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Risk factors for renal dysfunction after cardiac surgery. F. BURON¹, E. PINCK³, F. BLAFFART², R. LARBUISSON¹, L. ROEDIGER¹, M. SENARD¹, P. DAMAS¹, J. C. PREISER¹, M. LAMY. (1) Department of Anaesthesia and Intensive Care and (2) Department of Cardiovascular Surgery, University Hospital of Liege, Domaine universitaire du Sart-Tilman, B-4000 Liege ; (3) Intensive Care, St. Elisabeth Hospital, Place Louise Godin 15, B-5000 Namur.

Introduction

In patients requiring cardiac surgery, a postoperative deterioration of renal function is commonly observed. However, the risk factors for the development of postoperative renal failure or the aggravation of a pre-existing renal dysfunction are poorly defined.

Patients and methods

The renal function of patients requiring cardiac surgery over a 6-month period was prospectively followed. Chronically dialysed patients were excluded. The population was stratified according to the variables known to be associated with an increase in the risk of renal dysfunction in the general population and according to some features of surgery. Gender, age, the presence of diabetes, severe cardiac failure or previous cardiac surgery, the type of surgery (coronary artery bypass graft (CABG) and/or valve replace-

ment), the use of extracorporeal circulation were recorded. The plasma concentrations and the clearance of creatinine (CrCl) following the Cockcroft equation (1, 2), were recorded on the day before surgery, and on days 0, 1, 3 and one week after surgery. Significant correlations were searched by analysis of variance followed by the Tukey-Kramer test for multiple comparisons.

Results

Three hundred twenty patients were included. Mean age was 67 ± 11 years, with 158 patients older than 70 years. Sixty nine % were male. Diabetes, severe cardiac insufficiency and previous cardiac surgery were present in 21.3, 5.9 and 3.5%, respectively. CABG was performed in 69.4% and valve surgery in 41.9%. The CABG procedure was performed off-pump in 14.7%.

The results are described in the following table.

CrCl (mL/min)	J-1	J0	J + 1	J + 3	J + 1 week
Entire cohort	76.46 ± 30.13	92.83 ± 50.13	88.97 ± 47.63	91.25 ± 39.38	77.98 ± 33.90
Male	77.40 ± 29.60	97.40 ± 54.01	92.10 ± 38.60	95.56 ± 39.95	81.4 ± 33.80
Female	74.78 ± 31.33	82.02 ± 33.61	82.51 ± 62.52	81.53 ± 36.75	70.39 ± 32.76
≥ 70 years	61.33 ± 20.54	73.72 ± 24.93	68.32 ± 22.72	72.26 ± 25.84	62.62 ± 26.02
< 70 years	91.60 ± 30.60	111.33 ± 60.02	109.62 ± 55.71	110.21 ± 41.72	94.08 ± 35.62
Diabete	75.56 ± 32.05	88.22 ± 37.13	84.35 ± 37.93	86.69 ± 35.53	75.02 ± 33.55
No diabete	76.85 ± 29.65	93.84 ± 56.67	90.45 ± 49.63	92.47 ± 40.48	78.77 ± 33.89
Cardiac insufficiency	74.19 ± 40.03	90.84 ± 39.76	87.68 ± 50.69	93.84 ± 51.20	80.63 ± 43.48
No cardiac Insufficiency	76.72 ± 29.47	92.75 ± 50.38	89.24 ± 47.25	91.05 ± 38.71	77.82 ± 33.19
CABG	77.10 ± 31.17	92.60 ± 37.90	88.60 ± 38.71	90.71 ± 40.71	78.1 ± 35.12
Valve	71.92 ± 27.12	87.47 ± 61.53	84.00 ± 56.41	86.21 ± 36.2	79.9 ± 33.99

Discussion

In contrast to previous studies which demonstrated the deterioration of renal function after cardiac surgery after months or years, in our serie of patients, CrCl improved transiently during the week after cardiac surgery. This was observed in males and females, in patients younger and older than 70 years, in diabetic and non-diabetic patients, in presence and in the absence of cardiac insufficiency, after CABG and valve surgery. The deterioration of renal function after cardiac surgery was most often reported after months or years (3).

Conclusion

In this cohort of cardiac surgery patients with preoperative normal renal function, there was no postoperative

worsening of the glomerular filtration rate estimated by CrCl. However, an age older than 70 years, valve surgery and female gender may predispose to postoperative renal dysfunction.

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A comparison of ephedrine and phenylephrine boluses versus continuous infusion of ephedrine and phenylephrine during spinal anaesthesia for caesarean delivery. T. DEFOSSEZ, M. LAUWERS, F. CAMU, Department of Anaesthesiology, Flemish Free University of Brussels (VUB), Laarbeeklaan 101, 1090 Brussels, Belgium.

Introduction

Hypotension during spinal anaesthesia for caesarean section may cause adverse maternal symptoms and increase foetal acidosis. Diverse vasopressors have been used to treat these effects, administered intravenously either as single boluses or prophylactically as an infusion regime (1, 2). Whether different vasopressors and their administration mode affect maternal outcome and the neonate has not yet systematically been investigated. We therefore compared the effects of two vasopressors, ephedrine and phenylephrine, given either by bolus injection or by a continuous infusion regime, on maternal haemodynamics and foetal outcome (umbilical artery pH and Apgar scores).

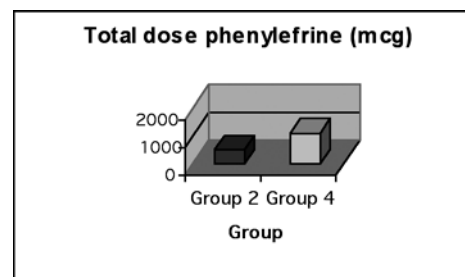
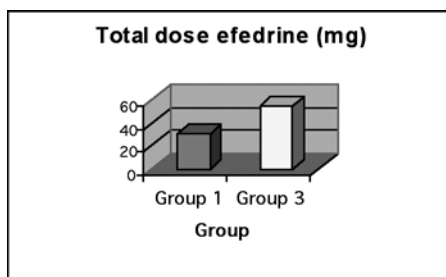
Methods

The local hospital ethics committee approved this randomised double blind study. After obtaining written informed consent 40 ASA physical status I or II patients were selected (exclusion: arterial blood pressure > 160/90, known arterial hypertension, epilepsy, psychiatric illness, age > 40) and assigned to four study groups: ephedrine 5 mg/ml boluses group (group 1), phenylephrine 100 µg/ml boluses group (group 2), ephedrine 1 mg/min continuous infusion group (group 3) and phenylephrine 20 µg/min continuous infusion group (group 4). The four groups showed to be homogenous for patient age, weight and length. In each of these 4 groups IV boluses were given whenever the

mean arterial blood pressure (MAP) was less than 70 mmHg or whenever the MAP was less than 75% of the pre-induction MAP value. Vasopressor infusion (groups 3 and 4) was started immediately after spinal anaesthesia and stopped at the end of the caesarean section. Blood pressure (BP) was measured non-invasively every 2 minutes. We compared maternal haemodynamics (HR, MAP, SaO₂), adverse side effects (blood loss, nausea, vomiting, dizziness), foetal umbilical bloodgases and Apgar scores. Between groups differences were analysed with t-test and 1-way ANOVA test. Results are presented as mean ± STDEV. A value of P < 0.05 was considered statistically significant.

Results

No significant differences were seen in maternal saturation (SaO₂), maternal blood loss and side effects, Apgar scores and umbilical bloodgases. MAP was higher and HR lower in group 4, but not significant (1-way ANOVA test). In the continuous infusion groups hardly any patient required additional boluses (2 patients in group 3 and 1 patient in group 4). A statistically significant difference (t-test) was observed in the total dose of vasopressor used between the bolus-only and continuous infusion groups, as well for ephedrine as for phenylephrine (group 1: 31 ± 14.2 mg ephedrine versus group 3: 55 ± 11.7 mg ephedrine [P < 0.001] and group 2: 520 ± 379 µg phenylephrine versus group 4: 1146 ± 202 µg phenylephrine [P < 0.05]).



