SECTION IV : GENERAL

Abstracts

Atropine premedication and the cardiovascular response to electroconvulsive therapy

P.M. Mayur, R. S. Shree and B. N. Gangadhar

A report by the Royal College of Psychiatrists recommended avoiding atropine premedcation during electroconvulsive therapy (ECT) We have examined the cardiovascular effects of ECT with or without atropine premeditation. Consenting patients (*n = 30*) were allocated randomly before their third ECT session to receive atropine or no premeditation. The rate pressure product (RPP) was recorded before anaesthesia, before ECT stimulus and at 1-min intervals thereafter for 5 min. Patients who did not receive atropine had significantly lower RPP values after all stimulus recordings. Administration of atropine or not explained 32% of the variance of summated RPP after the stimulus. There was no clinically significant bradyarrhythmia in those who did not receive atropine. Our findings support the recommendation of the Royal College of Psychiatrists. The study suggests that when threshold determination is not needed, avoiding atropine effectively contains potentially harmful cardiovascular responses. (Br.J.Anaesths. 1998; 81: 466-467).

Mivacurium compared with succinylcholine in children with liver disease

D.W. Green, M. Fisher and I. Socklingham

We have compared mivacurium and succinylcholine in 27 paediatric patients with mild (Child's A) to moderate (Child's B) liver disease undergoing oesophagogastroduodenoscopy (OGD) and injection of oesophageal varices, with 10 healthy children receiving mivacurium for ENT prodecures. With mivacurium 0.2 mg kg^{-1}, the severity of liver disease did not correlate with duration of block compared with controls (time from bolus to T1 25%, P=0.74; T1 25% to T4:T1>0.7, P=0.545). However, initial recovery (time to T1 25%, P=0.002) and overall recovery (bolus to T4:T1>0.7, P=0.004) from mivacurium induced neuromuscular block correlated inversely with pre-existing concentrations of plasma cholinesterase. Conditions for tracheal incubation at 2 min with mivacurium were comparable with conditions at 1 min with succinylcholine in the liver patients. (Br. J. Anaesth. 1998; 81: 463-465).

In vitro degradation of atracurium and cisatracurium at pH 7.4 and 37ºC depends on the composition of the incubating solutions

M. Weindlmayr-goettel, H.G. Krebs and F. Hammerschmidt

The pharmacokinetic models proposed for atracurium or cisatracurium are based on the assumption that spontaneous degradation via Hofmann elimination proceeds in vivo at the same rate as measured in vitro at pH 7.4 37ºC. As different degradation rates have been reported for all 10 stereoisomers of atracurium measured together, for each of its three isometric groups, and for the single isomer cisatracurium, we studied if the rate is dependent of factors other than pH and temperature. In vitro degradation of atracurium and cisatracurium was studied at 37ºC and pH 7.4 in nine incubating solutions containing one of three buffer systems)phosphate, HEPES or Tris) and additives (sodium chloride, potassium sulphate or glucose). Concentrations of atracurium, cisatracurium and laudanosine were measured after incubation for up to 240 min using an HPLC method. Degradation of atracurium proceeded monoexponentially. The rate was slower in the presence of sodium chloride, potassium sulphate, and in a lower concentration of the phosphate buffer. Glucose enhanced the degradation. At the same total buffer concentration (50 mmol $litre^{-1}$), degradation was fastest in the phosphate, intermediate in the HEPES and slowest in the Tris buffer. Degradation rates of cisatracurium in sodium phosphate 50 mmol $litre^{-1}$ and Sorensen (Na-K phosphate) butter 66.7 mmol $litre^{-1}$ were similar to those of atracurium. We concluded that, at constant pH and temperature, the degradation rate of atracurium was dependent on the total concentration of the base in the incubating solution. (Br. J. Anaesth. 1998; 81: 409-414).

