strategies, including pretreatment with narcotics, can be used to blunt suxamethonium, laryngoscopy, and intubation-induced increases in IOP. Remifentanil is one of the narcotics which have been found beneficial in this respect.4–6 Remifentanil, however, in common with other narcotics, produces dose-dependent respiratory depression, hypotension, bradycardia, and muscle rigidity. Nausea and vomiting are also side-effects of importance after ophthalmic surgery, including open globe injury. Although the ultra-short half-life of the drug results in short-lived side-effects, it may necessitate the administration of other opioids or neuromuscular blocking agents to prevent coughing which can result in increase in the IOP when the effect of suxamethonium wears off as recommended by Dr Alexander himself.4 Lastly, dexmedetomidine has, in addition to its analgesic and ocular hypotensive actions, sedative effects which make it suitable as premedication for ophthalmic surgery, particularly open eye injury.8

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Magnetic resonance imaging of the spinal column

Editor—Recently, the safe use of segmental spinal anaesthesia at T10 by using the combined spinal–epidural technique has been demonstrated.1 2 On the basis of these two papers, we evaluated the distance from the dura mater to the spinal cord by analysing the MRIs of 16 patients without spinal or medullary disease using the 1.5 T superconducting system (Gyrosan Intera, Philips Medical Systems, Best, The Netherlands). Measurements were made through sagittal spin-echo at the second, fifth, and 10th thoracic segments. Using the means of variation, no difference was found between interspaces T2 [3.59 (0.79) mm] and T10 [3.30 (0.78) mm] (P=0.119). There was a significant difference between T5 and T2 (P=0.001) and T5 [4.32 (1.1) mm] and T10 (P=0.002). There was no evidence of correlation between the age and the measured distance between the dura mater and the spinal cord. There was evidence of correlation between the measurement at T2 and those at T5 (r=0.8; P<0.001) and T10 (r=0.6; P=0.015). The longest distance between the dura mater and the spinal cord was at the fifth thoracic segment (Fig. 1). The calculated entry angle for a needle at T5 was 60°.

By our calculations, the distance from the entry point of the needle at an angle of 60° at T5 would double the distance to obtain cerebral spinal fluid when compared with a 90° angle at L3/L4 to 8.64 (2.2) mm. As the distance from the dura mater until the spinal cord at T5 is greater than at L1/L2, the 60° angle could increase the safety.

On the basis of these evaluations of T2, T5, and T10, we believe that the introduction of the needle in an acute angle (60°) may give greater safety for thoracic spinal anaesthesia.

Fig 1 Magnetic resonance imaging spinal column.
Effects of depth of isoflurane anaesthesia on a cognition task in mice

Editor—Several clinical studies have suggested the existence of postoperative cognitive dysfunction (POCD), especially in elderly patients. However, human studies carry many variables. As the sole effects of anaesthesia are difficult to study, we used mice without performing surgery to study the role of anaesthesia in cognitive dysfunction.

Thirty 10–12-week-old inbred male mice (approved by DGV, Portugal) were randomly assigned into three groups: control group (animals not anaesthetized); Group I (anaesthetized with 1% isoflurane); and Group II (anaesthetized with 2% isoflurane). The animals were placed individually in an induction chamber, and anaesthesia was induced with 3% isoflurane (Isoflo, Esteve Farma, Carnaxide, Portugal) in 100% oxygen with a delivery rate of 5 litre min⁻¹ until loss of righting reflex. After induction, the animals were moved into a plastic zip bag and placed in dorsal recumbence. Anaesthesia was then maintained with isoflurane in 100% oxygen with a flow of 1.5 litre min⁻¹. Heart rate and ventilatory frequency were recorded over intervals of 10 min. Body temperature was maintained at 37±2°C by a homeothermic blanket (N-HB101-S-402, Panlab, Barcelona, Spain) placed under the zip bag. Animals remained anaesthetized for 1 h. Isoflurane concentration was monitored in the exhausted air with an agent gas monitor (Datex Capnomac Ultima, Helsinki, Finland), and no stimuli were applied. At recovery, all animals received 100% oxygen until the gain of righting reflex. Animals from the control group were not anaesthetized; however, they were manipulated and placed inside the induction chamber for 1 min (average time until loss of the righting reflex in anaesthetized animals) and were thereafter returned to their home cage to avoid isolation stress.

One week before the procedure, a food restriction schedule was established to ensure feeding motivation in the spatial learning task. At 28 and 56 h after anaesthesia, mice were tested in an eight-arm radial maze (RAM) where animals had to find a piece of cereal. During the test, only one of the choice arms was baited, and this arm remained the same throughout the experiment. Each trial was over when the mouse entered the correct arm and ate the reward. Each animal made 15 test trials per session. An error was recorded when a mouse entered an unrewarded arm. Number of errors before correct choice in each trial, and time to complete the trial was also recorded.

Student’s t-testing for independent samples showed that Group II had a significantly higher heart rate (P<0.0004) and a lower ventilatory frequency (P<0.0002) 20 min after induction of anaesthesia compared with Group I. No differences were detected between the groups concerning the number of errors and time to complete the task using repeated measures ANOVA. Twenty-eight hours post-anaesthesia, the control group had a higher number of trials with zero errors and a lower number of trials with one error compared with Group II, using Kruskal–Wallis and Mann–Whitney test (Fig. 1). At 56 h post-anaesthesia, animals did not show any difference at this level.

Figure 1: Number of trials with 0 and 1 error (x-axis) in the different groups 28 h after anaesthesia administration. Data presented as a box plot (median is the horizontal bar inside box; 25th and 75th percentile are the boxes’ borders; whiskers are the lowest and highest values for the 5th and 95th percentiles, respectively; (o), outlier). *P<0.01 and aP<0.05 compared with the control group regarding number of trials with 0 and 1 error, respectively, using Mann–Whitney test.