Conclusion

No significant differences were observed in MAP and possible secondary adverse effects on mother and neonate, although a trend towards higher MAP was seen in the phenylephrine continuous infusion group. Haemodynamic stability was enhanced in the continuous infusion groups, as there was hardly any need for additional boluses in these groups. A larger patient population is likely to enhance these preliminary results. Our results seem to confirm the findings in recent literature, suggesting that phenylephrine via continuous infusion might be the preferred vasopressor during elective caesarean section.

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Measurement of the analgesic effects of Remifentanil-Adenosine combinations. L. DOUPEUX*, M.D., E. GUNTZ*, M.D., I. PASTIJN*, M.D., S. CARLIER**, M.D., M. SOSNOWSKI*, M.D., Ph.D.
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Introduction

Intraoperative adenosine infusion results in analgesia and postoperative pain relief (1). Conversely, remifentanil administration has been incriminated in difficult postoperative pain management and may promote of hyperalgesia (2). The effect of remifentanil and adenosine on postoperative pain might therefore be interesting to evaluate. The purpose of this study was to define whether different adenosine-remifentanil mixtures are, in term of their analgesic effect, additive, synergistic or antagonistic.

Methods

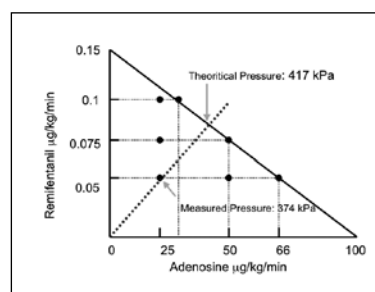
This study is approved by the ethic committee of Saint Pierre hospital. We first measured pain thresholds in presence of physiologic serum. Then, we measured pain thresholds in two groups of seven volunteers, during remifentanil (G1) or adenosine (G2) infusion. These pain thresholds are defined as the first pain feeling following application of 30 kPa/s on 0.5 cm² of the second, third or fourth finger of the dominant hand (manual computerised algometer, Somedic, Sweden). The equianalgesic concentration obtained for adenosine and remifentanil are introduced on the X and Y axes of a diagram. The line drawn between these 2 points represents every possible combinations of the 2 drugs in the case of a theoretical additive effect of these combinations, and serves as a reference in building up an isobologram (3). Finally, the necessary pressure to reach the pain threshold of seven different combinations of remifentanil-adenosine infusions (0.1/25 ; 0.1/33 ; 0.075/25 ; 0.075/50 ; 0.05/25 ; 0.05/50 ; 0.05/66) are measured in a group of six volunteers (three from group G1, three from group G2) and plotted on the isobologram. These pressures are compared to theoretical pressures that would be obtained if the considered combination was additive regarding the analgesic effect. Theoretical pressures are extracted from the isobologram once the line stretched

from the origin, passing by each combination point, crossed the X-Y line. Results are analysed with student *t* tests.

Results

Equianalgesic concentrations for remifentanil and adenosine are respectively 0.15 µg/kg/min and 100 µg/kg/min.

There is no statistical difference between pressures measured for the 2 drugs different combinations and theoretical additive pressures.



Conclusion

Our results show in term of analgesic effect the additive effect of remifentanil- adenosine combinations.

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Continuous Infusion of Epidural Sufentanil, Neostigmine and Clonidine for Labor Analgesia.

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Background

Optimal anesthetic management, during labor, is multifold. The goal is to reduce local anesthetics use to have selective sensory analgesia, to reduce instrumental delivery rate and to increase parturients' satisfaction (1). Epidural 500 µg neostigmine (N) combined with 10 µg sufentanil (S) or 75 µg clonidine initiates labor analgesia without motor block or side effects (2, 3). This study compared the analgesic efficacy of an epidural continuous infusion (CI) combining sufentanil to neostigmine or combining sufentanil to neostigmine and clonidine, with traditional ropivacaine (R)-sufentanil infusion during labor.

Materials and Methods

After approval by the Clinical Research Practices Committee and informed consent, an epidural catheter was inserted at the beginning of labor, in healthy parturients. When VAS was $\geq 30/100$, after a test dose, patients received epidural neostigmine 500 µg and sufentanil 10 µg. Then, they were randomly allocated to

receive epidural continuous infusion with sufentanil 2 µg/h combined with ropivacaine 10 mg/h (group SR ; n = 35), neostigmine 200 µg/h (group SN ; n = 32) or neostigmine 200 µg/h and clonidine 60 µg/h (group SNC ; n = 25) during 5 hours. When CI ended, ropivacaine 0.1% was used until delivery. Rescue doses of ropivacaine were available and given when needed. VAS, time before the first rescue dose (rescue 1) as well as the number of rescue doses (n), labor duration, instrumentation rate and total ropivacaine use were noticed. Maternal and fetal vital parameters and side effects were noted. Statistical analysis used ANOVA and posthoc test.

Results

Demographic data were similar in all groups. Analgesia efficiency (= % parturients with VAS < 30/100) differed after 3 hours : SR was significantly more efficient than SN (90% vs 50%). After 4 hours, SR and SNC were both more efficient than SN. Other results are expressed in the Table (mean \pm SD) ; p < 0.05 with SR (*) ; with SN (#).

	SR	SN	SNC
Rescue 1 (min)	179 \pm 88	131 \pm 63 *	178 \pm 70
Rescue 1 (VAS)	54 \pm 17	54 \pm 18	38 \pm 15 * #
N rescues < 5 hours	0.9 \pm 0.9	1.9 \pm 1.1 *	1.3 \pm 0.9
L duration (min)	307 \pm 150	307 \pm 106	336 \pm 113
R use (mg/h)	13.9 \pm 4	6.7 \pm 3.6 *	5.8 \pm 2.7 *
Instrumentation (%)	2.8	7	4

Conclusions

Sufentanil-neostigmine continuous infusion was less effective than classical sufentanil-ropivacaine infusion to alleviate pain during labor. Sufentanil-neostigmine continuous infusion combined with clonidine 60µg/h produced similar analgesia to sufentanil-ropivacaine continuous infusion, during 4 hours,

without side effects and allowed a ropivacaine sparing effect.

References

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Preoperative carbohydrate does not reduce nausea and vomiting after thyroidectomy. N. GODFROID, S. MAWEJA¹, A. KABA, M. LAMY, J. JORIS. Department of Anesthesiology & ICM, and Endocrine Surgery,¹ CHU Liège, University of Liège, B-4000 Liège, Belgium.

Introduction

Preoperative oral administration of carbohydrate (400 mL H₂O + 50 g glucose) reduces postoperative nausea and vomiting (PONV) after laparoscopic cholecystectomy, possibly by stimulating gastric emptying (1). Unlike abdominal surgery, PONV after thyroidectomy is mediated by cervical and laryngeal inflammation that provokes emetogenic reflexes (2). We therefore tested the hypothesis that preoperative carbohydrate administration does not reduce PONV after thyroidectomy.

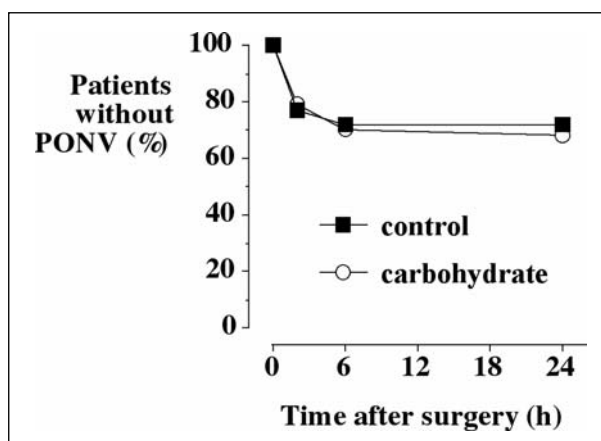
Methods

After approval of our institutional ethics committee, 180 ASA I-II consenting women scheduled for thyroidectomy were enrolled. Patients were randomly assigned, in a double-blind fashion, to preoperative (2-

3 hours before surgery) administration of 400 mL of water + 50 g glucose po or 100 mL of water + 0.5 g aspartam. Anesthesia was maintained with sevoflurane in 50% O₂ : air. Analgesia consisted of 2 mg/kg tramadol and 1 g paracetamol given iv 30 min before the end of surgery. Nausea was rated on a 0-3 scale, vomiting, and antiemetic request were recorded during 3 postoperative epochs : 0-2 h, 2-6 h, and 6-24 h. Data were analyzed using chi² or Students' *t* test when appropriate ; *P* < 0.05 was considered statistically significant.