Granisetron-droperidol combination for the prevention of postoperative nausea and vomiting in female patients undergoing breast surgery

Y. Fuji, H. Toyooka and H. Tanaka

We have compared the efficacy and safety of the combination granisetron-droperidol with each antimetic alone in preventing postoperative nausea and vomiting (PONV) after breast surgery. In a randomized, double-blind study, 150 female patients received granisetron 3 mg, with droperidol 1.25 mg or granisertron 3 mg with droperidol 1.25 mg (n=50 each) i.v., immediately before induction of anaesthesia was 18% with granisetron, 38% with droperidol and 4% with the granisetrondroperidol combination (P<0.05; overall Fishe's exact probability test). We conclude that the granisetron-droperidol combination was more effective than each antiemetic alone in the prevention of PONV in female patients undergoing breast surgery. (Br. J. Anaesth. 1998; 81: 387-389).

Effect of preoperative extradural bupivacaine and morphine on stump sensation in lower limb amputees

L. Nikolajsen, S. Ilkjaer and T.S. Jensen

We have examined the effect of preoperative extradural bupivacaine and morphine on postoperative stump sensation in 31 patients undergoing amputation of the lower limb in a prospective, randomized, double-blind study. Patients were allocated randomly to one of two groups: group 1 received extradural 0.25% bupivacaine 4-7 ml h^{-1} and morphine 0.16-0.28 ml h^{-1} before and during operation; group 2 received extradural saline before an during amputation and conventional analgesic for pain treatment. All patients received general anaesthesia for the amputation and extrdural bupivacaine and morphine after operation. Sensory examination of the limb/stump was carried out before amputation, and after 1 week and 6 months. The following were measured: pressure pain thresholds (pressure algometry), touch and pain detection thresholds (von Frey hairs), and allodynia and wind-up-like pain. There were no differences between the two groups at any of the postoperative assessments or mechanical and thermal sensibility or rate of allodynia and wind-up-like pain. Our study suggests that preoperative and intraoperative extradural block had no long-term prophylactic effect on hyperalgesia, allodynia or wind-up-like pain. (Br. J. Anaesth. 1998; 81: 348-354).

Respiratory sinus arrhythmia and clinical signs of anaesthesia in children

C.M. Blues and C.J.D. Pomfrett

We have investigated changes in respiratory sinus arrhythmia (RSA) and compared these with clinical signs of anaesthesia in children. Children aged 3-10 yr were anaesthetized by gaseous induction with halothane and nitrous oxide. Multiple heart rate variability (HRV) spectra were obtained by power spectral analysis of continuous epoch of time from before introduction of halothane (baseline) until the pupils were central and fixed (stage 3). Measurement of RSA was performed by integration of the area under the spectral curve within the range of the respiratory frequency ± 0.15 Hz. In all patients RSA decreased continuously during eduction unless stimulation occurred with insertion of an airway. Values of RSA were compared at three times: baseline, loss of pharyngeal tone and stage 3. The decrease in RSA from baseline to loss of pharyngeal tone and from loss of pharyngeal tone to stage 3 was significant (P=0.003 and P=0.018, respectively). These results how that RSA can be related to the clinical signs of anaesthesia and has potential as a measure of depth of anaesthesia in children. (Br. J. Anaesth. 1998; 81: 333-337).

Addition of clonidine or fentanyl to local anesthetics prolongs the duration of surgical analgesia after single shot caudal block in children

