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Potential for heart-beating and non-heart-beating organ donation : a retrospective medical record review on 7 critical care units in a 1900 bed hospital. D. ANDRIES, B. QUAGHEBEUR, F. VAN GELDER*, L. ROELS**, W. DAENEN*, G. VAN DEN BERGHE. Intensive Care Medicine, Transplantation Council U.Z.Gasthuisberg, Leuven, Belgium. *Donor Action Foundation.

Introduction

A growing mortality list of patients awaiting organ transplantation incites to review why suitable potential donors are lost.

Study aim

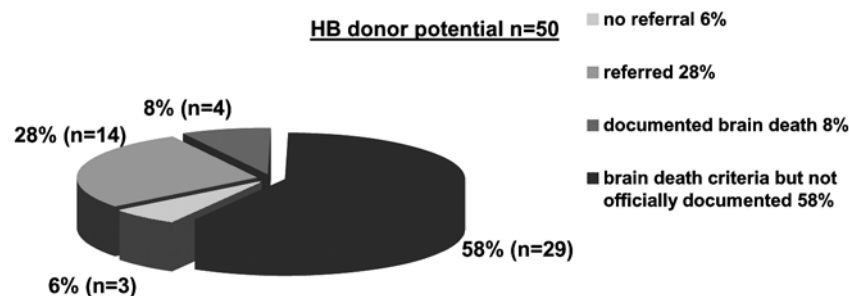
We therefore retrospectively reviewed our medical records of all deaths on 7 critical care units (surgical and medical ICU, the neurohighcare, post-anesthetic-care unit, the operating room, the emergency unit, the coronary and post-coronary care unit). Data of potential donors were inserted into the Donor Action Database System as published in Gore's study (1). We then compared potential heart beating (HB) and non heart beating (NHB) organ donors within our Donor Hospital Network in general and specifically per unit.

Methods

The MRR's of 656 deaths from 7 "critical care" units reported between Sept.1, 2003 and Aug.31, 2004 were entered into the DA database and analyzed on their potential for HB or NHB organ donors. Overall as well as unit specific results were generated.

Results

Of the 656 medical records reviewed, 50 (15%) records showed HB donor potential. 17/50 (34%) were officially brain death. Three of them were not reported to the transplant coordinator. Twelve of the remaining 14 lead to a successful multi-organ donation. Of the remaining 33/50, 4 met brain death criteria but were not officially documented as such. Three out of the 4 were potential donors. Of the remaining 29 records, 6 were unidentified, 6 medically unsuitable, 15 had de-escalation of therapy and in 2 cases there were judicial/coroner objections. The algorithm of the NHB donor potential, generated 127/656 (19%) records. Twenty two (17%) were excluded being dead on arrival, class I of the Maastricht criteria (2) for NHB organ donation. Out of the remaining 105 (83%) records (Maastricht classification II-IV) only 3 (2,8%) referrals took place resulting in 1 extraction procedure. De-escalation of therapy (Maastricht classification III) accounted for 72/105 (57%) records, mostly on the medical and surgical ICU.



Discussion

Analysis showed 42 records with symptoms of BD, of which 15/42 (35%) were signaled to the transplant coordinator, but of which 12/42 (28,6%) were never considered as potential donor. These preliminary data analysis shows a potential growth of at least 28,6% in the HB donor pool. The NHB donor pool definitely is an underused pool with 2% more potential compared to the HB donor pool.

Conclusion

These analyses are promising but further investigation is needed to stratify approaches (3) and define weaknesses in the donor detection and identification process.

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Changes of a Surgical Stress Index in response to standardized pain stimuli during propofol – remifentanyl infusion. N. B. K. BLYAERT, M.D., C. VAN PETEGHEM, M.D.; M. HUIKI, Ph.D., K. UUTELA, Ph.D., E. P. MORTIER, M.D., D.Sc., M. M. R. F. STRUYS, M.D., Ph.D. Dept. of Anaesthesia, Ghent University Hospital, Ghent, Belgium.

Introduction

The Surgical Stress Index (SSI), normalised from the R-wave peak positions of the ECG and the plethysmographic pulse wave amplitude, measures autonomic changes in response to surgical stress. (1) This study aimed at observing the changes of SSI in response to standardized tetanic pain stimuli (100 Hz, 60 mA, 30 s) during propofol – remifentanyl infusion.

Methods

After IRB approval and written informed consent, 40 ASA I and II patients were allocated to 1 of 4 groups to receive a remifentanyl step-up/-down effect-compartment target controlled infusion ($C_{e_{remi}}$) of 0, 2, 6, 2, 0 or 6, 2, 0, 2, 6 ng/ml and an effect-compartment TCI propofol infusion ($C_{e_{prop}}$) to keep the state entropy (SE) (2) between 30-50 or 10-30, respectively.

	Group 1	Group 2	Group 3	Group 4
Level of sleep	SE 10-30	SE 30-50	SE 10-30	SE 30-50
Level of analgesia	6-2-0-2-6	6-2-0-2-6	0-2-6-2-0	0-2-6-2-0

At every $C_{e_{remi}}$, after an equilibration of 4 min, max. change in SSI after a painful stimulus (SSI_{max}) compared to baseline (SSI_{BL}) were correlated with $C_{e_{prop}}$ and $C_{e_{remi}}$. RMANOVA with post-hoc and Pearson's correlation were done.

Results and Discussion

At similar time course of $C_{e_{remi}}$, both SSI_{BL} and SSI_{max} were independent from $C_{e_{prop}}$ used in this study (mean concentrations between 3.4 – 6.9 µg/ml). Poor correlations for SSI_{BL} and SSI_{max} vs. $C_{e_{prop}}$ were found ($r = 0.08$ and 0.07) suggesting that SSI_{BL} and SSI_{max} are not influenced by $C_{e_{prop}}$. Correlation between $C_{e_{remi}}$ and SSI_{BL} and SSI_{max} were -0.34 and -0.55 . SSI_{BL} and SSI_{max}

were significantly higher within a $C_{e_{remi}}$ range between 0 and 2 ng/ml than at higher $C_{e_{remi}}$. This might reveal a saturation effect of SSI values at higher $C_{e_{remi}}$.

Conclusions

SSI was independent from $C_{e_{prop}}$ titrated in this study. SSI_{BL} was poorly correlated with $C_{e_{remi}}$, SSI_{max} was better correlated and clearly higher at very low $C_{e_{remi}}$, but saturated at $C_{e_{remi}}$ concentrations higher than 2 ng/ml in combination with steady-state $C_{e_{prop}}$.

Spearman's R Correlation between $SSI_{baseline}$, SSI_{max} and SSI_{dif} (= change between $SSI_{baseline}$ and SSI_{max}) versus $C_{e_{prop}}$ and $C_{e_{remi}}$ for each group and for all groups pooled together (= pooled).

	Group 1	Group 2	Group 3	Group 4	pooled
$SSI_{baseline}$ vs $C_{e_{prop}}$	-0.51 **	0.15	0.23	-0.12	0.079
SSI_{max} vs $C_{e_{prop}}$	-0.48 **	0.16	0.22	-0.20	0.075
SSI_{dif} vs $C_{e_{prop}}$	-0.23	0.08	0.05	-0.15	0.009
$SSI_{baseline}$ vs $C_{e_{remi}}$	-0.17	-0.29 *	-0.48 **	-0.41 **	-0.34 **
SSI_{max} vs $C_{e_{remi}}$	-0.26	-0.43 **	-0.74 **	-0.68 **	-0.55 **
SSI_{dif} vs $C_{e_{remi}}$	- 0.29 *	- 0.36 **	- 0.45 **	- 0.50 **	- 0.43 **

* = significant relation at the 0.05 level ; ** = significant relation at the 0.01 level.

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Comparison of the effects of Tranexamic acid, Aprotinin and placebo on blood conservation, fibrinolysis and platelet function with extensive heart surgery. A randomised trial. A. BOSTEELS¹, R. DEMEYERE¹, J. ARNOUT², P. HERIJGERS³, W. FLAMENG³. Departments of Anesthesiology¹, Molecular and Vascular Biology² and Cardiac Surgery³, KULeuven, Herestraat 49, 3000 Leuven.

Objective

Fibrinolysis is an important cause of peri-operative bleeding after cardiopulmonary bypass (CPB). The antifibrinolytic drugs, aprotinin and tranexamic acid, are known to reduce bleeding and the need for allogenic blood transfusion, both events that increase morbidity and mortality.

This single blind prospective randomised trial was undertaken to compare the effects of a high dose aprotinin (a biological serine protease inhibitor), a high dose of tranexamic acid (a synthetic lysine analogue) and no treatment on blood loss, transfusion of blood products, coagulation parameters and platelet function during heart surgery and for the first 24 h after CPB.

Methods

After approval of the Institutional Ethical Committee and obtaining written informed consent, 60 patients, undergoing elective coronary artery bypass

with aortic valve replacement, using CPB, were assigned to three treatments groups. 20 patients received high dose aprotinin (A), a loading dose of 30.000 KIU/kg, given over 20 minutes, after sternotomy, followed by a continuous infusion of 0.5×10^6 KIU until transfer to the ICU and 2×10^6 KIU in the priming fluid of the oxygenator. 20 patients received high dose tranexamic acid (TA), 100 mg/kg over 20 minutes, after sternotomy, followed by an infusion of 1 mg/kg/h throughout surgery and 20 patients received placebo (P). In both the tranexamic acid and placebo group a dose of saline solution, equivalent to the bolus in the aprotinin group was given. Blood loss, total volume of fluid administered, routine haematology and biochemistry, haemodynamic effects, coagulation parameters, fibrinolysis parameters and glycofibrinogen were recorded at preset times. Analysis of variance for repeated measurements was applied for statistical differences between groups. P values < 0.05 were considered as significant. Data are expressed as mean values \pm SEM.