Results

Patients data were similar in the two groups. Incidence and severity of PONV, and request for antiemetic treatment did not differ in the two groups during each of the three epochs. The number of patients reporting PONV was similar in both groups (Fig.).



Conclusions

Oral preoperative carbohydrate does not reduce the risk of PONV after thyroidectomy, although it has been shown to after abdominal surgery.

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Evaluation of a dual nerve infiltration in subpectoral mammary implants surgery. C. LEBOS*, J.-P. LECOQ*, C. BACCUS*, M. LAMY*, D. JACQUEMIN**, J.-L. NIZET**, O. HEYMANS**. *Department of Anaesthesia and Intensive Care Medicine, University Hospital, University of Liège, Liège, Belgium; **Department of Aesthetic, Maxillo-facial, Hand, and Micro-Surgery, University Hospital, University of Liège, Liège, Belgium.

Introduction

Breast augmentation with subpectoral mammary implants (BASMI) produces marked postoperative pain resulting from incision and fasciomuscular stretching (1). In this study, the association of intercostal nerves (IC) and pectoral nerve loop (PNL) infiltration (as used in painful spasticity (2)) was compared to classical intravenous analgesia.

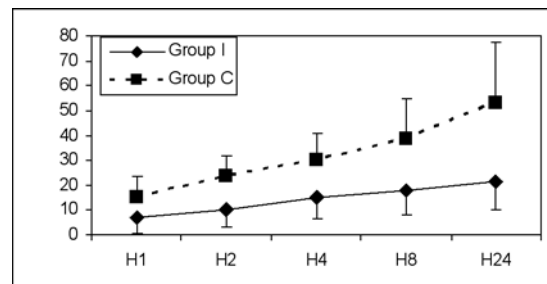
Materials and methods

After institutional approval and informed consent, 28 ASA 1 patients scheduled for BASMI were randomly allocated in two groups: Group I (IC and PNL infiltration) and group C (control). General anaesthesia was induced and maintained with propofol (TCI = 3 µg/ml), remifentanyl (remi), started at 0.25 µg/kg/min and titrated by steps of 0.05 µg/kg/min to maintain haemodynamics ($\pm 30\%$ of starting values), and rocuronium. All patients received 1 g of IV paracetamol and 20 mg of ketorolac at the end of the surgery. Postoperative analgesia was achieved with 1 g q6h of paracetamol, 200 mg celecoxib 6 h after the surgery and piritramide (piri) PCA. In group I, IC were blocked by a subcutaneous infiltration (12 ml) in the area of the anterior axillary line between T3 and T8 levels. To perform the PNL infiltration (3), the surgeon made an antero-posterior puncture beneath the middle of the clavicle. Local anaesthetics (7 ml) were injected after feeling the first "clac" corresponding to the space between major and minor pectoralis muscles. An amount of 38 ml ropivacaine 0.2% plus 150 µg of clonidine was used. We recorded preoperative remi consumption, postoperative pain evaluated with VAS (0-10 cm) at 0, 1, 2, 4, 8, 24 postoperative hours in parallel with piri consumption. Statistical analysis used ANOVA, Student t-test and Mann-Whitney U test. Significance differences were considered when $p < 0.05$. Shown are mean \pm SD.

Results

Demographic and operative data were similar among both groups. Total remi consumption was reduced from 0.27 (± 0.07) µg/kg/min in group C to 0.16

(± 0.04) µg/kg/min ($p < 0.0001$) in group I. Local infiltration was associated with a significant reduction in piri consumption at each post-operative time (Fig.). VAS score were non significantly lower in group I compared to group C at each time.



Discussion

This fast and simple technique of infiltration (IC plus PNL) in BASMI demonstrates an opioid sparing effect in the pre- and postoperative period. Nevertheless, associated with NSAIDs and paracetamol this infiltration is not sufficient to block all pain especially in the early postoperative period. Further studies with higher dose of local anaesthetics and adjuvants, or with other designs (only one of these two infiltrations? ...) are now necessary to confirm the beneficial effect of these infiltrations.

Conclusion

In our protocol, IC and PNL infiltrations seem to be an attractive technique to reduce opioids during and after BASMI surgery.

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Postoperative Analgesic and Antihyperalgesic effect of spinal Clonidine used during elective Cesarean Section. L. LEBREUX, M.D., F. ROELANTS, M.D., H. WATERLOOS, R.S., P. LAVAND'HOMME, M.D., PH.D. Anesthesiology Dept, St Luc Hospital, Université Catholique de Louvain, Brussels, Belgium.

Background

The spinal (IT) α_2 -adrenergic agonist clonidine (CLO) has been used as adjuvant to improve analgesia during and after cesarean section (CS) (1). Surgical injury induces central changes associated with increased postoperative pain perception, i.e. hyperalgesia, which enhances residual pain after surgery. Chronic pain is not unusual after CS (2). IT CLO has demonstrated antihyperalgesic properties in experimental incisional pain and in postoperative patients (3). The present study evaluates the benefit on postoperative pain, hyperalgesia and residual pain development of adding CLO to IT analgesia for CS.

Materials and Methods

After Ethical Committee approval and informed consent, healthy parturients undergoing elective CS (max 1 previous CS), were randomly assigned to receive IT hyperbaric bupivacaine 0.5% 1.8 mL combined with either sufentanil 1.8 μ g (BS group ; n = 14) or sufentanil

1.8 μ g and clonidine 75 μ g (BSC group ; n = 13) or clonidine 150 μ g (BC group ; n = 12) in 3 mL volume. Postoperative analgesia was assessed by IV PCA morphine requirements and VAS pain scores (VAS 0-10) for wound pain at rest and movement and pain from uterine contractions. All patients also received diclofenac and paracetamol. Mechanical hyperalgesia was measured with von Frey filaments. Presence and intensity (score : 1 to 5) of residual wound pain at 1, 3 and 6 months was questioned. Statistical analysis used ANOVA with posthoc test and X^2 analysis for multiple groups, $P < 0.05$ significant with BS group (*).

Results

Demographic data did not differ nor did surgery or IT analgesia duration or time before first PCA use. Postoperative visceral pain and parietal pain at rest were similar while 12 h parietal pain at movement was lower in BSC group ($3 \pm 2^*$ vs 7 ± 2 in BS group and 4 ± 2 in BC group). PCA morphine use (mg), mechanical hyperalgesia and residual pain are in Table.

	BS group	BSC group	BC group
Morphine use (mg) at 12 h	17 \pm 15	6 \pm 5	6 \pm 4*
At 24 h	27 \pm 16	18 \pm 12	12 \pm 10*
At 48 h	32 \pm 19	22 \pm 16	18 \pm 15
% Hyperalgesia at 48 h	61.5	33	17*
Residual pain at 1 ; 3 and 6 Months (n)	4 ; 1 and 1	4 ; 3 and 3	2 ; 0 and 0
Intensity at 3 ; 6 Months (1-5)	2.5 ; 2	3 ; 1	— — —

Discussion and conclusion

Besides a short-term opioid sparing effect, these preliminary data show that IT clonidine 150 μ g reduces the development of mechanical hyperalgesia, i.e. a clinical translation of central sensitization. IT clonidine 150 μ g hence seems to prevent the development of residual pain at 3 and 6 months after CS.