I. Constant, O. Gall and L.Gouyet

Caudal anaesthesia is indicated for surgical procedures lasting less than 90 min. Fentanyl and clonidine are known to prolong postoperative caudal analgesia, but there are no data on their effect on duration of surgical analgesia. We evaluated if the addition of clonidine or fentanyl to local anesthetics prolonged the duration of surgical analgesia after single shot caudal block in children in a randomized, double-blind study. We studied 64 children, aged 6-18 months, undergoing bilateral correction of vesicoureteral reflux which was expected to last more than 90 min. Patients were allocated to one of four groups: group O received 1 ml kg^{-1} of mixture of 0.25% bupivacaine with epinephrine and 1% lidocaine in equal parts; group F received the same mixture of local anesthetics in addition to fentanyl 1 µg kg^{-1}; group C received the same mixture of local anesthetics in addition to clonidine 1.5 µg kg^{-1}; and group C+F received the same mixture of local anesthetics in addition to fentanyl 0.5 µg kg^{-1} and clonidine 0.75 µg kg^{-1}. Single shot caudal block was sufficient in only 57% of children in group O C+F (P=0.035). Global assessment of anaesthesia, defined as the time from caudal injection to the first administration of analgesic (either during or after surgery), was significantly longer in the three groups of children who received additives compared with local anesthetics alone (P=0.035), but there were no differences between the three additive groups. Vomiting was observed only in children who received fentanyl. Addition of clonidine or fentanyl to local anesthetics prolonged the duration of surgical analgesia of caudal block, allowing single shot caudal anaesthesia to be recommended for surgery alsting 90-150 minutes. Clonidine had some advantages over fentanyl as it did not produce clinically significant side effects. (Br. J. Anaesth. 1998; 80: 249-298).

Double-blind comparison of extradural block with three bupivacaine-ketamine mixtures in knee arthroplasty

P.S. Weir and J.P.H. Fee

We have compared 0.5% bupivacaine 75 mg (group A; n=15) with three 0.5% bupivancaine 75 mg-ketamine mixtures for extradural block in 59 ASA I-III patients undergoing total knee replacement in a randomized, double-blind study. The following doses of preservative-free 1% ketamine were used: 0.3 mg kg^{-1} (group B: n=14); 0.5 mg kg^{-1} (group C: n=5); and 0.67 mg kg^{-1} (group D: N=15). Level of sensory block, degree of motor weakness and sedation scores were recorded before and after operation. Duration of postoperative analgesia was also noted. There was no difference between groups in median maximum level of sensory block (group A: T4 (range T10-T2); group B: T4 (T10-T2); group C: T4 (T8-T2); and group D: T3 (T8-C3)) or in the degree of motor block. Thirty-three of the 44 patients who received ketamine showed signs of systemic absorption (blurred vision, sedation) within 10 min of injection. There was no significant difference between groups in median duration of analgesia (group A: 240 (range 115-340) min; group B: 198 (97-460) min; group C: 150 (122-448) min; and group D: 210 (130-390) min). No patient suffered any adverse psychomimetic effects. We conclude that at the doses used, addition of ketamine to extradural bupivacaine did not improve extradural block in adult patients undergoing total knee replacement. (Br. J. Anaesth. 1998; 80: 299-301)

Augmentation of the neuromuscular blocking effects of cisatracurium during desflurane, sevoflurane, isoflurane or total i.v. anaesthesia

H. Wolf, M. Kahl and T. Ledowski

We have evaluated the enhancement of cisatracurium-induced neuromuscular block by potent inhalation anaesthetic agents, by constructing dose-effect curves for cisatracurium in 84 patients during anaesthesia with 1.5 MAC (70% nitrous oxide) desfluran,e sevoflurane, isoflurane or total i.v. anaesthesia (TIVA). Acceleromyography (TOF-Guard) and train-of-four (TOF) stimulation of the ulnar nerve were used (2 Hz every 12 s). Cisatracurium was administered in increments of 15 µg kg^{-1} until depression of T1/T0>95% was reached. ANOVA was used for statistical analysis (α = 0.05, ß = 2). Depression of T1/T0 during potent inhalation anaesthesia was enhanced compared with TIVA. ED_{50} and ED_{95} values of cisatracurium were 15 (SD 5) and 34(10) µg kg^{-1} for desflurane; 15 (5) and 33 (9) µg kg^{-1}) (P<0.01 in each case). After equi-effective dosing, times to T1/T0 = 25% were similar in all groups (19 (7), 19 (5), 20 (5) vs 16 (4) min). Recovery $index_{25-75\%}$ and time to a TOF ration of 0.70 were prolonged significantly by desflurane and sevolfurane compared with TIVA (18 (5), 19 (8) vs 12 (4) min and 43 (11), 44 (10) vs 35 (5) min, respectively), whereas the difference was not significant for isoflurane (14 (6) and 41 (7) min). (Br. J. Anaesth. 1998; 80: 308-312)