Results

	<i>Aprotinin</i>	<i>Tranexamic Acid</i>	<i>Placebo</i>
Duration post-CPB period (min)	55 \pm 18	71 \pm 19	84 \pm 26*
24 h chest tube drainage (ml)	470 \pm 74	626 \pm 59	1160 \pm 123*
Haemoglobin at 24 h after CPB (g/dl)	9.7 \pm 1.2	9.8 \pm 1.2	8.7 \pm 0.6*
Packed Red Blood Cells (ml)	793 \pm 591	844 \pm 429	905 \pm 477
Volume administered (ml)	2320 \pm 741	2760 \pm 1045	3232 \pm 743*
Additional heparin during CPB (IU)	3750 \pm 1200 (9 patients)	6500 \pm 1500* (15patients)	3000 \pm 100 (8 patients)
D-dimer at 1h after CPB (μ g/ml)	578 \pm 363	550 \pm 469	3603 \pm 1966*
Plasminogen at 1h after CPB (%)	51.7 \pm 1.6	40.1 \pm 2.1*	56.2 \pm 2.6
Anti-plasmin at 1h after CPB (%)	126.9 \pm 2.7*	38.2 \pm 4.3	41.7 \pm 5.1
Glycofibrinogen at 1h after CPB (%)	59.0 \pm 2.7	58.2 \pm 2.0	54.1 \pm 2.7

* p < 0.05 groups compared.

Discussion

Fibrinolysis is a common problem with CPB. We conducted this trial to compare the efficacy of the antifibrinolytic activity between a high dose A and a high dose TA. Our results show that their antifibrinolytic activity is comparable, but that the mechanisms are different. Their protective effect on platelet activation could not be confirmed by our glycofibrinogen analyses. We noticed a higher need for additional heparin in the TA group. Considering

these results, we believe that TA can be used as an equivalent alternative for antifibrinolytic purpose.

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Incorrect shunt placement due to anatomic variations of the aortic arch during carotid endarterectomy: a rare cause of perioperative ischaemia? M. CRISTIANI, M. KOCH, L. BARVAIS, D. SCHMARTZ. Department of Anaesthesiology, Erasme University Hospital, Brussels.

Introduction

We report an unintentional occlusion of the brachiocephalic trunk (BCT) during left carotid thromboendarterectomy (CEA).

Patient

A 71-year-old woman with a 90% asymptomatic stenosis of the left internal carotid, found during her annual diabetes check-up. Further investigations included a computerized tomography (CT) which showed an intact blood brain barrier and a previously undiagnosed meningioma. The CEA planning included EEG monitoring and shunt placement as direct or indirect Willis circle compression could not be excluded for the presence of the meningioma.

Method

A propofol and remifentanyl TCI technique was employed for general anaesthesia. Muscle relaxation for tracheal intubation was achieved with cisatracurium 0,15 mg/kg. Hemodynamic monitoring included a right radial artery catheter and central venous pressure monitoring. Parameters remained stable during cervical vessels dissection. After systemic heparinization, the left carotid artery (CA) was occluded and a temporary shunt was inserted.

Observation

Immediately after shunt insertion, right radial pulse pressure damping occurred. End-tidal carbon dioxide remained stable, as well as arterial blood pressure measured by an oscillometric automated cuff placed on the

left arm. No dysfunction of the catheter-tubing-transducer system was found. Blood pressure was assessed each minute by non-invasive oscillometric monitor and patch angioplasty was completed uneventfully after 36 minutes of carotid cross clamping. After shunt removal, right arterial pressure waveform regained its original shape and correlated with the non invasive oscillometric monitoring. An anatomic variation of the aortic arch was therefore suspected. This suspicion was confirmed by a retrograde BCT opacification of a perioperative angiography. Postoperatively, a nuclear magnetic resonance angiography confirmed a left common CA emerging from the BCT. Postoperative evolution was uneventful and the patient was discharged on day 10.

Discussion and conclusion

Aortic arch anomalies may lead to occlusion of adjacent vessels with possible ischaemia during shunt procedures. In our case, disappearance of the invasive blood pressure trace, may result from either obstruction of the right subclavian artery or from BCT obstruction. As no reflux of blood occurred in the operative field, inadvertent occlusion of the BCT seems more likely and may cause cerebral hypoperfusion and infarction in the heterolateral carotid artery territory. Such complication did not occur in our patient probably due to an adequate flow through the vertebral arteries, associated with a stable EEG.

Reference

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Pumpless Extracorporeal Lung Assist – a case report. V. DECAIGNY, M. ONGENAE, H. VANOVERSCHELDE, R. DONADONI. AZ Maria-Middelares, Kortrijksesteenweg 1026, 9000 Gent.

Introduction

On the ICU, a high mortality, associated with ARDS and/or exacerbation of lung injury by mechanical ventilation (1) still exists. The Interventional Lung Assist (iLA) was introduced in 2003 as an alternative to costly and labour intensive techniques like ECMO and heartlungmachines. This temporary (< 29 d) gas-exchange device permits less invasive ventilation so that lungs can heal. Worldwide so far, 300 patients have been treated with the iLA. This case report describes the experience with this device on the first Belgian patient.

Methods

A 32-year old male was referred with bilateral lobar pneumonia (CRP = 58 mg/dl). Severe hypoxaemia (p_aO_2 33 mmHg) prompted invasive ventilation. Despite empirical treatment with antibiotics, ARDS and septic shock developed in a few days. Five chest drains were placed and repositioned for recurrent pneumothorax. Pressure Controlled Ventilation with high airway pressures and low tidal volumes failed to improve oxygena-

tion and CO_2 -elimination. The iLA was inserted as an ultimate life saving therapy for maintaining reasonable oxygenation through cannulation of the femoral artery and vein in the left (17 FR) and the right (19 FR) groin. The minimal requirements for iLA insertion are a mean arterial pressure > 60 mmHg and a cardiac index > 3l/min/m², as arterial pressure is the driving force of this pumpless device (2).

Results

At the time of installation FiO_2 was 1.0 (p_aO_2 54 mmHg, p_aCO_2 80 mmHg) and a severe acidosis was present. Within 3 hours peak inspiratory pressure was decreased from 36 to 20 cmH₂O above PEEP, likewise the respiration frequency (31- > 10 breaths/min) There was an improvement in decarboxylation (p_aCO_2 52 mmHg), oxygenation (p_aO_2 62mmHg, sat. 92%) and pH (7.41). After 24 h oxygenation worsened demanding pressure control and respiratory frequency to be increased. With PEEP = 20cmH₂O, CO_2 removal was stable. During the next 3 days, there was a general deterioration and finally the patient died on day 51.

Arterieel	Before	1 h after	3 h after	Day 1	Day 2	Day 3	Day 4
pH	7.26	7.32	7.41	7.47	7.50	7.50	7.33
PaCO ₂ (mmHg)	80	65	52	49	39	42	53
PaO ₂ (mmHg)	54	99	62	44	51	43	35
HCO ₃ (mmol/l)	35.9	33.5	33	35.7	30.4	32.8	27.9
Saturation (%)	82	97	92	83	89	83	62
Mode (cm H ₂ O, PCV)	36	31	20	30	30	30	30
Freq (breaths/min)	31	28	10	30	30	30	30
FiO ₂ (O ₂ %)	100	100	100	100	100	100	100
PEEP	14	15	20	20	20	20	20

Discussion

CO_2 -elimination was very effective, but oxygenation was a problem. By means of a definition, published by Reng (3), efficacy of oxygenation was only 30% of the normal oxygenation, efficacy of CO_2 -removal seemed to be effective with 87,5%. Already in 2000, Möller described that patients in severe hypoxaemic respiratory failure, did not have an improvement in oxygenation, but that hemodynamic support was needed. Although p_aO_2 in the femoral vein was over 400 mmHg and progressive lowering of PaCO₂ was attained, ventilatory support could not be permanently reduced neither did systemic oxygenation improve. Although hemodynamic inclusion criteria were met, transmembrane flow may have been insufficient or lung destruction due to sustained barotrauma too severe to allow PCV to be reduced. Avoiding lung trauma remains of utmost importance in the ventilatory management of ARDS perhaps necessitating early use of extracorporeal assist devices.

Conclusion

The interventional lung assist is a feasible new treatment for patients with ARDS that allows separation of oxygenation and CO_2 -elimination. Now it is used as a 'last rescue method' and that is probably the reason why it failed in this case. In the future, the exact timing for its insertion still needs to be defined.

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Ropivacaine-sufentanil versus ropivacaine-clonidine for Labour epidural analgesia : A comparison of the side effects of two equi-analgesic solutions. V. DECURNINGE, M.D., P. Y. DEWANDRE, M.D., V. BONHOMME, M.D., P. HANS, M.D., J. F. BRICHANT, M.D. Dpt of Anesthesia and Intensive Care medicine, CHU Liege, CHR Citadelle, Liege, Belgium.

Introduction

Lipid soluble opioids and α_2 -agonists are effective adjuvants to local anesthetics for labour epidural analgesia (1-2). A recent study has demonstrated a similar reduction of the minimum local anesthetic concentration (MLAC) of ropivacaine by 5 γ sufentanil or 75 γ clonidine (3). The aim of our study was to compare the side effects of two equi-analgesic solutions combining ropivacaine with either 5 γ sufentanil or 75 γ clonidine for epidural labour analgesia.

Methods

After ethics committee approval, we prospectively studied 42 consenting patients requesting epidural analgesia for labour. They were randomly allocated to receive an initial 10 ml epidural bolus of either ropivacaine 0.2% 9 ml + 5 γ sufentanil (group R-S, N = 19) or ropivacaine 0.2% 9 ml + clonidine 75 γ + NaCl 0.9% 0.5 ml (group R-C, N = 23). Subsequent analgesia was maintained with a ropivacaine 0.2% PCEA in both groups. During 240 min the following maternal parameters were assessed at regular interval : Visual analogic pain score (VAPS), vital signs, sensory level, motor

blockade, sedation, nausea (N*), vomiting, pruritus, shivering, oxytocin use, ropivacaine and ephedrine consumptions, cervical dilation, temperature and administered fluid volume. Hypotension (SBP < 100 mmHg or 30% reduction from baseline) was treated with left uterine displacement, 5 mg ephedrine bolus(es) and increased fluid loading. The occurrence of non reassuring fetal heart rate (NRFHR), the mode of delivery and the Apgar score were also recorded. Statistical analyses were performed with Chi-square, Fisher's exact test, t-test and ANOVA as appropriate. $P \leq 0.05$ was considered statistically significant.

