There are reports of cuff incompetence in ETTs and methods to repair them. In situations such as craniotomy, when the ETT cuff starts malfunctioning sometime after intubation and after surgery has started, replacement of the defective tube is not feasible. Hence, identification of such an occult leak in such defective ETTs is important before using them. Flexometallic tubes have a metal or nylon spiral-wound reinforcing wire covered internally and externally by rubber, PVC, latex or silicone. Overuse and repeated sterilization of reusable spiral embedded tubes can predispose them to problems. In this instance, both the flexometallic ETTs revealed defects under magnification 22–24 cm from the patient end. This is usually the site of securing the tube with an adhesive tape or bandage. In the Portex flexometallic ETT, the fine cuts were probably the result of earlier attempts to remove the adhesive tape after extubation using a sharp surgical blade. With the Rusch flexometallic ETT, frequent use of too tight a bandage knot to secure it could explain the unevenness on its surface. This might have led to a breach in integrity of the embedded inflation tube at this level. These cuts/holes autoseal when the ETT is straight or when they are on the concave surface of the ETT. However, when made convex, these defects stretch, allowing air to leak. As flexometallic ETTs are straight without pre-formed curves, there are equal chances of these defects lying on the concave or convex surface once the trachea is intubated. This explains their malfunction only in some patients and despite normal routine checks. A similar occult leak caused by a bitten notch has been reported by Tamakawa and colleagues.

In conclusion, flexometallic ETTs should not be reused. If repeat use is inevitable for economic reasons, it is essential that a cuff leak should be checked for by flexing the tube in different directions, and especially by keeping the embedded cuff inflation tube on its convex surface to reveal occult leaks.

V. K. Arya
A. Kumar
J. Radhakrishnan
A. K. Durairaju
PGIMER-Chandigarh, India

1 Charlton JE. Checklists and patient safety. Anaesthesia 1990; 45: 425–6
5 Fisher MM. Repairing pilot balloon lines. Anaesth Intensive Care 1988; 16: 500–1

DOI: 10.1093/bja/aeh598

Accidental propofol infusion from a prefilled propofol syringe

Editor—Propofol, the most recently developed i.v. anaesthetic agent, has been widely used since 1977. It is available as a 1% solution in 20 ml clear glass ampoules, in 50 ml vials, and more recently in a prefilled syringe. There are two reports of failed propofol injection with a prefilled syringe, both associated with disconnection of the plastic flange from the glass barrel. We report a case of accidental propofol infusion from a prefilled syringe that occurred by a siphon effect before induction of total i.v. anaesthesia. A 64-yr-old man (163 cm, 56 kg) was scheduled to undergo left lower lobectomy for lung cancer under total i.v. anaesthesia with a
prefilled propofol syringe (Diprivan 1% infusion kit, Astra Zeneca, Sweden), and epidural block. The prefilled propofol syringe was assembled and set on an infusion pump (Anaesthesia Pump 3500, Graseby Medical, Hertfordshire, UK) by an attending nurse before induction. After epidural catheter insertion via the T4/5 intravertebral space, the prefilled propofol syringe was connected to the patient via a three-way stopcock. The stopcock was opened to the patient, but the infusion was not started. The infusion pump was placed 30 cm above the patient. Several minutes after connecting the prefilled propofol syringe, the patient became drowsy and did not respond to verbal commands. The patient soon became apnoic, and mask ventilation was started immediately.

Upon examination, we found that some of the propofol in the syringe had been replaced with air. We immediately checked the infusion pump, but the plunger rod of the glass syringe had not moved at all. We removed the prefilled propofol syringe and the infusion line and determined that approximately 200 mg of propofol had been injected into the patient. Twenty-five minutes after the patient lost consciousness, he recovered fully without any neurological symptoms. Thereafter, surgery was performed under total i.v. anaesthesia using another prefilled propofol syringe and epidural block, as scheduled and without further incident.

The affected syringe was sent to AstraZeneca for further examination. The prefilled propofol syringe has a rubber plug at the spigot to attach it to a Luer connector. Inspectors reported that the outside of the rubber plug in this case contained a single hole made by the connector needle, and the inside had a cleft approximately 1.1 mm wide. They also found a mark on the aluminum seal covering the rubber plug, indicating that the Luer connector might have been connected to the glass syringe at an incorrect angle. The glass syringe was neither broken nor cracked.

During assembly of the Luer connector to the syringe barrel, the user slides a connector over the aluminum seal until it is firmly seated; this positions the connector needle at the centre of the rubber plug. We suspect that the needle of the Luer connector penetrated the rubber plug, making a cleft on the inside of it probably because it was inserted on a slant. This could have caused laceration of the rubber plug, allowing influx of air into the glass syringe around the needle. Accidental propofol infusion would then occur by a siphon effect.

Accidental infusion of propofol can be fatal because it causes severe respiratory depression or hypotension. We offer the following suggestions to help avoid a similar experience:

(i) Do not open the three-way stopcock to the patient until immediately before commencing the propofol infusion;
(ii) Attach the Luer connector to the syringe in a straight line to prevent accidental laceration of the rubber plug;
(iii) Keep the infusion pump level with the patient to prevent siphoning between the prefilled propofol syringe and the patient;
(iv) Consider using an anti free-flow valve; and
(v) Only administer propofol when resuscitation equipment is immediately available.

K. Maruyama
K. Hara
Nagano, Japan

Acknowledgements

The analysis and technology section, Quality Control Department, Maihara Factory, AstraZeneca (Maihara, Shiga, Japan) examined the affected syringe and provided a report free of charge.

2 Breslin D. Failure of a ‘Diprivan 1%’ prefilled propofol syringe. Anaesthesia 2000; 55: 1030–1

DOI: 10.1093/bja/aeh609