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Perioperative hyperglycaemia is similar in nondiabetic morbidly obese and nonobese patients undergoing prolonged laparoscopy. H. LIEN*, A. KABA*, A. DEROEVER**, C. COIMBRA**, M. LAMY*, J. JORIS*. *Department of Anesthesiology & ICM, and **Abdominal Surgery, CHU Liège, University of Liège, B-4000 Liège, Belgium.

Introduction

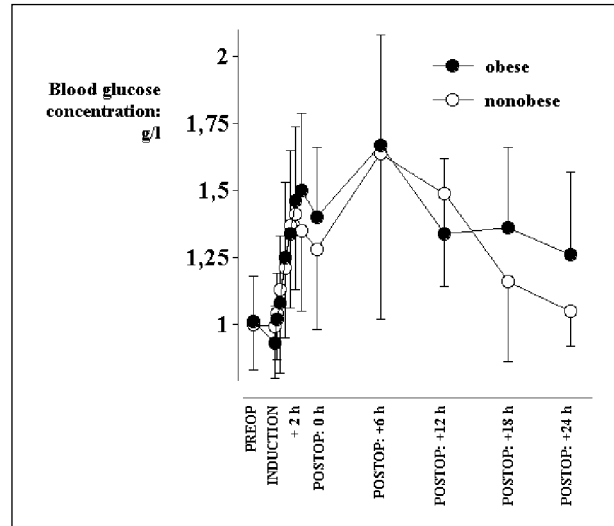
Surgical stress results in perioperative hyperglycaemia (1). Insuline resistance frequently develops in morbidly obese patients (2). We therefore tested the hypothesis that perioperative hyperglycaemia is greater in nondiabetic obese patients than in nonobese patients.

Methods

After approval of our institutional ethics committee, 23 ASA I-III non-diabetic morbidly obese patients (BMI : 41.1 ± 6.1 kg/m²) scheduled for laparoscopic gastric bypass were compared to 10 nonobese nondiabetic patients (BMI : 27.6 ± 2.5 kg/m²) scheduled for laparoscopic colectomy. Anesthetic technique (sevoflurane in O₂ : air mixture) was standardized in all patients. All patients were given clonidine iv at the induction of anesthesia (150 µg or 300 µg in nonobese and obese patients respectively). After surgery, all patients received a continuous infusion (80 ml/h) of Glucion® 10%. Blood glucose was measured in fasted patients before premedication, before induction of anesthesia, after induction of anesthesia, every 30 min intraoperatively, and then every 6 h postoperatively for 24 h. HbA1c was also measured. Data (means \pm SD) were analyzed using Students' *t* test or ANOVA for repeated measures when appropriate ; *P* < 0.05 was considered statistically significant.

Results

HbA1c plasma concentrations were similar in nonobese ($5.7 \pm 0.5\%$) and obese ($5.6 \pm 0.6\%$) patients.



Intra- and postoperative glycemia were not significantly different in morbidly obese and nonobese patients (Fig.).

Conclusions

Despite well-documented insuline resistance in obese patients, surgical stress during prolonged laparoscopy results in similar hyperglycaemia in nondiabetic obese and nonobese patients.

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Risk factors, morbidity and mortality prediction for valvular re-operations. M. LOSCHEIDER, P. REPER, P. WAUTHY, S. GOLDSTEIN, H. DEMANET, F. DEUVAERT, J. MASSAUT. Centre Hospitalier Universitaire Brugmann, ULB, Place A. Van Gehuchten 4, B-1020 Bruxelles.

Objectives

Valvular redo-operations carry a higher mortality and morbidity incidence than first heart valve operations. This study reports redo valve surgery results from a single centre. It analyses risk factors for peri-operative death, it computes a preoperative score for mortality prediction and it analyses the risk factors of prolonged post-operative mechanical ventilation and prolonged ICU stay.

Methods

Data of 225 consecutive patients, between 1997 and 2005, after redo valve operations were retrospectively analysed. Simple logistic regression (1) was car-

ried out to identify predictive risk factors of death and morbidity (ICU stay > 3 days and mechanical ventilation > 18 hours). Multiple logistic regression (1) was used to isolate independent risk factors for death and morbidity, and to compute pre-operative score of mortality prediction. Predictive values of our pre-operative score with 95% confidence intervals were computed on the same population and compared to the performance of the EuroSCORE (2).

Results

Hospital mortality is 8% ; 5% in the group of the 1st redo, 15% in the group of the 2nd redo and 25% in the group of the 3rd redo.

Independent risk factors of :

Mortality

Mortality	P
NYHA	0.025
Urea	0.075
LDH	0.002

Ventilation > 18 hours

Ventilation > 18 H	P
Age	0.006
NYHA	0.045
Surgery time	0.005
No of transfusion	0.001

ICU stay > 3 days

ICU stay > 3 days	P
NYHA	0.033
Surgery time	0.004
No of transfusions	< 0.001

Preoperative Score : $-9.0 + 1.393 * NYHA + 0.1228 * Urea + 0.0007258 LDH$
L-ROC of the Preoperative Score = 0.88.

Conclusions

Predictive risk factors for hospital mortality are highly related to the advanced stage of cardiac pathology. The number of redo-operations is linked to mortality ($p = 0.0063$ at the simple logistic regression) but this was not confirmed in our findings as an independent predictive factor of mortality. A simple preoperative score of mortality prediction can be predicted using NYHA class, preoperative LDH and urea values.

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Perioperative insulin requirements are higher in cardio-surgical patients with elevated preinduction blood glucose. G. MELSENS^{* **}, M.D., G. CAMMU^{*}, Ph.D., L. FOUBERT^{*}, Ph.D., P. LECOMTE^{*}, M.D., E. VANDERMEERSCH^{**}, Ph.D., T. DELOOF^{*}, M.D. ^{*}OLV Clinic, Aalst ; ^{**}Catholic University Hospital, Leuven.

Background and goal

Abnormally elevated blood glucose levels are commonly observed among cardiac surgical patients. Their presence has been associated with worsened outcome (1, 2, 3). In this study we hypothesized that in cardio-surgical patients, with a preinduction blood glucose value (BG) > 110 mg/dl, perioperative insulin requirements are higher and insulin management more difficult than in those with a normal preinduction BG.

Materials and methods

The EC approved the study and patients gave IC. Diabetics did not receive subcutaneous insulin therapy during the immediate preoperative period. 80 patients,

planned for cardiac surgery of any type, were assigned to 2 groups : group 1 had a preinduction BG ≤ 110 mg/dl and group 2 a BG > 110 mg/dl. Patients were considered diabetic if under treatment with diet, oral antihyperglycemic agents or insulin before surgery. Intraoperatively, a continuous infusion of insulin was started if the BG was > 110 mg/dl, and the infusion was adjusted to maintain normoglycaemia (80-110 mg/dl) until discharge from ICU.

Results

Group 1 comprised 45 nondiabetic cardio-surgical patients with a preinduction BG ≤ 110 mg/dl. Group 2 had 35 patients with a preinduction BG > 110 mg/dl ; 11 diabetic and 24 nondiabetic patients.

Table 1

Data are mean ± SD or median (range), unless otherwise stated
*P < 0.05 versus Group 1 (Kruskal-Wallis test with Dunn's multiple comparisons post-test)

Variable	Group 1 (n = 45)	Group 2 (n = 35)	Group 2 minus preexisting diabetes (n = 24)
Preexisting diabetes, n (%)	0	11 (31)	0
Preinduction BG (mg/dl)	101 ± 7	141 ± 47*	123 ± 8*
Intraoperative insulin consumption (U/h)	1.9 ± 0.9	3.7 ± 1.9*	3.5 ± 1.9*
Intraoperative insulin infusion changes (n per patient)	3.7 ± 2.0	5.3 ± 2.0*	4.8 ± 2.1*
Intraoperative periods of BG < 80 mg/dl (n per patient)	0 (0-3)	0 (0-9)*	0.5 (0-9)*
Intraoperative periods of BG > 200 mg/dl (n per patient)	0 (0-1)	0 (0-7)	0 (0-2)
ICU insulin consumption (U/h)	1.8 ± 0.8	2.9 ± 1.6*	2.8 ± 1.8*
ICU insulin infusion changes (n per patient)	4.1 ± 2.1	6 ± 2.4*	5.6 ± 2.3*
ICU periods of BG < 80 mg/dl (n per patient)	1 (0-5)	1 (0-4)	1 (0-4)
ICU periods of BG > 200 mg/dl (n per patient)	0 (0-1)	0 (0-3)	0 (0-3)

Hemoglobin A1C (%) was 5.6 ± 0.4 in Group 1, 5.9 ± 0.4 in the nondiabetic patients from Group 2, and 7.4 ± 1.5 in those with preexisting diabetes (P < 0.0001).