Results

Onset time, duration of analgesia of the first bolus, reduction of VAPS, motor blockade, sensory level, and ropivacaine consumption were similar in both groups. More frequent and severe episodes of hypotension and a higher ephedrine and fluid requirement were observed in the R-C group. We observed a trend for a higher incidence of pruritus in the R-S group. Other side effects, obstetrical and neonatal outcomes were similar in both groups.

	Hypotension (patients)	Hypotension (events)	Ephedrine (patients)	Ephedrine (mg/patient)	Fluid Vol (ml).	Pruritus	N*	NRFHR
RS	6/19	10/282	2/19	0.5 \pm 1.6	1350 \pm 404	3/19	7/19	5/19
RC	14/23	31/340	8/23	3.5 \pm 6.3	1695 \pm 528	1/23	7/23	6/23
p	0.04	0.005	0.05	0.04	0.02	NS	NS	NS

Conclusion

Clonidine 75 γ does not offer any advantage over sufentanil 5 γ when administered as an adjuvant to ropivacaine 0.2% for labour epidural analgesia. It produces similar analgesia with more frequent and severe episodes of hypotension. Its role in obstetrical analgesia has still to be determined.

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Non-invasive estimation of mixed venous oxygen saturation using near infrared spectroscopy.

M. DESMET, A. CAERS, E. VANDERMEERSCH, P. WOUTERS.

Introduction

Mixed venous oxygen saturation (SvO₂) reflects the balance between oxygen supply and oxygen demand and thus provides an integrated view on global hemodynamics. However, SvO₂ measurements are invasive and are not part of routine anesthesia monitoring. Near infrared spectroscopy (NIRS) estimates regional cerebral oxygen saturation (rSO₂) in a continuous and non-invasive way. It has primarily been marketed as a cerebral perfusion monitor but its usefulness for this application has been debated (1). Since NIRS primarily reflects venous oxygen saturation in the brain we hypothesize that it offers incremental value to anesthesia monitoring by providing a non-invasive estimate of SvO₂.

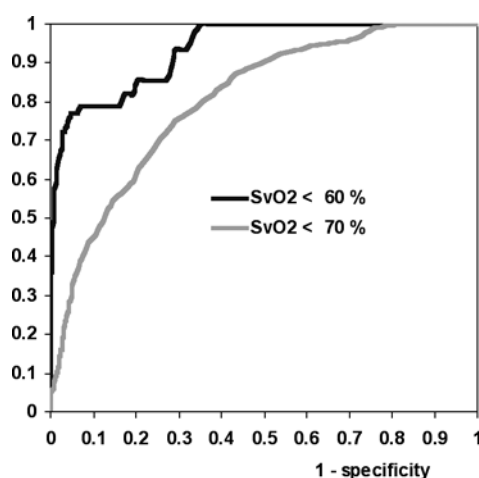
Methods

Ethical Committee approval was obtained and informed consent was waived for this prospective observational study. Thirty one individuals scheduled to undergo off pump coronary bypass surgery in whom

cerebrovascular disease was excluded were studied. Continuous measurements of rSO₂ (INVOS TYPE, Somanetics Inc.) and SvO₂ (Vigilance PAC catheter, Baxter Inc.) were stored digitally every minute from the induction of anesthesia until the completion of surgery. Perioperative hemodynamic management was similar in all patients according to a standard written protocol and decision making was not influenced by oximetry data. 6605 datapoints from 31 patients served to compare SvO₂ and rSO₂ using Blant-Altman analysis. Receiver operating characteristics (ROC) analysis was used to study the sensitivity and specificity of NIRS for detecting clinically relevant decreases in SvO₂.

Results

Bias was 13% and limits of agreement +/- 11%. Receiver operating characteristics as displayed in the figure below show an area under the curve for detecting decreases of SvO₂ below 70% and 60% of 0.80 and 0.94 respectively as compared to 0.51 and 0.72 for blood pressure and 0.63 and 0.62 for cardiac index.



Discussion

Absolute values of rSO₂ are significantly lower than SvO₂ but show a fair agreement over a wide range of data. Most importantly, NIRS was able to detect clinically relevant decreases in SvO₂ with high sensitivity and specificity.

Conclusion

NIRS is able to reliably detect SvO₂ changes and, as a non-invasive technique, may add significant value to anesthesia monitoring. These findings may also explain

the association between NIRS values and postoperative outcome reported in cardiac surgery (2).

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Quality of obstetric anesthesia : feasibility of an audit. F. ENGONGA*, M.D., P. SALENGROS**, Ph.D., V. DECOTTENIER*, M.D., C.-E. VELGHE*, M.D., B. ICKX*, M.D. *Anesthesiology, Erasme University Hospital, Brussels ; **Faculty of Psychology.

Background

Improvement in health care depends on the evaluation of the quality of care. The evaluation of patient's satisfaction is fundamental to health related quality insurance projects. Epidural is the most commonly used technique in obstetric anesthesia during labor. Current knowledge around obstetric epidural anesthesia is ambiguous on the quality and the patient's satisfaction after epidural obstetric anesthesia (1, 2, 3).

Objectives

To develop a questionnaire to assess the quality of obstetric analgesia during labor under epidural anesthesia.

Methods

Questionnaires were proposed to the first post-partum day women, and recovered within 24 hours. It evaluated the women understandings about epidural analgesia, sources of explanation on obstetric epidural and expectations. The survey containing eleven questions with yes/no or check box answers was developed after literature review (2, 3) by the Anesthesiology department with the help of the Faculty of Psychology. The study was conducted at the Erasme University hospital.

Results

The study lasted ten months. It included 1313 child-births with 239 caesarean sections (143 under epidural). Within the 1074 remaining patients, 306 did not accept epidural analgesia and 187 patients did not receive the questionnaire due to various reasons. 561 patients received the questionnaire but 60 of them failed to give it back. Finally, 501 were analyzed. 89% of patients were satisfied with the epidural technique. 42% were afraid prior to epidural puncture, 97% of patients were

satisfied of the anesthetist. 36% would have preferred to attend a pre anesthetic consultation. 21% said they have never got any explanation on epidural anesthesia. More than 52% applied spontaneously for epidural but 32% did it during labor due to severe pain. 58% reported asymmetric pain relief. 33% complained for motor blockade. 30% experienced severe pain during child-birth. More than 90% of patients were satisfied with our labor pain care.

Discussion

Our primary results are similar to literature (1) regarding patients complains a contrasted level of patient' satisfaction. Our initial questionnaire, already allowed assessing the quality and the satisfaction in our delivery room. It supported in-depth modifications of our previous labor pain care and was helpful in the distribution of manpower in our obstetric anesthesia unit.

Conclusion

We have been able to undertake an audit in obstetric anesthesia department. The questionnaire we elaborated seems enough reliable so it could be used as a tool for "quality insurance" policies

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Internal audit and implementation of a postoperative nausea and vomiting prophylaxis strategy based on a quality assurance program. L. HONTOIR, M. LAVENS, A. ROMAN, M. SOSNOWSKI.
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Objectives

To report the efficiency and the direct cost of a quality assurance program (QAP) aimed at reducing the first 24 hours incidence of postoperative nausea and vomiting (PONV).

Methods

After Ethical Committee approval, a prospective and descriptive study was carried on based on the validated predictive score of APFEL (1) whereby 1 point is scored for each of the following risk: female patient, prior PONV or motion sickness, non smoker, post

operative use of opioids. The incidence of PONV was evaluated prior to, and following, the introduction of a PONV prophylaxis strategy. In the first phase of the study, we observed 138 hospitalized adults and recorded the occurrence of PONV 24 hours postoperatively. In the second phase, 132 patients were divided into 4 groups according to their risk scores. The groups presenting a moderate or high risk were given a prophylactic medication according to an algorithm based on gradual efficacy and cost. Statistical Analysis was performed with U-Mann and Withney test for quantitative data, χ^2 test for qualitative data, as appropriate at significance of $p < 0,05$.

Risk score	Group No.	Risk level	Attitude
0 or 1	1	Low	None
2	2	Moderate	Regional anesthesia or TIVA* or DHB* or DXM*
3	3	High	Regional anesthesia or TIVA + {DHB or DXM} or anti-5 HT ₃ * + {DHB or DXM}
4	4		Regional anesthesia or TIVA + DHB + DXM or Anti-5 HT ₃ + DHB + DXM

* Legend :

TIVA = Total Intravenous Anesthesia
(continuous Propofol)

DHB = Dehydrobenzperidol (Droperidol®)

1,25 mg at the end of surgery

DXM = Dexamethasone (Aacidexam®)

5 mg at the beginning of surgery

Anti-5HT₃ = Serotonergic antagonist:

2 mg at the end of surgery

{x or y} : select either x or y.

Results

The QAP allowed a 30% PONV relative risk reduction ($p < 0,05$), with a prophylactic rate increased by 2,7. The cost/benefit ratio for patients receiving a prophylaxis is favorable, particularly for those presenting a high PONV risk (NNT = 5). The average prophylaxis cost for patients at risk of PONV increased from 0,99 to 4,82 €, it raised to 35,4 € for groups 2 and 3 and reached 63,2 € for group 4. Independently of the type of surgery, the time spent in the recovery room was on average reduced by 46 ± 19 minutes ($p < 0,05$). For the gynecologic surgery group, this reduction reached 75 ± 42 minutes ($p < 0,05$).

	Risk factors	No. patients	After 24 h			Avg cost per pat. (€)
			N+V	RRR	NNT	
Phase 1	0+1	54	14 26%	-	-	-
	2	44	17 39%	-	-	0,12
	3	32	14 44%	-	-	1,90
	4	8	3 38%	-	-	2,10
	Total	138	48 35%	-	-	0,99

Phase 2	0+1	41	9 22%	-	-	-
	2	43	12 28%	28%	9	1,37
	3	37	9 24%	41%	5	6,51
	4	11	2 18%	52%	5	12,64
	Total	132	32 24%	30%	7	4,82

Conclusion

Based on a risk score, the proposed PONV prophylactic algorithm significantly reduces the PONV incidence during the first 24 hours postoperative time period. In addition, the prophylactic management reduces the PONV in the recovery room and allowed an earlier

return of the patients to the ward. The increase in cost for the patients with a moderate or high risk remains acceptable.

