

## MAC value of desflurane may vary for different machines

Nobukazu Sato<sup>1</sup> · Takashi Terada<sup>1</sup> · Ryoichi Ochiai<sup>1</sup>

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To the Editor:

Although anesthetic-gas monitoring is important to maintain adequate depth of anesthesia with inhalation anesthetics [1], it is not practical to memorize age-specific minimum alveolar concentration (MAC). Some modern anesthesia machines are equipped with a function to automatically convert gas concentration to age-adjusted MAC equivalent if age is input. Such calculation typically uses either Mapleson's or Eger's formula.

Mapleson's formula [2]

$$\text{MAC (age)} = \text{MAC (40yo)} \times 10^{(-0.00269 \times (\text{Age} - 40))}$$

Eger's formula [3]

$$\text{MAC (age)} = \text{MAC (40yo)} \times 1.32 \times 10^{(-0.00303 \times \text{Age})}$$

Dräger uses Mapleson's formula whereas GE and Nihonkoden calculate MAC by use of Eger's formula. Furthermore, each device uses different value for MAC(40yo). For example, Dräger Perseus uses 6 % whereas Dräger Apollo uses 6.65 %, GE Aisys uses 6 %, and Nihonkoden BSM9101 uses 6.45 %.

To address potential differences between results from calculation of MAC equivalent, we show, graphically, the relationship between concentration equivalent to 1 MAC for different ages and manufacturers (Supplementary Figure). When these data are compared with the data from the manufacturer of desflurane, age-corrected MAC values are likely to be underestimated for young people by the Perseus or GE. Nihonkoden and Apollo tend to overestimate MAC equivalent for elderly people. For example, if desflurane concentration is 6.6 %, all machines display MAC as 0.9 for a 15-year-old patient. However, MAC may be displayed as 1.0–1.2 for a 49-year-old patient and 1.3–1.6 for a 89-year-old. To avoid intraoperative recall, we must achieve clinically appropriate anesthesia without the need for repeated calculation of MAC value.

### References

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✉ Nobukazu Sato  
sato.nobukazu@med.toho-u.ac.jp

<sup>1</sup> Department of Anesthesiology, Toho University, 6-11-1 Oomoriinishi, Oota-ku, Tokyo 143-8541, Japan