Reply

We thank Dr Kalso for her interest in our paper [1] and are grateful for the opportunity to reply. We are fully aware and agree with Dr Kalso that the ventilatory depressant effects of opioids are dose-dependent. At the time when we performed our study, the only available data indicated a dose-ratio of 1:1 for oxycodone and morphine. The study by Kalso et al. [2] was published only after we had completed our study. In children equianalgesic doses of most opioids have not been determined. This, in part, reflects the fact that in children pharmacodynamic studies are more difficult than in adults. Since our study in children and the study by Kalso et al. in adults indicate that less oxycodone is needed for equipotent effect compared with morphine, we are conducting a dose-finding study comparing oxycodone and morphine in children and in adults. However, results are not yet available.

Dr Kalso is concerned that patients given morphine and oxycodone were not comparable with respect to age and duration of sleep after anaesthesia. The groups did not differ statistically. Our study was designed to describe the pharmacokinetics and ventilatory effects of oxycodone in children not the analgesic effect. Proper examination of the analgesic effect would have required a different study design and larger number of patients. Concerning the duration of analgesic effect our finding is in conflict with that in adults. However, we felt that it was relevant to report it but not to draw any further conclusions concerning the analgesic effect of oxycodone in comparison with other opioids for reasons mentioned above.

In our study design the ventilatory depressant effects of opioids were combined with the residual effects of premedication and anaesthesia. However, as we have stated in the article, non-invasive ventilatory measurements in children suffering from acute postoperative pain are impossible! Using our protocol, data from a calm and quietly resting patient can be obtained reliably. Monitoring of end-tidal gases by a small plastic tube in the nostril is comfortable and unobtrusive to the patient. Even so, children in pain do not tolerate this minimal disturbance. In our further study we have attempted to measure ventilation in children given either morphine or oxycodone for pain but, in most cases, failed for the reasons stated above.

We conclude that in children the ventilatory depression observed after oxycodone 0.1 mg kg\(^{-1}\) appears to be greater than that following morphine 0.1 mg kg\(^{-1}\), pethidine 0.67 mg kg\(^{-1}\), methadone 0.1 mg kg\(^{-1}\) and buprenorphine 0.003 mg kg\(^{-1}\) i.v. [1, 3].

KATRI HAMUNEN\(^1\), KLAUS T. OLKKOLA\(^2\) & EEVA LIISA MAUNUKSELA\(^1\)
\(^1\)Helsinki University Eye Hospital, Haartmaninkatu 4C, FIN-00290 Helsinki and \(^2\)Department of Anaesthesia, University of Helsinki, Helsinki, Finland

Received 13 October 1994, accepted 17 October 1994

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