Reference

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Comparison between postoperative ilioinguinal-iliohypogastric nerve block and combined wound infiltration-instillation, both with 20 ml ropivacaine 0.75%, for herniorrhaphy in outpatients.
 R. ICKX, V. VAN GORP, K. COENEYE*, M. LAUWERS, F. CAMU. Departments of Anaesthesiology and Surgery (*), Flemish Free University of Brussels (VUB), Belgium, Laarbeeklaan 101, 1090 Brussels, Belgium.

Introduction

Performing a preoperative ilioinguinal – iliohypogastric nerve block (INB) or an infiltration – instillation of the wound (WII) both decrease postoperative pain and the use for added analgesics after surgery.

Moreover both techniques increase the time to first analgesic request when compared to placebo. The difference between both pain relieving approaches has not well been assessed so far (1, 2).

Objective

This study investigated the effectiveness and patient satisfaction after a postoperative INB versus a WII with 20 ml ropivacaine 0.75% in adults undergoing unilateral herniorrhaphy.

Patients and Methods

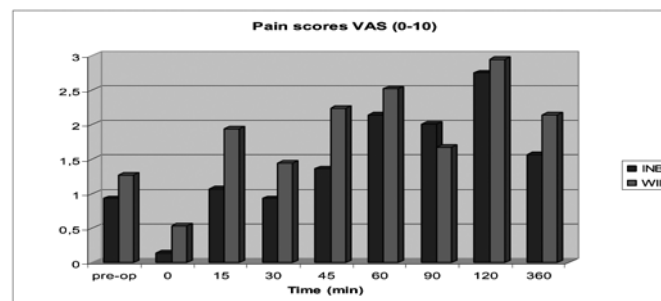
Following Ethics Committee approval and informed consent, 28 ASA I-III patients aged between 20 and 89 years participated to this study. In a randomised and blinded fashion half of the them received

an INB at the end of surgery and the other half a WII just before closure of the wound, both with 20ml ropivacaine 0.75%. Anaesthesia was performed with 0.1 µg/kg sufentanil at induction, TCI propofol, remifentanyl infusion and mivacurium for muscle relaxation. When requested, the patients received Paracetamol 1 g and Parecoxib 40 mg IV in the postoperative period. We evaluated following parameters in the PACU: VAS scores at rest and when moving, haemodynamics (BP, HR), oxygen saturation, sedation, duration of the block, side-effects and satisfaction score (0-10) during the first 6 postoperative hours. Data were analysed with the unpaired t-test.

Statistical significance was accepted if $P < 0.05$.

Results

There was no significant difference in demographics, haemodynamics, SaO₂, sedation, side effects or in relative block duration. VAS-scores at rest and when moving were comparable in both groups. Also the patient satisfaction ratio was comparable during the first 6 postoperative hours.



Discussion

These results are consistent with the analysis of the PROSPECT group (3) of the ESA. The power of this study was only 12.5%, so larger groups are needed. The duration of the block was a relative measure because of the short follow-up. Due to the minimal invasive nature of the Kugel technique, VAS scores were very low.

Conclusion

INB or WII with ropivacaine 0.75% in a dose of 20 ml appear clinically to be equally effective and safe techniques. We failed to withhold a statistical significant difference in postoperative analgesia. Bigger studies are needed.

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2. Moiniche, *et al.*, *A qualitative systematic review of incisional local anaesthesia for postoperative pain relief after abdominal operations*, BR. J. ANAESTH., **81**, 377-383, 1998.
3. PROSPECT: Procedure specific postoperative pain management: www.postoppain.org.

Comparison of endoscopic ultrasound guided celiac plexus neurolysis and the posterior percutaneous block with steroid in chronic pancreatitis. S. IFEKA BONKOMO, N. MATHIEU, M. DELHAYE*, J. DEVIERE*, D. HENNART. Department of Anaesthesiology and Department of Gastroenterology*, Erasme Hospital, Free University of Brussels, Belgium.

Introduction

Endoscopic ultrasound (EUS)-guided celiac plexus neurolysis has been reported to have some success in controlling pain from chronic pancreatitis. The posterior approach with steroid was as efficient as alcohol as described in a previous report in 1994 (1).

Aim

This retrospective study was conducted to compare the reduction of pain in 28 patients with painful chronic pancreatitis who underwent celiac plexus block from January 2000 to July 2004 either by the EUS-guided or the percutaneous method.

Methods

All patients underwent prior endoscopic or surgical management for chronic pancreatitis and were dependant on morphine like drugs to control their pain.

Follow-up was obtained by phone call if not available in the chart of patient. The EUS block was performed in 13 patients with injection of 20 ml of alcohol at the bifurcation of the celiac artery. Fifteen patients received 160 mg of methylprednisolone acetate diluted in 50 ml of bupivacaine 0.25% or ropivacaine 0.2% by the bilateral posterior percutaneous approach under fluoroscopic control. Pain intensity was assessed using a verbal scale. Chi squared test with $P < 0.05$ significant.

Results

At 2 weeks, pain was reduced in 7/13 patients in the EUS group and in 11/15 patients in the percutaneous

group. At 20 weeks, the improvement was still present in 5/13 patients in the EUS group and in 9/15 patients in the percutaneous group, but the difference was not statistically significant between the two groups. The results are displayed in Table 1.

Side effects were rare and transient with both methods.

Table 1

Number of patients with reduced pain (%)

Weeks	Percutaneous group n = 15	EUS group n = 13	P-value
0-2	11 (73.3%)	7 (53.8%)	NS
2-4	9 (60%)	6 (42.2%)	NS
4-8	9 (60%)	5 (38.5%)	NS
8-20	9 (60%)	5 (38.5%)	NS

NS : No significant.

Conclusion

Both techniques can be proposed as additional treatment for refractory pain due to chronic pancreatitis but more studies are needed to evaluate the long term effects on pain control.

Reference

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Effects of sevoflurane on biochemical markers of hepatic and renal dysfunction after coronary surgery. S. LORSOMRADEE, S. CROMHEECKE, Sr. LORSOMRADEE, S. DE HERT. Department of Anesthesiology, University Hospital Antwerp, Belgium.

Introduction

Experimental and clinical evidence has indicated that volatile anesthetics have cardioprotective effects in coronary surgery patients. Only recently evidence has suggested that these protective actions may also extend to other organ systems (1, 2). We hypothesized that the use of a volatile anesthetic regimen might also have beneficial effects on the function of other organ systems such as hepatic and renal systems. To address this question, we compared the effects of a propofol-based and a sevoflurane-based anesthetic regimen on biochemical markers of hepatic and renal function after coronary surgery.

Methods

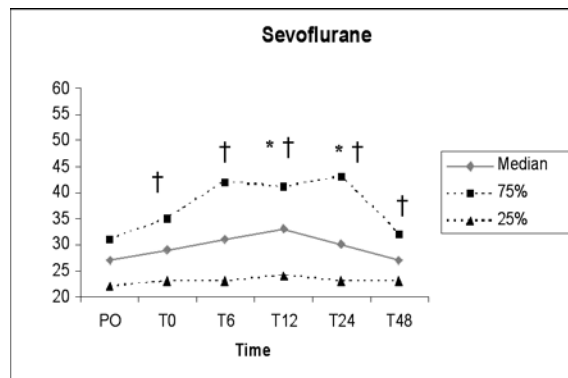
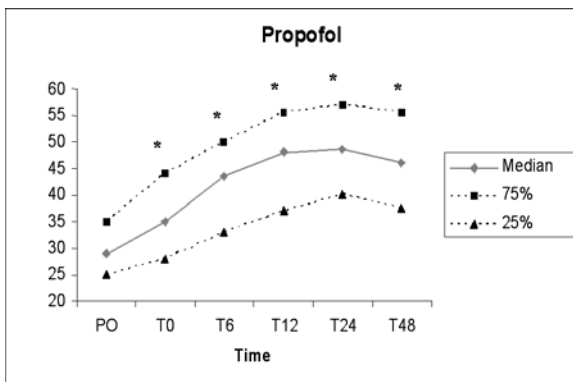
After approval of the local ethical committee and written informed consent, 320 patients undergoing elective coronary surgery were randomly assigned to 2 different anesthetic protocols: propofol (n = 160) or sevoflurane (n = 160). Hemodynamic data were registered before the start of surgery, before the start of CPB,

15 min after the end of CPB, at arrival in the intensive care unit (ICU), and 6 and 12 hours after installation in the ICU. Serum glutamic oxaloacetic transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT), serum lactate dehydrogenase (LDH) and serum creatinine concentrations were measured before surgery (P0), at arrival in the ICU, and after 6, 12, 24, 48 hours. Data were analyzed using the Friedman repeated-measures analysis of variance on ranks followed by the Tukey test for multiple comparisons versus control and expressed as median [interquartile range]. Concentration between groups were compared using the Mann-Whitney Rank Sum Test. Statistical significance was accepted at $P < 0.05$.

Results

Postoperative levels of serum SGOT, SGPT and LDH increased transiently in both anesthetic groups, but the increase was significantly lower in the sevoflurane group compared to the propofol group. Creatinine levels remained largely unchanged in both groups.

(* compared to P0 and † difference between groups).



Conclusions

Postoperative biochemical markers of hepatic function but not of renal function were lower with a sevoflurane-based anesthetic regimen compared to a propofol-based anesthetic regimen in patients undergoing coronary surgery with cardio-pulmonary bypass.

References

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Thromboelastography : an alternative to anti-Xa activity for the monitoring of low-molecular-weight heparins ? B. MWEPU KATOTOLA, T. TUNA, I. ABBATOY, P. EWALENKO. Institut Jules Bordet, ULB, 1000 Brussels.

Introduction

As anti-Xa activity (aXa) poorly predicts the efficacy of prophylactic subcutaneous (sc) low-molecular-weight heparins (LMWH), we checked whether bedside acquired thromboelastograph (TEG) could do better for 40 mg sc enoxaparin (Enox).