Effects of Temperature and Volatile Anesthetics on $GABA_A$ Receptors

Andrew Jenkins, Ph.D., Nicholas P. Franks, Ph.D., and Willaim R.. Lieb, ph.D.

Background: Potentiation of the activity of the r-aminobutyric acid type A (GAB_A) receptor channel by volatile anesthetic agents is usually studied in vitro at room temperature. Systematic variation of temperature can be used to assess the relevance of this receptor to general anesthesia and to characterize the modulation of it sbehavior by volatile agents at normal body temperature.

Conclusions: These results are consistent with direct binding of volatile anesthetic agents to the GAB_A receptor channel playing an important role in general anesthesia. The finding that the degree of anesthetic potentiation was agent specific at low temperatures but not at 37ºC emphasizes the importance of doing in vitro experiments at normal body temperature. (Anesthesiology 1999; 90:184-91)

Ondansetron Is Effective to Treat Spinal or Epidural Morphine-induced Pruritus

Alain Borgeat, M.D., and Hans-Ruedi Stirnemann, M.D.,

Background: Spinally and epidurally administered morphine is frequently associated with pruritus. Isolated case reports indicate that ondansetron may be effective in this context. This study aims to investigate the effectiveness of ondansetron to treat this side effect.

Conclusion: The administration of 8 mg ondansetron intravenously is an effective treatment fro spinally or epidurally administered morphine-induced pruritus. In this clinical condition the treatment is safe and well tolerated. (Anesthesiology 1990; 90:132-6)

Effect of Xenon on Hemodynamic Responses to Skin Incision in Humans

Yoshinori Nakata, M.D., M.B.A., Takahisa Goto, M.D., and Shigeho Morita, M.D.

Background: The authors evaluated the hemodynamic suppressive effects of xenon in combination with sevoflurane at skin incision in patients undergoing surgery.

Conclusions: Xenon and nitrous oxide in combination with sevrflurane can reduce hemodynamic responses to skin incision compared with sevoflurane alone. One probable explanation may be that xenon has analgesic propertics similar to those of nitrous oxide, although the exact mechanism is yet to be determined. (Anesthesiology 1999; 90:106-10)

Dexamethasone Changes Brain Monoamine Metabolism and Aggravates Ischemic Neuronal Damage in Rats

Shinzo Tsubota, M.D., Naoto Adachi, M.D., Ph.D., and Toshihiro Yorozuya.

Background: Glucocorticoid have been reported to aggravate ischemic brain damage. Because changes in the activities of various neuronal systems are closely related to the outcome of ischemic

damage, the authors evaluated the effects of deamethasone on the monoaminergic systems and ischemic neuronal damage.

Conclusions: Dexamethasone suppresses the inhibitory serotonergic system and facilitates the excitatory dopaminergic system in the rat telencephalon. This may be a mechanism by which dexamethasone aggravates ischemic neuronal injury. Anesthesiology 1999; 90:515-23)

Intrathecal Clonidine Alleviates Allodynia in Neuropathic Rats

Interaction with Spinal Muscarinic and Nicotinic Receptors

Hui-Lin Pan, M.D., Ph.D., Shao-Rui Chen, M.D., and James C. Eisenach, M.D.

Background: Intrathecally administered clonidine increases release of spinal acetylcholine, which may be related to its analgesic action in neuropathic pain. The current study determined the role of spinal muscarinic and nicotinic receptors in the antiallodynic effect of intrathecally administered clonidine in spinal nerve-ligated rats.

