rats were judged at 10 min and 20 min, by the absence of eyelash and
the presence of the conjunctival reflex, to be at a clinically
similar depth of anaesthesia. Furthermore, respiratory rates were
checked at intervals throughout the study and these did not
fluctuate once stable anaesthesia was established. The use of this
clinical approach was further justified by the similar duration of
recovery of consciousness and exploratory activity after enfurane
and halothane. The similar clinical depth of anaesthesia at appar-
ently disproportionate inspired concentrations did surprise us
but the finding was consistent and, initially, might in part be
explained by the different blood-gas solubility coefficients of
enfurane and halothane.

If one accepted Professor Merin’s interpretation, that the
difference between the effect of enfurane and halothane was a
result of a dose factor, then it would be reasonable to expect that a
progressive change in intestinal activity would occur as anaes-
thetia deepened. However, this was not the case, the evidence we
presented confirmed that the motor response of the small intest-
ine in the rat is not the same for different agents. Therefore, even
if, during the course of the anaesthetic period, a deeper level of
anaesthesia were achieved with halothane, this did not alter the
direction of the results obtained and so we conclude that the
difference in the effects of enfurane or halothane on intestinal
motility was not dose-dependent. Indeed, a careful study of our
paper reveals that the changes in the migratory myoelectric
complex (MMC) associated with treatment with enfurane and
halothane were not part of a trend. The responses to enfurane
included a significant reduction in the duration of the MMC with
no change in the duration of phase III activity, whereas halothane
was associated with a significant increase in the duration of the
MMC and phase III activity was either abolished or of a signific-
antly reduced duration. Furthermore, while the changes after the
cessation of anaesthesia using either drug were similar for a 30-
min period, that is a return to a pattern approximating to that
detected in the normal conscious fasting rat, there were marked
abnormalities in the subsequent intestinal motor activity in those
rats that had received halothane. We did examine the effect of 5%
enfurane and 2% halothane on intestinal motility and the changes
recorded were similar to those recorded at the concentrations
published (Wright et al., 1982) for both drugs, however the
general condition of the rats suggested very deep and very light
anaesthesia respectively. These results were not included in our
paper because, as a result of the very obvious differences in the
levels of anaesthesia, they were not comparable.

We conclude therefore that, while the doses of anaesthetic
agents administered for the short period (30 min) of the study
were different, comparable levels of anaesthesia were achieved as
judged by time of onset of anaesthesia, duration of the awakening
periods and the constancy of the conjunctival reflex activity. We
do not feel that our concluding sentence was other than, as stated,
a suggestion, it was not intended to be taken as a definitive
conclusion, but we believe that the suggestion based on our
findings was none the less valid.

REFERENCES

Wright, J. W., Healy, T. E. J., Balfour, T. W., and Hardcastle J.

VECURONIUM AND ATRACURIUM

Sir,—In their recent paper comparing vecuronium and atr-
acurium Robertson and colleagues (1983) raised some interest-
ings points concerning the two drugs.

From their results it can only be claimed that vecuronium has a
shorter duration of action than atracurium at the lower dose. At
the higher doses (vecuronium 129 μg kg⁻¹ and atracurium
564 μg kg⁻¹) there was no significant difference in duration be-
tween the agents. They also noted that the ED₅₀ and ED₉₀ for
atracurium (131.1 μg kg⁻¹ and 188.7 μg kg⁻¹, respectively) were
lower than those found by other authors and, thus, the role of
anaesthetic agents in affecting the results needs to be considered.

Folds and colleagues (1982) found the ED₅₀ and ED₉₀ for vec-
oronium to be 21.5 and 26.7 μg kg⁻¹, and for atracurium the
values were 103.0 and 167.2 μg kg⁻¹, respectively.

It has been shown by Thompson, Merret and Webb (1982) that
erster hydrolysis does not play a significant part in the elimina-
tion of atracurium. The Hoffman Elimination described in 1851 by A.
W. Hoffman involved the decomposition of quaternary am-
monium salts when heated with strong alkalies. With atracurium,
electron withdrawal because of the positive charges on the nit-
rogen is thought to weaken the B – H bond, thereby assisting
proton transfer (Stenlake, 1982). This reaction occurs at
physiological temperature and pH and requires no enzymes.
Thus, there is no metabolic pathway as such to be overloaded and
it is not surprising that the elimination has been observed to be a
constant reaction (Hughes and Chappie, 1981; Payne and
Hughes, 1981) since biological variables, such as enzyme con-
centrations and hepato – renal function play no part in the drugs
removal (Uting, Hunter and Jones, 1982).

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REFERENCES

Folds, F. P., Nagashima, H., Yun, H., Kaplan, R., Lauber,
R., Nguyen, H. D., and Duncafl, D. (1982). The dose re-
sponse of vecuronium and atracurium in man; in Proceed-
ings of Symposium, Eighth European Congress of Anaes-
thesiology, London.

Hughes, R., and Chappie, D. J. (1981). The pharmacology of
Anaesth., 55, 51.


Robertson, E. N., Booij, L. H. D., Fragan, R. J., and Crul, J. F.
(1983). Clinical comparison of atracurium and vecuronium

Stenlake, J. B. (1982). Atracurium: Design and function; in
Proceedings of Symposium, Eighth European Congress of Anaes-
thesiology, London.

vivo degradation of atracurium in normal and pseudocholines-
terase deficient human plasma; in Proceedings, Atracurium

in renal failure; in Proceedings, Atracurium Symposium, London
1982.

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REFERENCES