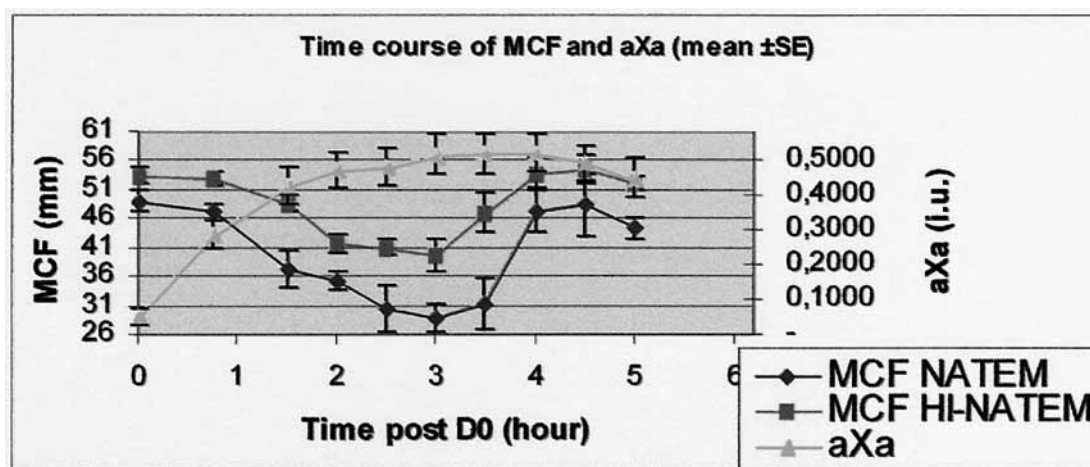
Methods

Local ethic committee approval and written consent of 30 male patients were obtained. The cases were scheduled for abdominal oncological surgery by coelioscopy. Enox 40 mg sc was injected preoperatively between 4 and 6 p.m. (D-1) and 24 hours (h) after D-1 (D0). Samples were collected at D-1, at induction of anaesthesia, at D0 and at intervals post D0 of 2×0.75 h, 5×0.5 h and 2×1 h. TEG parameters (CT : coagulation time, CFT : clot information time, MCF : maximal clot firmness) were obtained for 4 TEG tests : NATEM (inactivated global coagulation assay), HI-NATEM (NATEM + heparinase), INTEM (NATEM + intrinsic

pathway activator), HEPTTEM (INTEM + heparinase). Data were submitted to analysis of variance (T test), paired comparisons (Fisher's test). In accordance with the 3 phases of aXa curve, mean values post D0 were used : M2, M3, M4 represented respectively the values from 0.75 to 2 h (aXa rise), from 2.5 to 4 h (aXa plateau) and from 5 to 6 h (aXa lowering). M reflected all values after D0. Correlations between aXa and TEG parameters were looked for. $P < 0.05$ was significant.

Results

aXa versus h post D0 to M2 ($p < 0.05$) except for HI-NATEM test. MCF tended to decrease after D0 for NATEM and HI-NATEM test. The comparisons D-1 to M2 and M3 to M4 showed a significant change. Correlations were only found for M3 period between aXa and CFT NATEM ($r^2 = 0.62$; $p < 0.05$), between aXa and MCF NATEM ($r^2 = -0.60$; $p < 0.05$) and at D-1 between aXa and MCF HI-NATEM ($r^2 = -0.54$; $p < 0.05$).



Discussion

CT NATEM is prolonged (comparison D-1/M) but Different from Klein's result p is > 0.05 . Alterations of MCF NATEM and CFT NATEM are partially corrected by heparinase and so can be attributed to LMWH effect.

Conclusions

TEG and aXa are only correlated for the plateau period of aXa. TEG is less sensitive than aXa to assess the activity of prophylactic enoxaparin 40 mg sc.

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Does EMLA-cream application before cervical block for carotid endarterectomy reduce pain ?

M. OULAD, V. UMBRAIN, V. VAN GORP, Chr. VERBORGH, P. Vandenbrande*, F. CAMU. Dienst Anesthesie en Centrum voor Pijnbeleid en *Dienst Vaatheelkunde. Academisch Ziekenhuis Vrije Universiteit Brussel. Laarbeeklaan, 101, 1090 Brussel.

Introduction

Anesthesia with cervical block (CB) for carotid endarterectomy (CEA) is associated with less perioperative vasoactive support, enhanced cognitive control during carotid clamping and better cost-effectiveness than under general anaesthesia (1-3). Despite these advantages CB remains painful, as anaesthetic in situ supplements are often needed during surgery. Moreover, the prolonged immobilization period of the head during surgery decreases the patient's satisfaction of surgery. EMLA cream (an eutectic mixture of prilocaine and lidocaine) gives 1 to 3 mm deep skin analgesia after 90 min application. Whether EMLA improves block quality in elderly vascular patients scheduled for CEA under CB is unknown (4). We therefore investigated whether the preoperative application of EMLA on the neck before performing CB for CEA improved pain during block, surgery and in the PACU.

Material & Methods

After Local Ethical Committee approval, patient selection and exclusion for CB as well as the technique for CB were kept as described previously (5). We choose a 30 ml dose of ropivacaine 7,5 mg/ml as local anaesthetic. The cervical plexus block consisted of a deep block (according to Winnie's technique) and a superficial block.

In the EMLA group an EMLA cream tube containing 25 mg of prilocaine and of lidocaine was applied over the neck area under an occlusive dressing (Tegaderm®) 90 minutes before CB while the untreated group was treated as usual.

We investigated preoperatively pain with VAS during the block, after the application of the block, at inci-

sion, during vascular sheath dissection and the end of surgery. Timing and location of topical surgical lidocaine supplements given by the surgeons were noted. Patient requests for treatment of hypertension (labetalol 5 mg supplements) were recorded.

Postoperatively, active and passive VAS as well as timing of analgesic supplements (paracetamol 1g and iv. piritramide) were recorded at fixed intervals. Statistical tests applied were : t-test, MWU-test and Chi-square analysis when considered appropriate. $P < 0.05$ was considered significant.

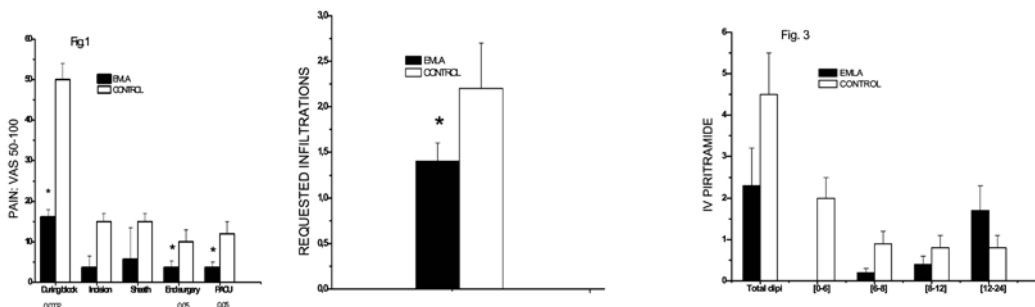
Results

Forty patients gave their oral consent for study participation. Except for a higher diabetes incidence ($p = 0.01$) the population demography was similar in both groups. Duration of anesthesia and surgery was similar in both studied groups. The three participating surgeons had similar carotid clamping times.

Lower pain scores while performing cervical block and at surgical incision were observed in the EMLA group (Fig. 1). Also fewer requests for additional surgical infiltrations at skin incision and during vascular sheath dissection were seen (Fig. 2).

Postoperative VAS score just after arrival in the PACU was also lower in the EMLA-group. Other PACU observations included : similar paracetamol dose administrations in both groups and a lower global piritramide i.v.(mg) consumption particularly at the [0-6 h] and the [6 h-8 h] intervals in the EMLA treated group and at the [12 h-24 h] interval in the control group (Fig. 3).

Surprisingly, a higher tendency of headache ($p = 0.07$) was noticed in the EMLA-group.



Conclusion

EMLA cream application decreases pain during block performance and lowers the probability of added surgical infiltrations. This pain reduction in the EMLA group was maintained in the initial postoperative period. Unfortunately, these advantages are shadowed by the increased tendency of headache observed in the EMLA treated patients during their stay in the PACU.

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Sciatic nerve block : a comparison of the lateral versus the posterior approach of the popliteal fossa.

C. H. M. PLUYMAKERS, S. LORSOMRADEE, V. L. H. HOFFMANN, M. P. E. VERCAUTEREN. *From the Department of Anesthesiology, University Hospital of Antwerp.*

Introduction

Sciatic nerve blocks may provide intraoperative anaesthesia as well as postoperative analgesia during foot and ankle surgery (1). Several techniques have been described including the posterior and lateral approach (1, 3). The posterior approach in the popliteal fossa is the most popular technique but requires the patient lying in prone position. A lateral approach may be a useful alternative since the patient remains in supine position. In this study, we investigated whether the lateral popliteal block is a valuable alternative to the posterior approach.

Methods

Forty-five patients ASA class I or II, aged 17-91 years and scheduled for lower limb surgery, were selected in a prospective study. Written informed consent was obtained from each patient. Randomly, patients were allocated to receive a lateral or a posterior popliteal nerve block. Special care was taken to assure a free movement of the foot. In each patient, the sciatic nerve block was induced with a single injection of 30 ml of ropivacaine 0.75%. An additional block of the saphenous nerve was provided by injection of 5 ml of ropivacaine 0.75%, paravenous to the saphenous vein (2). For the posterior approach, the tendons of the semitendinosus, semimembranosus and biceps femoris muscles

were identified. The needle was introduced at a distance of 10 cm above the knee joint, slightly directed cephalad with an angle of 60 degrees. For the lateral technique, the tendons of the biceps femoris and vastus lateralis muscles were located. The needle was introduced between these two muscles at a distance of 10 cm above the knee joint in a horizontal plane and advanced until the femoral shaft was contacted. The needle was then withdrawn and redirected posterior at an angle of 30 degrees and 60 degrees cephalad. Patient's satisfaction and duration of analgesia were recorded postoperatively.

All data were analysed using Student t-test. $P < 0.05$ was considered statistically significant. Data are presented as mean SD.

