the stomach. The attempt was initially aborted. Removal of the probe also here revealed a mass of chewing gum at the end of the probe”.


“A 52-year-old patient had to have some tissue (a lump) removed from her right breast. The preoperation examination revealed nothing special apart from hypertension. The patient stated that she had been sober since midnight. Anaesthesia was induced using propofol and fentanyl without complications and the airway was secured with a laryngeal mask. The following course including emergence and extubation were again uneventful. On extubation, the team found a green, rubber-like mass on the tip of the laryngeal mask. The patient awoke following the operation, felt oriented, had a sore throat, did not feel sick and had no dysphagia or dysphonia. When asked, the patient could no longer remember whether or not she had spat out the chewing gum before the operation on the way to the hospital. No-one in the medical team noticed the chewing before the operation.”


Recommendations in case of foreign bodies:

- Check for the adherence to preoperative fasting rules (incl. Chewing gum). Possibly explicitly state on the leaflets handed to patients that chewing gum is also not permitted.
- Oral inspection before each intubation/insertion of LMA (laryngeal mask airway)
- Increased awareness particularly in children and retarded patients
- If in doubt, the airway device should be removed and the patient being ventilated with the mask.
- Perform direct laryngoscopy, remove any visible foreign bodies.
- In case of persistent suspicion of a foreign body deep in the airway flexible/rigid bronchoscopy and removal of the foreign body is indicated.
- Knowledge of the algorithm “Handling the airwayobstruction by foreign bodies (FBAO)"
  http://circ.ahajournals.org/cgi/reprint/112/24suppl/IIV-136
  http://circ.ahajournals.org/cgi/reprint/112/24suppl/IIV-19
- Remember: not being able to place a gastric tube could be due to an oesophageal foreign body (e.g., chewing gum).

Be aware of foreign bodies!
Quick-Alert

Expert comment:
The CO₂ measurement reacts to problems in ventilation or the airway or the circulation as soon as the problem occurs (within seconds), while a drop in saturation generally occurs only after a time lag of up to a few minutes.
The (sudden) loss of a previous and normal CO₂ signal or its sudden change during anaesthesia must always be considered as an alarming signal. This requires immediate differential diagnostic considerations. It is for this reason that capnography is an indispensable element in the control of the ventilation.

A sudden loss or a sudden dramatic change of a capnogram may be due to various malfunctions listed in the appendix.

Recommendations on sudden loss of the CO₂ signal:
- Initiate manual ventilation
- Immediate check of the airway and the respiratory system from the patient to the respirator
  a. Check the correct position of the ETT (endotracheal tube) or LMA (laryngeal mask airway) and intubation depth
    i. Auscultation
    ii. Laryngoscopy
    iii. If necessary, bronchoscopy
  b. Check the patency of the ETT or the LMA by inserting a suction catheter
  c. Suction the airway
  d. Auscultation and percussion, rule out pneumothorax
  e. Check tubings of the respirator and filters
    i. Disconnection? (Near patients or apparatus?)
    ii. Secretion? Condensed water?
    iii. Leak?
    iv. Mechanical compression?
- If in doubt, the airway device must always be removed and the patient be ventilated with the mask.

Expect the unexpected!

Note:
This problem is of interregional relevance. Please judge what this means for your business and ensure, if necessary, in consultation with your respective agencies that this is communicated as necessary.

These recommendations were worked out by Stiftung für Patientensicherheit, the CIRRNET Steering Group and external experts and approved by the SGAR Liability Commission.

These recommendations were approved by the CIRRNET Steering Group and external experts. They are aimed at sensitising and supporting health institutions and health care specialists in setting up their internal guidelines. It is the service provider’s task to verify the recommendations locally and to decide whether these are included in a binding manner or are amended or rejected. The specific arrangement and application in accordance with the current duties of care (based on local specialist, company, legal, individual and situational circumstances) are the exclusive and sole responsibility of the service provider professionally qualified for this.
Appendix

Malfunctions that could suddenly and dramatically change a capnography:

1. Malfunctions around the airway device
   • Accidental dislocation of the endotracheal tube (ETT), the laryngeal mask airway (LMA) or other airway devices (Combitube, Easy Tube etc.)
   • Partial or total obstruction of the tube, the laryngeal mask due to blood, secretion or foreign body (teeth or parts of tooth prostheses, vomit, piercing, chewing gum, etc.)
   • Kinking or external compression of the tube, the laryngeal mask (e.g., tonsillectomy mouth gag)
   • Cuff hernia

2. Malfunctions around the respiration tubes (circuit)
   • Disconnecting the tube from the LMA or the anaesthetics apparatus
   • Major leak
   • External compression of the respiration tubes
   • Collection of secretions and blood in the respiration tubes (if no filter was used)
   • Collection of condensed water
   • Blocked filter

3. Malfunctions around the airway, the bronchia and the lungs
   • Laryngospasm with LMA*
   • Bronchospasm*
   • Acute bronchial obstruction*, acute exacerbation of a COPD*
   • Bronchopulmonary accumulation of secretions*
   • Endotracheal and endobronchial foreign bodies (vomit, teeth, nuts, chewing gum, toys, etc.)*
   • [Tension] pneumothorax*
   • Endobronchial intubation*
   • Pulmonary embolisms (thromboembolism, air, particles, etc.)
   • Actively pressing against the respirator/coughing (local anaesthetic, insufficient muscle relaxation)*
   • Increased intra-abdominal pressure with pneumoperitoneum for laparoscopic operations*
   • Surgeon leaning against the thorax*
   • Pulmonary oedema
   • Atelectases

(*The malfunctions, in the case of volume-controlled respiration are generally associated with an increase in airway pressure and in the case of pressure-controlled respiration, with a reduction in the tidal and respiratory minute volumes).

4. Serious changes in haemodynamics (respiratory disorders)
   • Cardiac arrest
   • Any kind of shock
   • Air embolism
   • Embolus
   • Damaged venous backflow, pressure on the vena cava, pericardial effusion, tension pneumothorax, etc.

5. Apparent – technical malfunctions:
   • Failure of the capnography device
   • Disconnection of the capnography tube (near the patient or the capnograph (sidestream units) or defective connection of the cuvette (main flow units))
   • Contaminated/condensed cuvettes or contaminated capnographic tubes
   • Malfunction or failure of the respirator

A = Airway - B = Breathing - C = Circulation!

Further reading:
• Kradel B et al. NPO includes chewing gum. Anesth Analg 1992;74:621
• Cairo SA. An unusual result of using a laryngeal mask airway. Anaesthesia Intensive Care 1994;22:231
• Cupitt JM et al. A sticky situation. Anaesthesia 1999;54:1127-1128
• Afzaal A et al. Something to chew over? Anaesthesia 2003;58 (12):1242