Discussion

In patients with a preinduction BG > 110 mg/dl, perioperative insulin requirements are higher and insulin management is more difficult than in patients with a normal preinduction BG. In *nondiabetic cardio-surgical patients with a preinduction BG > 110 mg/dl*, perioperative insulin requirements are still higher and insulin management is still more difficult than in those with a normal preinduction BG.

Conclusions

This study suggests that preinduction glycaemia > 110 mg/dl predicts difficult perioperative glucose control and, moreover, that a preinduction blood glucose of ≤ 110 mg/dl is associated with less insulin need.

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Do we need inhaled anaesthetics to blunt arousal and haemodynamic responses to intubation after intravenous induction with propofol, remifentanil and rocuronium? D. NDJEKEMBO SHANGO, M. COPPENS, L. VERSICHELEN, E. MORTIER, M. STRUYS. Department of Anaesthesia, Ghent University Hospital, Gent, Belgium.

Background

This study aims to investigate whether inhaled anaesthetic administration should be started immediately after intravenous induction with propofol, rocuronium and remifentanil in order to minimize autonomic and arousal response during intubation (1).

Methods

After local ethics committee approval, written informed consent was obtained from 100 ASA 1-2 patients scheduled for surgery requiring general anaesthesia. They were randomised into 4 groups to receive 1 MAC of desflurane or sevoflurane shortly before or just after tracheal intubation. All groups receive an effect site controlled infusion of remifentanil at 2 ng/ml for 3 minutes, followed by a bolus of propofol until loss of con-

sciousness (LOC). Rocuronium (0.6 mg/kg) was given at LOC and the trachea was intubated after 90 seconds of manual breathing support (= baseline) with or without inhaled anaesthetics. Vital signs and Bispectral Index (BIS) were recorded until 10 minutes post-intubation to reveal autonomic and arousal response. Statistical analysis used ANOVA with Tukey test if required.

Results

A significant increase in BIS value (Fig. 1) after intubation is seen in all groups. Even without pre-intubation inhaled anaesthetics, increases were mild. In contrast to sevoflurane, pre-intubation delivered desflurane was able to blunt the arousal response partially. Heart rate, systolic and diastolic pressure increase similarly in all groups.

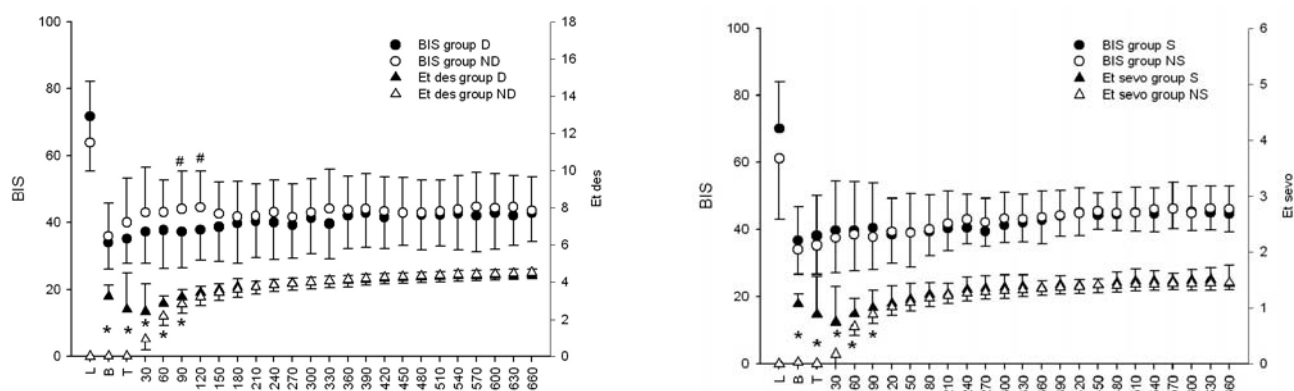


Fig. 1. — Mean values for Bis and end tidal concentration of inhaled anaesthetics. D = desflurane, ND = non-desflurane, S = sevoflurane, NS = non-sevoflurane, L = moment of LOC, B = Baseline moment, T = end of endo-tracheal intubation, * = $p < 0.05$.

Conclusions

Inhaled anaesthetics (desflurane, sevoflurane) were unable to blunt the arousal reflex completely, as observed by BIS, although the reflex was significantly less when desflurane was used during manual ventilation between loss of consciousness and intubation. Induction with remifentanil, propofol and rocuronium and without inhaled anaesthetics before intubation can

be done without resulting in dangerous haemodynamic and arousal responses at intubation after 90 seconds.

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Leak pressure after orotracheal vs nasotracheal intubation with uncuffed tracheal tubes in children.

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Introduction

The use of uncuffed tracheal tubes is still recommended in children < 8 years old. A leak pressure (LP) greater than 25 cm H₂O is associated with a higher incidence of postextubation adverse events (1). For nasotracheal intubation (NTI), the choice of the tube depends on the degree of air leak evaluated after initial orotracheal intubation (OTI). Our objective was to determine whether a difference exists between orotracheal and nasotracheal LP.

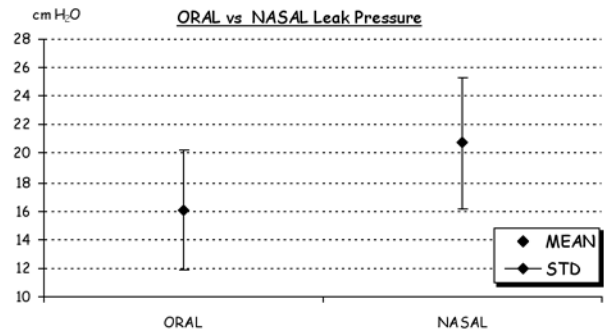
Methods

We prospectively studied 50 children from 3 months to 6 years old requiring nasotracheal intubation for elective surgery: neither ethical committee nor parental consent was therefore deemed necessary. General anesthesia was induced with sevoflurane by mask followed with 1 mg/kg of IV propofol and topical anesthesia of the glottic area with 2 mg/kg of lidocaine 2 minutes before intubation. No muscle relaxants were used. The size of the foreseen tracheal tube was determined by means of the formula (age/4 + 4,5). After OTI, the attending anesthesiologist assessed the LP with a Mapleson D circuit at 3 l/min of fresh gas flow and the child's head in neutral position (2). LP was measured with a Portex® cuff manometer. NTI was performed within 4 minutes after performing the oral leak test and LP was assessed by the same anesthesiologist (3). The occurrence of cough, bucking, difficult intubation, epistaxis, rhinorrhea, stridor and the duration of surgery was recorded. The T-test was used for the statistical analysis.

Results

Results are presented as mean ± sd, (range) and [median]. OTI: 16,0 cm H₂O ± 4,1, (6-30) [15,5] and NTI: 20,7 cm H₂O ± 4,5, (12-30) [20] (see figure). We observed an increase of LP after NTI in 80% of cases. The difference between the LP in NTI compared with LP in OTI was significant (p < 0.0001). No cough, buck-

ing or other complication of intubation was observed in any cases.