Results

Groups were similar according to demographic data. In the present study, we demonstrated that both techniques are comparable in efficacy as nerve localization time, onset and success rate were similar. Postoperative analgesia was significantly prolonged after a lateral approach ($p = 0.03$) (Table 1). Despite the too small number of patients to draw conclusions, diabetes strongly prolonged nerve tracing time. There were no complications and all patients had good intra- and postoperative analgesia.

Table 1

Demographic and efficacy parameters for both the lateral and posterior approach

	Posterior approach, mean (+/- SD)	Lateral approach, mean (+/- SD)	p
Age	53.3 (17)	48.2 (19)	0.17
BMI	27.8 (5.9)	27.3 (4.9)	0.76
Nerve tracing time (sec)	247 (177)	204 (209)	0.095
Onset time from injection until complete block (sec)	773 (484)	658 (404)	0.41
Total effective analgesia duration (hour)	15.8 (2.8)	18.7 (5.1)	0.03

SD = standard deviation.

Discussion

The popliteal approach to the sciatic nerve is rather popular because of its high success and low complication rate. Although both lateral and posterior techniques have been described earlier, the latter is considered to be more convenient because of its ease of performance (3). Unfortunately, this technique requires a prone position which excludes patients with compromised mobility. The lateral approach offers the advantage of supine position and results in a low incidence of side effects (1).

Conclusion

The present study demonstrates comparable anaesthetic efficacy for both the lateral and the poste-

rior approach to the sciatic nerve in the popliteal fossa.

References

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2. Demey J., Deruyck L., Cammu G., *et al.*, *A paravenous approach for the saphenous nerve block*, REG. ANESTH. PAIN. MED., 504-6, 2001.
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Comparison of MLAC of ropivacaine between induced and spontaneous parturients in the first stage of labour. Ph. STRYPSTEIN, P. Y. DEWANDRE, V. BONHOMME, P. HANS, J. F. BRICHANT. University Department of Anaesthesia & ICM, CHR de la Citadelle, CHU Liège, Liège, Belgium.

Background

Induced labour is reported to be more painful than spontaneous labour (1). The aim of the present study was to compare the minimum local analgesic concentration (MLAC) of ropivacaine in parturients with spontaneous and PGE₁ induced labour.

Methods

After IRB approval and individual consent were obtained, 72 parturients requesting epidural analgesia were enrolled in this prospective double blind, sequential allocation study. The parturients were assigned to two different groups according to which labour was spontaneous (n = 36) or induced (n = 36). Their initial visual analog pain scale (VAPS) was ≥ 7 . They received 20 ml of the study solution through a lumbar epidural catheter. In each group, the initial dose was ropivacaine 0.09% and subsequent doses were determined by the response of the previous patient in the same group using up-down sequential allocation. The testing interval was 0.01%. Analgesic efficacy was assessed using the 10 cm VPAS, with VAPS < 1 cm 30 min after injection considered as effective. The MLAC of ropivacaine was determined in each group. The 95% confidence intervals

(95% CI) were computed as $MLAC \times 1.95$ (standard deviation of the mean). For power calculation, α value was set at 0.05 and relevant MLAC difference at 0.02%. Patients' characteristics were compared using unpaired *t* tests or χ^2 as appropriate. Concentrations of local anaesthetics were calculated as concentrations of the hydrochloride of the molecule.

Results

Demographic and obstetric characteristics were similar in both groups. The MLAC of ropivacaine was 0.1% (95% CI : 0.093-0.106) in parturients in spontaneous labour and 0.1% (95% CI : 0.094-0.106) in those in induced labour. The power of the study was 1.00.

Discussion and conclusion

Prostaglandin induced labour and spontaneous labour result in similar analgesic requirement. This conclusion contrasts with a previous study suggesting that analgesic requirements were greater in parturients in whom labour is induced than in those who undergo spontaneous labour (1). Possible mechanisms responsible for that discrepancy include differences in the drugs used and/or in the population studied.

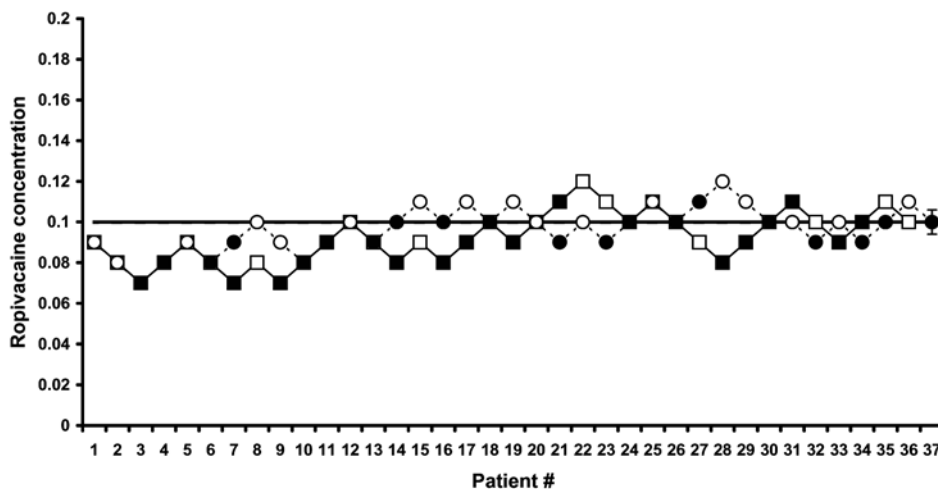


Fig. 1. — Sequence of ropivacaine concentration used in each group of parturients. Circles correspond to parturients in induced labour, squares to spontaneous labour. Symbols are open when ropivacaine concentration was effective and closed when not effective. Median effective concentrations and 95% CI are also displayed.

Reference

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Global incidence of memorisation before and awareness during anaesthesia in children.

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Introduction

In adults, a 0.1-0.2% incidence of awareness is reported after general anaesthesia (GA) (1). Few studies investigated this global incidence in children. We therefore investigated memorisation before and awareness during anaesthesia in children submitted to elective surgery, using an improved version (questions B) of Brice's questionnaire (questions A) (2).

Methods

Following parents and/or patient's approval, children were interviewed after elective surgery under GA associated or not to local or regional anaesthesia. The interview occurred immediately before leaving the recovery room. Premedication consisted in midazolam, hydroxyzine or flunitrazepam. All patients received morphine systematically in the recovery room for post-operative analgesia. No patient received muscle relaxants.

Results

Out of 430 recruited patients, those under the age of 4 and older than 18 were excluded, leading to a total number of 376 eligible children. Their mean (SD) age was 9.7 (3.6). Detailed description of responses to questions are given in the table. Main findings : 2/3 of pre-medicated children remember the initial phase of anaesthesia, pain is present in 43% of children upon waking but it remains the first souvenir in only 5% of them, fear of the procedure fades with time and reassuring progress through the process of care (41% afraid when entering the OR, 58% of these no longer afraid when put to sleep and 61% not afraid at waking up), and incidence of true awareness is 0.8%.

A1. Last thing remembered before going to sleep ?
Nothing 26%, mask 18%, OR and persons 11%, no answer 9%
B1. Do you remember the mask ?
Yes 66%, comfortable while going to sleep 75%
B2. Afraid when arriving to the OR ?
No 40%, yes 41%
B3. Afraid when put to sleep ?
Out of those afraid when arriving to the OR : no longer 58%, yes 42%
A2. First thing remembered upon waking ?
No remembrance 28%, pain 5%
B4. Afraid when waking up ?
43% had pain upon waking, 82% of these were not afraid when put to sleep.
Out of those afraid when put to sleep, 61% were not afraid upon waking.
A3. Dream or any other experiences while sleeping ?
Yes 14% : good dream 50%, bad dream 11%
A4. Remember anything between being put to sleep and waking up ?
Yes 4%, true awareness 0.8%

Conclusion

Global incidence of awareness in children seems to be comparable to the same incidence in adults. Pain is a frequent problem during recovery but leaves few short term explicit memories. Further analysis is required to identify surgery, anaesthetic technique or demography-related factors that may influence those incidences. Further studies are needed to evaluate long term consequences of perioperative memories and unexpected awareness in children.

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A Pilot study on Heart Rate Variability (HRV) during an inhalation bolus technique with sevoflurane or desflurane (preliminary results). G. TCHOUNKACHU, A. BAELE, A. KALMAR, M. R. F. STRUYS, L. DE BAERDEMAEKER. Department of anesthesia, university hospital Ghent, De Pintelaan 185, 9000 Gent, Belgium.

Introduction

High desflurane concentrations can cause sympathetic stimulation (1). The ratio of the low and high frequency components (LF and HF) of HRV obtained after Fourier transformation, is a non invasive tool to detect changes in the sympathetic tone (2). The aim of this pilot study was to demonstrate the ability of LF/HF ratio to detect changes in sympathetic tone and to show that the LF/HF ratio during high desflurane concentrations is not different compared to high concentrations of sevoflurane and propofol.

Methods

After Institutional Ethics Committee approval, written informed consent was obtained from 18 ASA I patients scheduled for minor non laparoscopic surgery. Following induction with remifentanyl 4 ng.ml⁻¹, propofol (300ml.hr⁻¹ until loss of consciousness) and rocuronium (0.9mg.kg⁻¹ IBW), patients were randomised into 3 groups (n = 6) to receive BIS-guided TCI propofol, desflurane or sevoflurane (targeted to BIS-value 45-55. If BIS > 55 : FGF 4L/min vaporizer full output for

15 sec or target TCI +25%) combined with TCI remifentanyl initiated at 4 ng/ml and guided 25% up or 25% down by hemodynamic responses, maintaining mean arterial pressure and heart rate within 20% of baseline. Groups were compared for LF/HF ratio at different timepoints : awake, intubation, before (baseline) and during bolus administration. Normality of distributions was tested with one-sample Kolmogorov-Smirnov and statistical analysis was performed by using Paired Samples T-test and One way ANOVA with post-hoc Tukey test where applicable.

