REFERENCES

- 1 Gerrish SP, Peacock JE. Variations in the flow of cerebrospinal fluid through spinal needles. *Br J. Anaesth* 1987; 59: 1465–71.
- 2 Mustafa K, Milliken RA. A simple device for the identification of the epidural space. *Anesthesiology*, 1982; 57: 330–2.
- 3 Slattery PJ, Rosen M, Rees GAD. An aid to identification of the subarachnoid space with a 25G needle. *Anaesthesia* 1980; 35: 391.

Atracurium in the Bard alfentanil pump

To the Editor:

The concentration of atracurium can be manipulated for use in the alfentanil Bard pump. This pump is designed to deliver bolus doses and/or a constant infusion of injectate with a concentration of $500 \mu\text{g} \cdot \text{ml}^{-1}$. Four dials control the amount of drug delivered. The first is the constant infusion dose delivery dial (0 to $3.0 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$); the second is the patient weight dial (30 to 100 kg); the third is the bolus dial (0 to $150 \mu\text{g} \cdot \text{kg}^{-1}$); and the last actuates the pump into either the infuse or bolus mode. The bolus dial is spring loaded and cannot deliver multiple boluses without being reset.

To use atracurium, a 1:1 dilution of atracurium ($10 \text{ mg} \cdot \text{ml}^{-1}$) with D5W (pH 4.0) or NaCl (pH 5.0) is required. The resultant concentration of atracurium is $5 \text{ mg} \cdot \text{ml}^{-1}$ ($5000 \mu\text{g} \cdot \text{ml}^{-1}$) which is ten times the concentration of drug for which the pump was designed. With this concentration in the pump, the actual dose of drug delivered at constant infusion or by bolus is ten times the displayed scale.

As an example, let us assume that a $0.5 \text{ mg} \cdot \text{kg}^{-1}$ intubating dose of atracurium has been selected which is preceded by a priming dose of $0.05 \text{ mg} \cdot \text{kg}^{-1}$, and an infusion is planned at $5 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$. To accomplish these goals, atracurium is diluted and placed in a syringe connected to the Bard alfentanil syringe pump. Next, the weight dial is set to the patient's weight in kg, the infusion rate dial is set at $0.5 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ (to deliver $5 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$) and the bolus dial is set at $5 \mu\text{g} \cdot \text{kg}^{-1}$. As soon as the priming dose is delivered, the bolus dial is reset to $50 \mu\text{g} \cdot \text{kg}^{-1}$ in order that, when activated, an intubating bolus dose of $0.5 \text{ mg} \cdot \text{kg}^{-1}$ will be administered. Following the induction/intubation sequence and determination of return in twitch function, the pump is placed in the continuous infusion mode. The atracurium infusion rate may then be increased or decreased as indicated.

The Bard alfentanil pump offers several advantages over conventional syringe pumps. (1) After making the original dilution no other calculations need to be made because the pump is calibrated in units that correspond to the patient's weight. This avoids one of the primary problems in using constant infusions, i.e., clerical error. (2) The pump offers a calibrated bolus dial for exact bolus dosing which is especially useful when using the predose method with muscle relaxants. (3) The bolus function delivers the bolus over 60–90 sec, thereby avoiding the histamine release associated with bolus atracurium.

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Harold Griffith

To the Editor:

The undersigned are writing a biography of Dr. Harold R. Griffith for the "Canadian Medical Lives Series" published by the Hannah Institute for the History of Medicine. While it is intended the book shall be ready in time to celebrate the fiftieth anniversary of the use of curare in surgery, the authors would point out that this was only one of many innovations Dr. Griffith promoted during a lifetime devoted to anaesthesia, such as the use of ethylene and later cyclopropane, endotracheal intubation and manual ventilation, at a time when anaesthesia was very often relegated to nurses or inexperienced general practitioners.

His other contributions included the promotion of the professional status of the specialty by organising regional societies. He was President of the Associated Anesthetists of the United States and Canada in the 30s, first President of the Canadian Anaesthetists Society in the 40s and ultimately Founder President of the World Federation of Societies of Anaesthesiologists in the 60s. As a teacher he organised with others the first formal teaching course in anaesthesia during and after World War II at McGill, where he subsequently became Professor and Chairman.

We would be glad to have any comments or stories relating to Dr. Griffith's life that your readers may care to contribute.

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