Conclusion

The LP measured after OTI does not provide an adequate estimation for LP after NTI. In most cases, we observed an increase of LP after NTI. We therefore recommend measuring LP after NTI when uncuffed tracheal tubes are used. Different hypotheses might explain the observed increase in LP: 1. a different positioning of the tracheal tube in the subglottic area, 2. an accumulation of nasal secretions around the tube after its passage in the nose, 3. a softening of the tube after the orotracheal test, 4. a tighter contact with the cricoïd mucosa.

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Epidural sufentanil combined to levobupivacaine 0.1125% for labor analgesia : a prospective randomized double-blind study. E. REILES, N. MAGASICH, F. DE GROOTE, A. DE VILLE, P. VAN DER LINDEN. Department of Anesthesiology CHU Brugmann – HUDERF, Free University of Brussels.

Introduction

The synergic spinal effect of lipophilic opioids combined to local anesthetics in epidural analgesia is well documented (1). Its application in obstetric analgesia allows for a reduction in the concentration and dose of the local anesthetic used (2), resulting in a decreased incidence of motor blockade and thereby a potentially lower impact on obstetric mechanics. This prospective randomized double-blind study compares the addition of sufentanil (SUF) to levobupivacaine (LEVO) either in the bolus solution, the following continuous infusion or in both of them, in terms of analgesic quality, side effects and obstetric outcome.

Methods

Following institutional Ethics Committee approval, 60 primi- or multiparae laboring women, with a cervical dilatation of at least 3 cm, requesting epidural analgesia were randomized in three groups after having given their written informed consent :

- Group 1 : initial bolus solution (LEVO 0.1125% + SUF 0.5 µg/ml) - continuous infusion (LEVO 0.1125%)
- Group 2 : initial bolus solution (LEVO 0.1125%) - continuous infusion (LEVO 0.1125% + SUF 0.5 µg/ml)
- Group 3 : initial bolus solution and continuous infusion (LEVO 0.1125% + SUF 0.5 µg/ml).

Exclusion criteria were multiple or complicated pregnancies, non cephalic presentation, and preterm labor (< 36 weeks). After a 3 ml test dose (lidocaine 2% + epinephrine 5 µg/ml), a given volume of the initial bolus solution was injected to achieve a Th10 sensory blockade level. The continuous infusion was started 20 min thereafter. If requested, bolus re-injections of the continuous solution were administered throughout labor. Ineffective analgesia was defined as the maintenance of a visual analogue pain score (VAS) greater than 30 mm in the presence of a Th10 sensory blockade level. Anesthetic requirements, vital signs, pain scores (VAS), motor blockade, incidence of side effects, obstetric outcome and post-delivery day 1 maternal satisfaction (VAS) were collected. Demographic, obstetric and anesthetic data were compared between groups by ANOVA (continuous data) or χ^2 (discontinuous data). Data collected over time were compared using two-way ANOVA. A $p < 0.05$ was considered significant. Data are presented as mean \pm SD, or % of patients.

Results

Demographic and obstetric characteristics were not different among groups. Vital signs, pain scores and motor blockade over time showed no difference either. The number and the volume of bolus re-injections were significantly lower in group 3 compared to groups 1 and 2 (Table). Obstetric outcome and patient's side effects (nausea, vomiting, itching, and hypotension) were not significantly different between groups.

	Group 1	Group 2	Group 3	P
Re-injections (number)	3.3 \pm 2.2	3.0 \pm 1.6	1.7 \pm 2.1	0.021
Re-injections (ml)	10.7 \pm 7.3	9.0 \pm 6.2	5.0 \pm 4.7	0.015
Instrumental delivery (%)	5	10	15	NS
Cesarean section (%)	5	10	5	NS
Fetal pH (U)	7.30 \pm 0.07	7.33 \pm 0.07	7.32 \pm 0.08	NS
Nausea and vomiting (%)	10	5	5	NS
Itching (%)	0	20	20	NS
Ineffective analgesia (%)	10	0	0	NS
Maternal satisfaction (VAS : mm)	87.6 \pm 13.7	83.5 \pm 16.7	92.6 \pm 8.1	NS

Conclusion

A previous study conducted in our institution using a pure LEVO solution (0.125%) showed a relatively high rate of inadequate analgesia (33%) (3). The present study does not demonstrate any advantage for one of the different regimens combining SUF to LEVO in term of analgesic efficacy or obstetric outcome. As the number and the volume of bolus re-injections were significantly lower in the group of patients receiving SUF in the bolus and the continuous infusion, and side effects were overall very low, we advocate this regimen in the perspective

of further reducing the concentration of the local anesthetic.

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Effect of intraoperative Clonidine on early postoperative pain after inguinal hernia repair. J. SHIH, M.D., H. WATERLOOS, R.S., V. COLLET, M.Sc., P. LAVAND'HOMME, M.D., Ph.D. Anesthesiology Dept., St. Luc Hospital, Université Catholique de Louvain, Brussels, Belgium.

Background

Surgical injury can lead to residual pain (RP) (1). After inguinal hernia repair (IHR), a very common procedure, RP incidence is high (15-53%): moderate to severe pain is found in 12% of patients, with daily activity impairment present in up to 25% of patients (2, 3). Among the risk factors to develop RP after IHR, the severity of early postoperative pain, specifically during the first week, is a striking factor (1, 3). In the current literature, the effect of specific analgesic treatments in reducing RP after IHR is missing (3). From previous studies, spinal α 2-adrenergic agonist clonidine (CLO) seems to have a protective effect and to prevent RP after colonic surgery (4). We present here the preliminary results of a prospective randomized double-blind study assessing CLO effect (systemic and spinal) on RP development after IHR.

Materials and methods

After Ethical Committee approval and informed consent, adult male patients (ASA 1 and 2) scheduled for unilateral IHR were randomly assigned to receive spinal anesthesia with hyperbaric bupivacaine 0.5% and sufentanil plus either saline (group IT Sal, n = 14) or CLO 150 μ g (group IT CLO, n = 10). In a third group

(group IV CLO, n = 12), patients received systemic CLO 150 μ g and IHR was performed under general anesthesia (either volatile or intravenous maintenance and induction with propofol, sufentanil and atracurium). All the patients received ketorolac 30 mg and paracetamol 1 g at the end of surgery. Spinal anesthesia failure and intraoperative complication were exclusion criteria. The day after IHR, patients were sent home with a written questionnaire to evaluate early postoperative pain. This questionnaire evaluated the recall of pain during the first 48 h with average and maximal VAS scored from 0-10, the duration of pain (less than 10 days or still present at day 10 after the procedure). When pain was still present at day 10: pain intensity (average and maximal VAS score), pain location, timing of pain, need for analgesics and impact of the pain on daily quality of life was assessed. Statistical analysis used ANOVA with post-hoc test and X^2 for multiple groups, $P < 0.05$ significant.

Results

No patient was excluded from the study. Questionnaires return rate was 94% in IT Saline, 90% in IT CLO and 92% in IV CLO group. The results are expressed in the Table and concern pain located at surgery site.

	B + IT Saline	B + IT CLO	IV CLO
Recall of early pain (48 h)			
Average VAS value	3.2 \pm 1.5	4.1 \pm 2.3	3.8 \pm 2
Maximal VAS value	5.1 \pm 2.6	5.1 \pm 3	6.2 \pm 2.6
Patients with pain at day 10 (%)	27	17	40
Average VAS value	2.2 \pm 0.9	1.7 \pm 0.6	2.7 \pm 2
Maximal VAS value	2.7 \pm 1.4	2.7 \pm 0.6	3.8 \pm 2.1
Need for analgesics (%)	43	33	80 (* with IT groups)
Impact of pain on daily life at	day 10		
Daily activity (0 - 10)	3.7 \pm 2.3	3 \pm 1.8	4.6 \pm 2.3
Mood (0 - 10)	1 \pm 1.2	1.8 \pm 2	2.1 \pm 2.5
Sleep (0 - 10)	0.2 \pm 0.4	0.6 \pm 0.5	2.6 \pm 3

Discussion

The preliminary results confirm the importance of RP after IHR. Patients operated under spinal anesthesia seem to present with lower pain incidence and less severe pain at 10 days as they requested less postoperative analgesics. Perhaps related to the small number of patients, no significant difference was observed between IT Saline and IT CLO groups.