Results

When comparing awake versus intubation timepoints, within group analysis showed a significant increase in LF/HF ratio in all groups. Between group analysis showed no differences. (Fig. 1) When comparing baseline versus period of bolus administration, within group analysis showed highly significant increases in LF/HF ratio in all groups. Between group analysis showed a higher baseline ratio in the propofol group compared to the desflurane group. The ratio during bolus administration were similar (NS between groups).

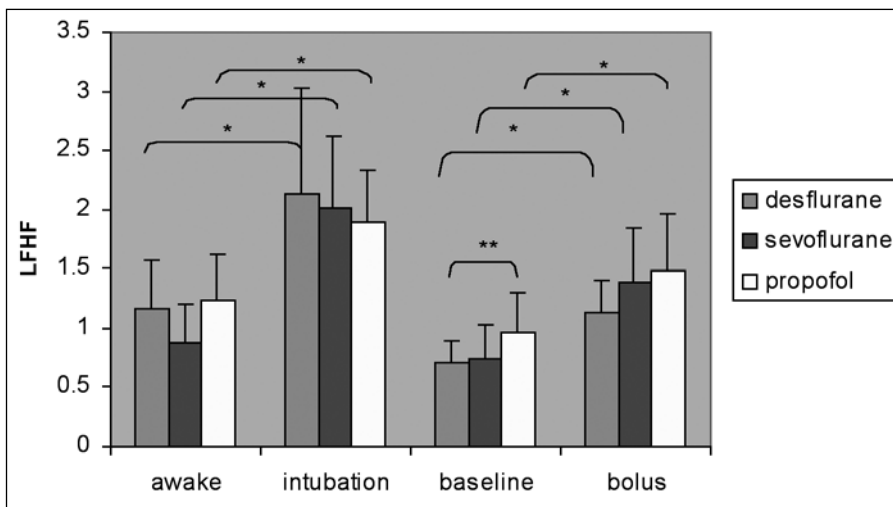


Fig. 1. — LF/HF ratio (mean (SD))

* p < 0.05 within groups

** p < 0.05 between groups.

Discussion

The reports of sympathetic activation were originally described during desflurane mono-anesthesia. Opiates are known to blunt this sympathetic activation³. HRV values are reported to be higher under equipotent (BIS guided) propofol anesthesia. The changes in LF/HF ratio coincided with changes in BIS values.

Conclusion

LF/HF ratio is a proper tool to demonstrate changes in sympathetic activity. High concentrations of desflurane combined with remifentanyl do not cause higher sympathetic activity than high concentrations of sevoflurane or propofol. Bolus administration of desflurane is safe in the context of this study.

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Effects of acute normovolemic hemodilution on left ventricular function in coronary surgery patients. V. VAN DAMME, S. LORSOMRADEE, S. CROMHEECKE, S. DE HERT. Department of Anesthesiology, Universital Hospital Antwerp, Belgium.

Background

Preservation of tissue oxygenation during acute normovolemic hemodilution (ANH) depends on an increase in cardiac output (CO) and an increase in blood oxygen extraction^{1,2}. However, the precise effects of ANH during total intravenous anesthesia on left ventricular function have not yet been determined in cardiac patients.

Materials and methods

After approval of the local ethical committee and written informed consent, 20 elective coronary surgery patients received a midazolam-based anesthesia. After aortic cannulation, a pressure manometer was inserted in the left ventricle (LV). The measurements consisted of recordings of electrocardiographic and LV pressure tracings during an increase in systolic and diastolic pressure, obtained by leg elevation. Measurements were obtained before and after ANH. Arterial and mixed venous blood gases were taken before and after ANH. Data were compared using a paired t-test. All data (mean \pm SD) were considered significant if $p < 0.01$.

Results

ANH resulted in a decrease in hematocrit (Hct) from 39 ± 4 to $30 \pm 2\%$. After ANH, CO remained unchanged (respectively 5.3 ± 1.1 and 5.7 ± 0.7 l/min). This was associated with a decrease in systemic vascular resistance from 959 ± 173 to 799 ± 158 dynes/sec/cm⁵. With ANH, oxygen delivery significantly decreased from 1002 ± 136 to 768 ± 106 ml/dl. Oxygen consumption was similar before and after ANH, hence the increased oxygen extraction ratio from 16 ± 1 to $22 \pm 2\%$. Compared to before ANH, the myocardial function seems to be depressed as is evident from a decrease in dP/dt max under baseline conditions (975 ± 167 versus 843 ± 91 mmHg/s). Also with an increased cardiac load (i.e. leg elevation), the change in dP/dt max was significantly lower after ANH (66 ± 31 versus -20 ± 45 mmHg/s). The rate of isovolumic relaxation (?) increased from 59 ± 6 to 65 ± 5 ms with ANH. The change in ? with leg elevation was also different before and after ANH (-1 ± 1 versus 2 ± 2 ms).

	Before ANH (mean \pm SD)	After ANH (mean \pm SD)	p
Hct (%)	39 ± 4	30 ± 2	< 0.001
CO (L/min)	5.3 ± 1.1	5.7 ± 0.7	0.176
SVR (dynes/sec/cm ⁵)	959 ± 173	799 ± 158	< 0.001
Oxygen delivery (ml/dl)	1002 ± 136	768 ± 106	< 0.001
Oxygen consumption (%)	168 ± 40	172 ± 35	0.778
Oxygen extraction ratio (%)	16 ± 1	22 ± 2	< 0.001
dP/dtmax (mmHg/s)	975 ± 167	843 ± 91	0.004
?dP/dtmax (mmHg/s) with leg elevation	66 ± 31	-20 ± 45	< 0.001
Isovolumic relaxation (?) (ms)	59 ± 6	65 ± 5	< 0.001
??(ms) with leg elevation	-1 ± 1	2 ± 2	< 0.001

Conclusion

With ANH under total intravenous anesthesia, myocardial function seems to be depressed. This is evident from a slower myocardial relaxation and a decreased response of dP/dtmax with an increased cardiac load. CO remained largely unaltered, despite the decrease in SVR observed with ANH.

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Influence of Sufentanil 7.5 µg on the Extent of the sensory Block measured by Pinprick and Cold in Epidural Labor Analgesia. F. VAN DE PERCK, F. SOETENS, M. VANHOOF, M. DE VEL. Department of Anaesthesiology, Sint-Elisabeth Ziekenhuis Turnhout.

Introduction

Opioids enhance the extent of a sensory block (1, 2). Also, it seems that a sensory block measured with cold is more extended than with pinprick (3). The metal cylinder is a new device to measure the sensory block : it consists of a solid metal cylinder, which is mounted on a screw-driver in such a way it can roll over the skin ; it is stored in the refrigerator ; to determine the sensory block it is rolled from the blocked area to the unblocked area.

This study was designed to : 1. evaluate the difference in the extent and upper level of the sensory block in epidural labor analgesia with and without sufentanil ; 2. determine the difference in the extent of the sensory block between the different methods of measurement (pinprick, ether and metal cylinder) and 3. determine the easiest and most comfortable method.

Methods

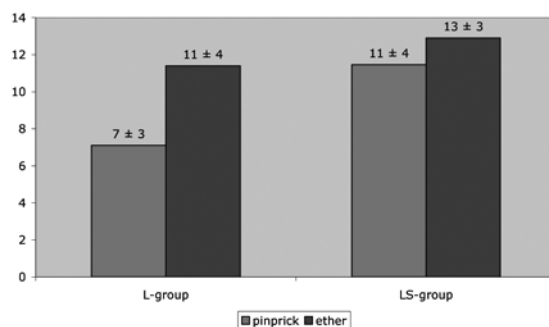
After approval from the hospital ethics committee and written informed consent, sixty parturients requesting epidural analgesia were randomly assigned to receive either 10 ml levobupivacaine 0.125% (L-group) or 10 ml levobupivacaine 0.125% with 7.5 µg sufentanil (LS-group). The sensory block was measured after 30 minutes with different methods in random order : pinprick (the stylet of the epidural needle was used),

cold (with a swab soaked in ether) and the metal cylinder. A particular dermatome was considered blocked if it felt less sharp or cold than on the forearm. Differences between groups were evaluated by means of t-test (number of dermatomes) or by Mann-Whitney test (upper level). A p-value of < 0.05 was considered significant.

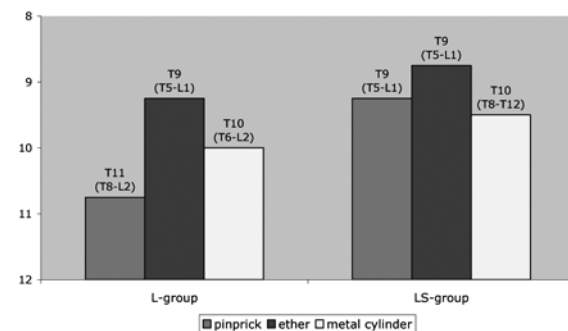
Results

There were no demographic differences between the two groups. When the block was measured with pinprick, patients in the LS-group had more dermatomes blocked ($p < 0.001$) and a higher upper sensory level ($p < 0.05$) than patients in the L-group. These differences were not significant when the block was tested with ether or the metal cylinder (Fig.). Comparing the different methods of measuring the sensory block in all parturients, the number of dermatomes blocked was higher with ether than with pinprick (mean \pm SD 12 ± 4 vs. 9 ± 4 ; $p < 0.001$) and the upper sensory level was higher with ether than with pinprick or the metal cylinder (median (range) ether-pinprick : T9 (T5-L1) vs. T10 (T7-L1) ; $p < 0.05$; ether-metal cylinder : T9 (T5-L1) vs. T10 (T7-L1) ; $p < 0.05$). Measuring the sensory block with ether was the easiest for the parturients to interpret (43%), compared to pinprick (25%) and metal cylinder (32%). Pinprick was the least comfortable method (91% vs. 3% for the metal cylinder and 5% for ether).

Number of blocked dermatomes : mean \pm SD



Upper level of thoracic block : median (range)



Conclusion

The addition of sufentanil to levobupivacaine 0.125% increases the extent and the upper level of the sensory block, when measured with pinprick but not with ether or the metal cylinder. For all parturients, measurement of the extent and upper level of the sensory block was the highest, when tested with ether. Ether was the easiest method to interpret and pinprick was the least comfortable method for the parturient.