Conclusions: These results demonstrate that the analgesic effect of intrathecally administered cloniding on neuropathic pain is mediated by spinal muscarinic and nicotinic receptors. Therefore, this study provides functional evidence that spinally released acetylcholine plays a role in the antiallodynic effect of intrathecally administered clonidinge in neuropathic pain. (Anesthesiology 1999; 90:509-14)

Airway Obstruction and Perioperative Complications in Smokers Undergoing Abdominal Surgery

David O. Warner, M.D., Mark A. Warner, M.D., and Kenneth P. Offord.

Background: The goal of this study was to determined whether airway obstruction determined by preoperative spirometry predicts perioperative complications in smokers undergoing abdominal surgery whose treatment is managed according to current clinical practice.

Conclusions: When other factors were considered, preoperative airway obstruction predicted the occurrence of bronchospasm, but not prolonged endotracheal intubation, in smokers undergoing abdominal surgery who are treated according to current clinical practices. (Anesthesiology 1999; 90:372-9)

Mechanisms of Bronchoprotection by Anesthetic Induction Agents

Propofol versus Ketamine

Robert H. Brown, M.D., M.P.H., and Elizabeth M. Wagner, Ph.D.

Background: Propofol and ketamine have been purported to decrease bronchoconstriction during induction of anesthesia and intubation. Whether they act on airway smooth muscle or through neural reflexes has not been determined. We compared propofol and ketamine to attenuate the direct activation of airway smooth muscle by methacholine and limit neurally mediated bronchoconstriction

Conclusion:: The local bronchoprotective effects of ketamine and propofol on airways is through neurally mediated mechanisms. Although the direct effects on airway smooth muscle occur at high concentrations, these are unlikely to be of primary clinical relevance.

(Anesthesiology 1999; 90:822-8)

A Double-blind Comparison of 0.125% Ropivacaine with Sufentanil and 0.125% Bupivacaine with Sufentanil for Epiduaral Labor Analgesia

Philippe Gautier, M.D., Marc De Kock, M.D., Ph.D., and Albert Van Steenberg.

Background: This study intends to evaluate the benefits of the administration of intermittent bolus doses of ropivacaine (0.125%) compared with bupivacaine (0.125%) after addition of sufentanil for analgesia during labor.

Conclusions: Ropivacaine 0.125% with sufentanil affords reliable analgesia with minimal motor blockade. (Anesthesiology 1999; 90:772-8)

Behavioral and Physiological Effects of Remifentanil and Alfentanil in Healthy Volunteers

Matthew L. Black, M.D., Joanna L. Hill, B.A. and James P. Zacny. Ph.D.

Background: The subjective and psychomotor effects of remifentanil have not been evaluated. Accordingly, the authors used mood inventories and psychomotor tests to characterize the effects of remifentanil in healthy, non-drug-abusing volunteers. Alfentanil was used as a comparator drug.

Conclusions: The notion that the pharmacodynamics effects of remifentanil are extremely short-lived after the drug is no longer administered must be questioned given our findings that psychomotor effects were still apparent I h after the infusion was discontinued. (Anesthesiology 1999; 90:718-26)

Dose-Response Effects of Spinal Neostigmine Added to Bupivacaine Spinal Anesthesia in Volunteers

Spencer S. Liu, M.D., Peter S. Hodgson, M.D., and James M.D.

Background: Intrathecal adjuncts often are used to enhance small-dose spinal bupivacaine for ambulatory anesthesia. Neostigmine is a novel spinal analgesic that could be a useful adjunct, but no data exist to assess the effects of neostigmine on small-dose bupivacaine spinal anesthesia.