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Assessment of survival and quality of life in octogenarian 1-year after cardiac surgery. M. TOWE, D. LEDOUX, S. PIRET, J. L. CANIVET, P. DAMAS. Intensive Care, Liege University Hospital, Liege, Belgium.

Introduction

The frequency of cardiac surgery in patients 80 years of age and older is increasing. The benefit of such procedures may be questionable. Therefore the aim of this study is to analyse the quality of life and the survival in octogenarian patients operated for heart surgery.

Methods

From April 2003 to January 2004 all consecutive patients admitted after heart surgery were prospectively included in the protocol. The study protocol was approved by the hospital ethic committee. At one year post surgery, the euroQOL questionnaire (1) was submitted to patients and survival evaluated via the patients' general practitioner. Patients were separated into octogenarian and not octogenarian, for analysis. Data were analysed using chi-square test and Mann Whitney test. A Cox model was used for survival analysis. A p-value < 0.05 was considered as significant.

Results

498 patients were included in the protocol, 44 (8.8%) of them were Octogenarian. During the 1-year follow-up, 44 (8.8%) patients died. There were 5 (11.4%) death in octogenarian patient and 39 (8.6%) in younger patients ($p = 0.574$). The EuroQOL questionnaire was completed for 426 (94% of survivors) patients. The results in table 1 show that although octogenarian patients have mobility limitations and difficulties with their self-care they do not complain of major limitation in their usual activities. Moreover octogenarian patients do not suffer more from pain or depression. when self-reporting their current health status on a scale from 0 to 100, octogenarian patients rated a significantly lower health status as compared with younger patients (62.0 +/- 14.8 vs 71.5 +/- 15.8, $p = 0.001$). However, the proportion of patients who considered their health improved as compared with their preoperative status was similar in both groups. (62.5% vs 67.7% , $P = 0.547$). The univariate Cox model revealed that being octogenarian did not significantly increased the risk of fatal event during the 1-year follow-up (OR 1.377 95% CI : 0.953-4.428, $p = 0.501$).

Table 1

	80 years	> = 80 years	p-value
Mobility	75.3	57.6	0.011
Self-care	92.4	78.8	0.029
Usual activities	78.9	75.7	0.354
Pain/Discomfort	55.7	60.6	0.082
Anxiety/Depression	66.7	60.6	0.521

Discussion

Although mobility and self care were significantly lower in octogenarian as compared to younger patients, most of these patients considered their health improved. Moreover octogenarians' one-year survival rate was not different.

The limitation in terms of mobility and self care is probably due to age rather than to heart surgery. However our study could not verify this hypothesis. It would have been interesting to submit the questionnaire preoperatively.

Conclusion

These results are consistent with previous reports (2) suggesting that cardiac surgery is worthwhile in octogenarian patients and it should not be withheld on the base of age alone.

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Impact of intrathecal morphine on the tolerance of early feeding after cesarean section.

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Introduction

Early feeding is well tolerated in patients undergoing caesarean section under general or loco-regional anesthesia (1). Intrathecal morphine is efficient for postoperative analgesia but can induce nausea and vomiting which may hamper feeding (2). This study assessed prospectively the effects of intrathecal morphine on early feeding in patients undergoing caesarean section.

Methodology

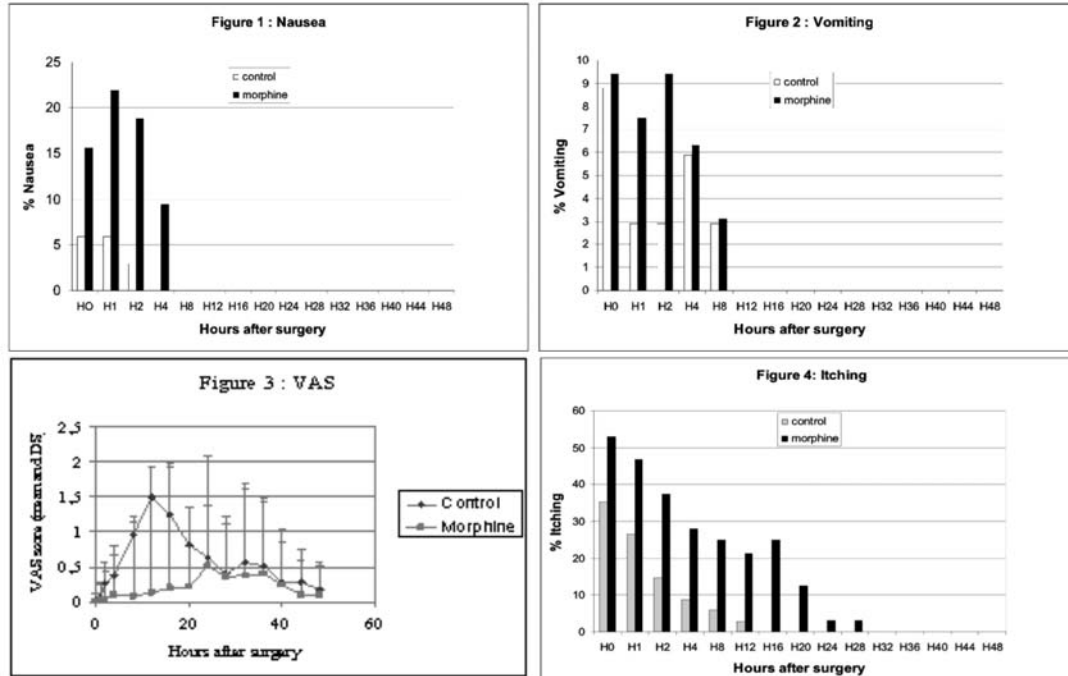
After Ethical Committee approval, 66 consenting women scheduled for caesarean section were randomized to receive intrathecal morphine 0.1 mg (group M, n = 32) or not ("control group", group C, n = 34) at the time of intrathecal anaesthesia performed with a 3 ml mixture containing 8.6 mg bupivacaine, 64.3 mg clonidine and 4.3 mg sufentanil. Standard antiemetic prophylaxis (5 mg dexamethasone + 4 mg tropisetron) was administered intravenously in all patients after clamping of the umbilical cord. Standardized multimodal analgesia was initiated postoperatively with 1g of paracetamol and 20 mg of ketorolac given every 6 hours. Analgesia was evaluated by a visual analogue scale (VAS) at 4 hours intervals and 10 mg of oral morphine was administered if the VAS score exceeded 3. All patients

received a protein enriched solution, eight hours after caesarean section and were allowed to eat solid food on postoperative day 1. Nausea and vomiting episodes, gas and/or stools emission, itching, VAS score and morphine consumption were recorded on the first, second and fourth postoperative hour and then every four hours during 48 hours.

Results are expressed as mean values \pm standard deviation or percentages. Statistical analysis included unpaired Student-t test and Mann-Whitney U test using spss13.0. A p-value < 0.05 was considered significant.

Results

Nausea was significantly more frequent and persisted longer in group M (Fig. 1). Vomiting occurred equally in both groups and stopped after feeding (Fig. 2). Gas and/or stools emission appeared within 48 hours postoperatively in 71.2% and 67.6% of patients in group M and group C respectively. Oral morphine consumption was significantly lower in group M (1.9 ± 4 vs 6.5 ± 7.3 mg, $p = 0.006$). When compared to group C, VAS scores were also lower in group M from the second to the 20th postoperative hour (Fig. 3). Itching was observed more frequently and persisted longer in group M (Fig. 4).



Discussion and conclusion

A small dose of intrathecal morphine provided adequate and prolonged pain relief after caesarean section but increased the incidence of nausea and vomiting despite antiemetic prophylaxis. Oral food intake was not

hampered by intrathecal morphine as vomiting stopped after feeding.

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Clonidine postpones discharge when added to spinal levobupivacaine for day-case arthroscopy.