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Time Course of End-Tidal CO₂ After Ventilatory Parameter Adjustment During Stable General Anesthesia. S. VAN DE VELDE, M.D., L. L. SZEGEDI, M.D., Ph.D., E. P. MORTIER, M.D., D.Sc. Ghent University Hospital, Department of Anesthesiology, De Pintelaan 185, 9000 (address) Gent, Belgium.

Background and Goal of study

Ventilatory parameters resetting frequently occurs too early, before the end-tidal CO₂ (E'CO₂) reaches a steady state, leading to hyper- or hypoventilation. The time course of E'CO₂ to reach a steady-state, after tidal volume (Vt) changes during stable general anesthesia is not established.

Materials and Methods

After local Ethical Committee approval and informed consent, 144 ASA class 1-2 adult patients scheduled for elective non-laparoscopic and non-thoracic surgery were studied. A continuous infusion of NaCl 0.9% solution via a peripheral i.v. catheter was administered. Induction of general anesthesia was with propofol, fentanyl and monitored muscle relaxation with rocuronium, and its maintenance with sevoflurane. After intubation, mechanical ventilation was started with the following baseline settings : Vt : 10 ml.kg⁻¹, respiratory rate 10 bpm, inspiratory : expiratory time ratio 1:2. After induction and surgical incision, when a steady-state level of E'CO₂ was reached (constant values for at least 15 minutes), the patients were randomly allocated to Group 1 (the Vt was decreased to 8 ml.kg⁻¹, n = 76) or group 2 (the Vt was increased to 12 ml.kg⁻¹, n = 68). The

value of the E'CO₂ was recorded every minute during a period of 30 minutes with a Datex capnometer. The t-test was used to compare the results. (p < 0.05 ; mean (SD)).

Results and Discussion

There were no baseline demographic, hemodynamic and E'CO₂ differences between the two groups. The E'CO₂ increased from 36.5 (4.1) to 39.1(3.7) mmHg (p < 0.05) in Group 1 and decreased from 37.6 (3.3) to 33.8(3.4) (p < 0.05) in Group 2. In Group 1, after 14 minutes and after 17 minutes, 50% (P₅₀, in analogy with the MAC value for anesthetic gases) respectively 95% (P₉₅) of the patients reached a steady-state E'CO₂, while in Group 2 the values were respectively 12.5 and 17 minutes (Fig. 1). No blood pressure, nor heart rate variations were noted in the two groups.

Conclusions

After either increasing or decreasing by 20% the Vt during volume-controlled, mechanical ventilation and stable general anesthesia, 17 minutes are needed to reach a new steady-state level of E'CO₂ in 95 of the patients. A practical recommendation, in order to avoid hyper- or hypoventilation, is to adjust ventilatory settings only after E'CO₂ has reached a steady-state.

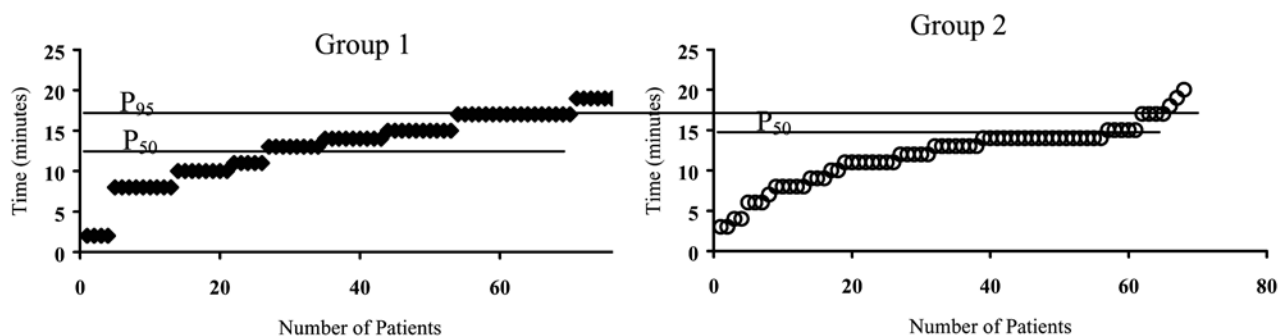


Fig. 1. — P₉₅ and P₅₀ in the two groups

Combined spinal epidural analgesia during labour: Is a prophylactic intravenous fluid load required to prevent hypotension? Y. VANDORMAEL, B. SPITZ *, J. VERHAEGHE *, E. VANDERMEERSCH, M. VAN DE VELDE. Departments of Anaesthesiology and Obstetrics and Gynaecology*, UZ Leuven, Belgium.

Introduction

Prophylactic IV crystalloids were considered to be essential to prevent maternal hypotension following epidural analgesia during labour (1). Recent evidence however suggests that with low dose epidural analgesia, crystalloids are not required to guarantee haemodynamic stability (2,3). The effect of omitting crystalloid pre-loading prior to combined spinal epidural analgesia (CSE) during labour, has never been evaluated. The purpose of the present trial is to investigate whether the incidence of hypotension is increased when no fluid load is given just prior to CSE.

Methods

Following ethics committee approval and written patient informed consent, 126 ASA I and II parturients in active labour with vertex presenting, singleton pregnancies were included in this double-blind, randomised trial. All patients received CSE analgesia using intrathecal 4.375 mg ropivacaine combined with 1.875 µg sufentanil. In the F-group, 63 patients received an IV fluid load, consisting of 1000 ml lactated Ringer's solution, less than 5 min prior to initiation of analgesia. In the NF-group no IV fluids were administered. The primary outcome variable studied was the incidence of hypotension, defined as a decrease in systolic blood pressure (SBP) below 80% of baseline value or a decrease below 100 mmHg. Maternal blood pressure and heart rate were followed every minute for 10 minutes and every 2 minutes for a further 20 minutes. Demographic data, obstetric data, fetal heart rate and neonatal outcome data were recorded. Statistical analysis consisted of repeated measures ANOVA with post hoc testing whenever appropriate. Categorical data were analysed using Chi square analysis and Fisher exact test. A $p < 0.05$ was considered statistically significant.

Results

No differences in demographic and baseline obstetric data could be identified between the groups. No dif-

ferences in pain intensity and pain relief could be observed. The two groups had similar haemodynamic reactions to CSE analgesia (Table 1). Neonatal outcome was good in both groups.

Table 1
Haemodynamic data in the F- and NF-groups

	F-group (n = 63)	NF-group (n = 63)
Mild hypotension (%)	78	76
Hypotension (%)	48	49
Severe hypotension (%)	8	13
Duration of hypotension (min)	2.1 ± 3.6	2.4 ± 3.7
Lowest recorded SBP (mmHg)	103 ± 10	103 ± 13
Maximal decrease in SBP (%)	16 ± 9	17 ± 10
Ephedrine (%)	48	49
Ephedrine (mg)	5.5 ± 7.2	6.8 ± 8.1
Phenylephrine (%)	10	13
Phenylephrine (µg)	11 ± 36	34 ± 111

Data are presented as% of group total or as mean ± Standard Deviation. No statistically significant differences were identified. Mild hypotension : decrease in SBP > 10% ; Hypotension : decrease in SBP > 20% or SBP < 100 mmHg ; Severe hypotension : decrease in SBP > 30%. SBP : systolic blood pressure.

Discussion and conclusion

Crystalloid pre-loading is routinely used to prevent maternal hypotension and fetal heart rate abnormalities following CSE analgesia during labour. The results of the present trial indicate that fluid pre-loading has no benefit as compared to omitting a fluid load.

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Biases in the Apache II Score. L. VANFLETEREN, M. DINGENS, A. VAN DAM, M. SCHETZ, G. VAN DEN BERGHE. Department of Anesthesiology and Intensive Care, UZ Gasthuisberg, Leuven.

Introduction

A recent large randomized trial in our unit revealed low APACHE II (APII) scores, despite a clinical impression of high illness severity, resulting in an unexpectedly high standardized mortality ratio (SMR) (observed/expected mortality). Possible explanations for this discrepancy are negligence or inexperience of the residents who complete the APII score or lead-time bias (decreased severity score due to pre-ICU care).

Methods

We performed a retrospective study of 505 patient files, comparing the "original" APII score, completed by the attending resident on discharge, with an "expert" APII score completed by a physician. In addition, in a prospective study of 100 ICU patients with delayed admission, the APII score with the data from the first 24 h of critical illness was compared with the first 24 h of ICU admission. The mortality prediction by the APII scores was adjusted for diagnosis. Data were analysed using paired & independent t-test and Mann-Whitney U non-parametric test where applicable.

Results

We found retrospectively that the "original" APII was 10 (range 0-31). This score was lower than the "expert" score of 16 (range 4-40) ($p < 0,0001$).

The main reasons for this discrepancy were related to: failure to choose the worst value of physiological parameters (92,6%), missing A-aDO₂ gradients in patients with FiO₂ ≥ 0.5 (23%), wrong Glasgow Coma Score attribution (8,3%) and assignment of wrong chronic health points (8,3%). The observed hospital

mortality was 12,5% and comparable with the 11,1% predicted by the "original" APII score ($p0,5$) (SMR 1,12). This contrasts with 18,9% predicted mortality of the "expert" ($P < 0,0001$) (SMR 0,66).

However the AUROC (area under receiver operating curve) of the "original" and "expert" score were comparable (0,80 versus 0,79), what also implies that discriminatory ability is independent of accuracy of data acquisition.

Prospective study

In the prospective study the pre-ICU APII score [17 (Inter-Quartile Range 12-23 / range 0-35)] was not significantly different from the ICU APII score [16 (13-20 / range 4-32)] ($p 0,27$). The corresponding predicted mortalities were 25,9% and 22,8%, both incidences being significantly different from the observed mortality of 17% (both $p < 0,0001$) (SMR 0,63 and 0,74 respectively). The AUROC of both scores were comparable (both 0,66).

Conclusion

Insufficient knowledge or a wrong attitude towards the APII score caused important underscoring of illness severity and an increase of the SMR. However, the discriminatory ability of the score was maintained. In our unit lead-time bias did not appear to be an important factor in explaining the erroneously high SMR.

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