Conclusions: The addition of 50 µg neostigmine prolonged the duration of sensory and motor block. However, high incidences of side effects and delayed recovery from anesthesia with the addition of 6.25 to 50 µg neostigmine may limit the clinical use of these doses for outpatient spinal anesthesia. (Anesthesiology 1999; 90:710-7)

Causes of Nitrous Oxide Contamination in Operating Rooms

Yuichi Kanmura, M.D., Junyal Sakai, Ph.D., and Heiji Yoshinaka, M.D.

Background: To reduce the ambient concentration of waste anesthetic agents, exhaust gas scavenging systems are standard in almost all operating rooms. The incidence of contamination and the factors that may increase the concentrations of ambient anesthetic gases have not been evaluated fully during routine circumstances, however.

Conclusions: N_2O contamination was common during routine circumstances in our operating rooms. An unconnected scavenging system led to the highest concentrations of N_2O recorded. Proper use of scavenging systems is necessary if contamination by anesthetic gas is to be limited. (Anesthesiology 1999; 90:693-6)

Increased Reading Speed for Stories Presented during General Anesthesia

Sinikka Munte, M.D., Isabelle Kobbe, M.D., and Avra Demertzis, M.D.

Background: In the absence of explicit memories such as the recall and recognition of intraoperative events, memory of auditory information played during general anesthesia has been demonstrated with several tests of implicit memory. In contrast to explicit memory, which requires conscious recollection, implicit memory does not require recollection of previous experiences and is evidenced by a priming effect on task performance. The authors evaluated the effect of a standardized anesthetic technique on implicit memory, first using a word stem completion task, and then a reading speed task in a subsequent study.

Conclusions: Implicit memory was demonstrated after anesthesia by the reading speed task but not by the word stem completion task. Another explanation is that anesthesia with propofol, alfentanil, and nitrous oxide suppressed the word priming but not the reading speed measure of implicit memory. The reading speed paradigm seems to provide a stable and reliable measurement of implicit memory. (Anesthesiology 1999; 90:662-9)

Sevoflurane Selectively Increases Coronary Collateral Blood Flow Independent of K_{ATP} Channels In Vivo

Judy R. Kersten, M.D., Tood Schmeling, B.S., and Douglas A. Hettrick,

Background: Volatile anesthetic agents produce coronary vasodilation via activation of adenosine triphosphate-sensitive potassium (K_{ATP}) channels. The authors tested the hypothesis that sevoflurane selectively increases coronary collateral blood flow and assessed the role of K_{TPA} channel activation in this process.

Conclusions: The results demonstrate that sevoflurane selectively increases large and small coronary collateral blood flow via mechanism(s) independent of K_{TPA} channel activation. (Anesthesiology 1999; 90:246-56)

Characterization of the Antihyperalgesic Action of a Novel Peripheral Mu-opioid Receptor

Natsuko Nozaki-Taguchi, M.D., and Tony L. Yaksh, Ph.D.

Background: Preclinical and clinical evidence indicates that locally administered opioid agonist produce an antihyperalgesic effect through peripheral opioid receptors in inflamed tissue, Loperamide, a μ opioid agonist, does not cross the blood-brain barrier and therefore lacks central effects after systemic administration. The authors defined the effects of topical loperamide on a thermal injury-induced hyperalgesia.

Conclusions: Loperamide, a peripherally acting μ opioid agonist, applied topically at the site of inflammation possesses a significant antihyperalgesic action without any systemic side effects. (Anesthesiology 1999; 90:225-34)

Inhibitory Effects of Diazepam and Midazolam on Ca^{2+} and K^+ Channels in Canine Tracheal Smooth Muscle Cells

Michiaki Yamakage, M.D., Ph.D., Takashi Matsuzaki, M.D., Ph.D., and Naoki Tsujiguchi.

Background: Benzodiazepines have a direct bronchodilator action in airway smooth muscle, but the mechanisms by which these agents produce muscle relaxation are not fully understood. The current study was performed to identify the effects of the benzodiazepines diazepam and midazolam on Ca^{2+} and K^+ channels in canine tracheal smooth muscle cells.

