

## Dealing with a broken bottle of desflurane

Daisuke Maruyama · Naoyuki Hirata ·  
Michiaki Yamakage

Received: 26 July 2013 / Accepted: 30 July 2013 / Published online: 20 August 2013  
© Japanese Society of Anesthesiologists 2013

**Keywords** Desflurane · Thin film · Bottle

To the Editor:

The boiling point of desflurane, which is 22.8 °C under atmospheric pressure (760 mmHg) [1], is much lower than that of other volatile anesthetics. Hence, desflurane can evaporate at ambient operation room temperature. Desflurane is, thus, stored under positive pressure in a glass bottle, and needs a special vaporizer that allows heating and pressurization. In addition, the glass bottle for desflurane is covered by a thin vinyl chloride film, so that its pieces do not scatter if it breaks due to a fall. We describe here how we dealt with a broken bottle of desflurane.

The bottle of desflurane accidentally fell to the floor in our hospital's operation room, with an ambient temperature of 24 °C. The glass bottle broke but the thin covering film did not tear. A few minutes later, the thin film gradually started to expand due to evaporation of desflurane (Online resource 1, Fig. 1A). An anesthesiologist tried cooling the expanding bottle down with tap water as soon as possible. However, since it continued to expand, he put it into the freezer (approximately -24 °C). After 30 min, when the size of the thin film decreased (Online resource 1, Fig. 1B), he carried it in ice water to a safe place and allowed it to evaporate by drilling a hole in the film.

If both the glass and vinyl sheet of a desflurane bottle break, complete ventilation of the room is required, because desflurane overflows from the film and vaporizes very quickly. A potentially dangerous situation could arise if the glass bottle is broken but the thin film remains intact: an increase in internal pressure could lead to an explosion. In such a situation, speedy cooling is needed to prevent expansion. Putting the broken bottle of desflurane into the freezer appears to be useful when expansion of the film is observed; in addition, this method is able to reduce the potential damage even if fragments of the broken bottle get scattered.

In conclusion, we suggest quickly putting the broken bottle of desflurane into a freezer in case the glass bottle is broken and the thin film remains intact.

**Conflict of interest** None of the authors has any conflicts of interest to declare.

### References

1. Susay SR, Smith MA, Lockwood GG. The saturated vapor pressure of desflurane at various temperatures. *Anesth Analg.* 1996;83:864–6.

---

**Electronic supplementary material** The online version of this article (doi:10.1007/s00540-013-1696-3) contains supplementary material, which is available to authorized users.

---

D. Maruyama (✉) · N. Hirata · M. Yamakage  
Department of Anesthesiology, Sapporo Medical University  
School of Medicine, South-1 West-16, Chuo-ku, Sapporo,  
Hokkaido 060-8543, Japan  
e-mail: d.maruyama@sapmed.ac.jp