Conclusion: Diazepam and midazolam had inhibitory effects on voltage-dependent Ca^{2+} channels, which lead to muscle relaxation. However, high concentrations of these agents were necessary to inhibit the K^+ channels. The lack of antagonized effects of their antagonists is related to the non-Y-aminobutyric acid-mediated electrophysiologic effects of benzodiazepines on airway smooth muscle contractility. (Anesthesiology 1999; 90:197-207)

Sevoflurane Has No Effect on Sinoatrial Node Function or on Normal Atrioventricular and Accessory Pathway Conduction in Wolff-Parkinson-White Syndrome during Alfentanil/Midazolam Anesthesia

Michael D. Sharpe, M.D., F.R.C.P.C., Daniel J. Cuillerier, M.D., F.R.C.P.C., and John K. Lee, M.D.

Background: The effects of sevoflurane on the electrophysiologic properties of the human heart are unknown. This study evaluated the effects of sevoflurane on the electrophysiologic properties of the normal atrioventricular conduction system, and on the accessory pathways in patients with Wolff-Parkinson-White syndrome, to determine its suitability as an anesthetic agent for patients undergoing ablative procedures.

Conclusions: Sevoflurane had no effect on the electrophysiologic nature of the normal atrioventricular or accessory pathway and no clinically important effect on sinoatrial node activity. It is therefore a suitable anesthetic agent for patients undergoing ablative procedures. (Anesthesiology 1999; 90:60-5)

Perioperative Pulmonary Aspiration in Infants and Children

Mark A. Warner, M.D., Mary E. Warner, M.D., and David O. Warner.

Background: Pulmonary aspiration of gastric contents during the perioperative period in infants and children may be associated with postoperative mortality or pulmonary morbidity. There has not been a recent determination of the frequency of this event and its outcomes in infants and children.

Conclusions: In this study population, the frequency of perioperative pulmonary aspiration in children was quite low. Serious respiratory morbidity was rare, and there were no associated deaths. Infants and children with clinically apparent pulmonary aspiration in whom symptoms did not develop within 2 h did not have respiratory sequelae. (Anesthesiology 1999; 90:66-71)

Volume Kinetics of Ringer's Solution in Hypovolemic Volunteers

Dan Drobin, M.D., and Robert G. Hahn, M.D., Ph.D.

Background: The amount of Ringer's solution needed to restore normal blood volumes is thought to be three to five times the volume of blood lost. This therapy can be optimized by using a kinetic model that takes accounts fro the rates for distribution and elimination of the infused fluid.

Conclusions: The dilution of the blood and the retention of infused Ringer's solution in the body increases in the presence of hypovolumia, which can be attributed chiefly to a reduction of the elimination rate constant. (Anesthesiology 1999; 90:81-91)

Effects of Sodium Nitroprusside and Phenylephrine on Blood Flow in Free Musculocutaneous Flaps during General Anesthesia

Andrej Banic, M.D., Ph.D., Vladimir Krejci, M.D., and Dominique Erni, M.D.

Background: Hypoperfusion and necrosis in free flaps used to correct tissue defects remain important clinical problems. The authors studied the effects of two vasoactive drugs, sodium nitroprusside and phenylephrine, which are used frequently in anesthetic practice, on total blood flow during general anesthesia.

Conclusions: Systemic phenylephrine in a dose increasing the systemic vascular resistance and arterial pressure by 30% appears to have no adverse effects on blood flow in free musculocutaneous flaps. Sodium nitroprusside, however, in a dose causing a 30% decrease in systemic vascular resistance and arterial pressure, causes a severe reduction in free flap blood flow despite maintaining cardiac output.

SMILE

Urologist to a patient of stricture urethra: "How many times have you been operated upon before?"

Patient: "Twice for the first stage, and five times for the second stage."