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Aim of the study

Spinal levobupivacaine 10 mg provides spinal anaesthesia comparable to 15 mg ropivacaine but slower regression of sensory block than lidocaine 60 mg (1). Spinal anaesthesia causes a significant bladder dysfunction due to interruption of the micturition reflex (2). In addition voiding difficulties were more pronounced in male subjects compared to females (1). Clonidine allows to reduce the local anaesthetic dose while offering better postoperative analgesia (3). The aim of the present study was to evaluate if the addition of clonidine may accelerate voiding and home discharge after spinal anaesthesia for day-case arthroscopy.

Methods

Following approval by the Ethics committee and after their written informed consent, 42 male subjects (16-60 yrs) undergoing day case arthroscopy were randomized to receive in a double blind fashion for spinal anaesthesia either levobupivacaine 10 mg (group L) or levobupivacaine 7.5 mg to which was added clonidine 30 mcg (group LC). Measured were vital parameters, onset of sensory block i.e. when T12 was reached, the maximal motor block, intraoperative side-effects, time needed for discharge to the day-case ward (when Bromage 1 was obtained), time to first micturition and discharge. To evaluate the quality of micturition a DxUbladder scanner was used and micturition problems were classified by the use of a 5-point scale. Data expressed as mean \pm SD were evaluated with the unpaired, two-tailed Student-t test while for nonparametric data the chi-squared test was used ($P < 0.05$ being significant). Based upon the results of previous studies and aiming at a 60 min. faster discharge, 20 patients per study-group were required for a power of 0.8.

Results

The onset of sensory block was significantly slower in patients in the LC group (7 ± 3.6 vs 11 ± 9 min, p

$= 0.048$). This delayed the time to incision. The spread of the block was less reliable in this group (T2-L2 vs T4-T12). All blocks resulted in satisfactory surgical anaesthesia. Regression of sensory blockade was not different. The degree of motor block was more pronounced in the LC group but recovery was faster. Nevertheless the time to arrival in the daycase department tended to be prolonged, though not significant, in the LC group due to the delayed incision and the higher incidence of hypotension requiring a prolonged recovery room stay. Micturition problems were comparable in both groups. Two patients in the L group required in-and-out catheterisation. Time to micturition was not different but time to home discharge was significantly prolonged in the LC group (348 ± 53 vs 300 ± 47 min, $p = 0.04$) which has to be explained by the occurrence of side-effects (hypotension and sedation) and multiple trials to reach a residual bladder volume less than 100 ml.

Conclusion

Despite the fact that addition of clonidine to levobupivacaine allows a dose sparing of 25%, the combination prolongs the onset and duration of sensory block while there were more side-effects which significantly delayed discharge times to both the ward and home.

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Non-invasive cerebral oximetry in cardiosurgical patients receiving aortic root versus femoral cannulation. M. VAN TORNOUT^{1, 2}, M. D., G. CAMMU*, Ph.D., J. CODDENS*, M.D., E. VANDERMEERSCH**, Ph.D., T. DELOOF*, M.D. *OLV Clinic, Aalst ; **Catholic University Hospital, Leuven.

Introduction

In this study, we hypothesize that there is no difference in cerebral oximetry between femorally cannulated vs. root-cannulated cardiac surgical patients. To measure cerebral oximetry we used the recently introduced cerebral oximeter (INVOS, Somanetics Corp., USA) (1).

Materials and methods

Twenty patients were included after EC approval and written IC. All patients were ASA III and IV and scheduled for cardiac surgery with hypothermic cardiopulmonary bypass (CPB) (28°C). Group 1 contained 10 patients planned for cardiac surgery for which aortic root cannulation was planned (CABG, valve, CABG + valve, valve + valve surgery). The second group consisted of 10 patients planned for port access surgery (valve or combined valve surgery) and thus requiring femoral artery cannulation. Nonpulsatile CPB, a membrane oxygenator, a 40 µm blood filter, systemic cooling to a rectal temperature of 28°C and alpha-stat pH management were standard features during CPB. Mean arterial pressure on CPB was maintained at 50 to 70 mm Hg or higher. Two INVOS sensors were fixed to the head over the frontoparietal region to measure cerebral oxygen saturation (rSO_2) on both hemispheres. Data were blinded intraoperatively ; no interventions were thus attempted based on the device's measurements. CPB time (min) during which rSO_2 was < 25% of baseline, was compared between femorally cannulated vs. root-cannulated cardiac surgical patients using a Mann-Whitney U-test. Postoperatively, the patients were evaluated for type I neurological deficit.

Results

Data are presented as number of patients or as mean \pm SD.

There was no significant difference in CPB time during which rSO_2 was < 25% of baseline between femorally cannulated vs. root-cannulated cardiac surgical patients ($P = 0.56$ for left rSO_2 ; $P = 0.51$ for right rSO_2). The test used here (INVOS cerebral oximetry) had a sensitivity of only 50%, a specificity of 78%, a positive predictive value of 20%, a negative predictive value of 93% and a pre-test probability of 10%.

Discussion

In this study, there was no difference in cerebral oximetry between femorally cannulated vs. root-cannu-

Table 1

Variable (* = $P < 0.05$)	Femoral	Root
CPB duration (min)	145 \pm 35	140 \pm 23
ICU stay (hrs)	25 \pm 8	67 \pm 92
Hospital stay (days)	8 \pm 2	12 \pm 5
Perioperative stroke	0	0
Perioperative TIA	0	0
Other periop neuro (n)	Vertigo (1) ^a	Confusion (1) ^b

CPB = cardiopulmonary bypass.

Table 2

Patient	Min during CPB of rSO_2 < 25% of baseline		
	Femoral	rSO_2 L	rSO_2 R
1	0	0	False positive
2	0	0	
3	0	0	
4	33	18	
5	0	0	
6	0	0	False positive ^a True positive
7	116	109	
8	112	101	
9	4	22	False positive
10	0	0	
Root	rSO_2 L	rSO_2 R	
1	1	0	^b False negative
2	0	0	Dead False positive
3	0	0	
4	0	0	
5	9	3	
6	92	100	
7	0	0	
8	0	0	
9	0	0	
10	0	1	

^{a,b} Patients with perioperative neurologic event (see Table 1).
 rSO_2 = cerebral oxygen saturation ; L = left ; R = right.

lated cardiac surgical patients. However, INVOS test results needed to be taken with caution.

Conclusion

Using INVOS technology, we found no difference in cerebral oximetry between femorally cannulated vs. root-cannulated cardiac surgical patients.

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Advantage of transcutaneous nerve mapping before an interscalenus block. A preliminary report.

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Introduction

Anatomic surface landmarks are widely used as a guide to perform an interscalenus block. Nonetheless, finding the target nerve can be difficult and sometimes several punctures are needed, giving more discomfort and pain to the patient and hereby increasing the risk of nerve damage (1). Capdevila already concluded that percutaneous nerve mapping was a simple reliable non-invasive technique for prelocation of the axillary brachial plexus (2). We investigated the advantage of transcutaneous nerve mapping before an interscalenus block.

Methods

After oral informed consent 24 patients (ASA I & II) scheduled for shoulder surgery, were randomly allocated into 2 groups. They received an interscalenus block with 30 ml of Ropivacaine 0.375% for pre- and postoperative analgesia. The same anaesthesiologist performed all blocks.

In group A we used the classical Winnie landmarks to perform the block.

In group B we first located the plexus interscalenus with transcutaneous nerve location using the Stimuplex® pen (Braun®). The pen was held perpendicular to the skin at all times and the stimulation was started at 0.1 ms / 1 Hz / 5 mA. When a motor response was elicited, the amperage was lowered and the place of best response with lowest amperage was marked. The

Stimuplex® needle (Braun®) was introduced at that place.

In both groups needle stimulation started at 0.3 ms / 2 Hz / 1 mA and the amperage was lowered until motor response stopped. The time to perform the block, the lowest amperage reached, and the VAS score (scale 0-10) for pain during puncture were recorded.

After performing the block, all patients received a standardized general anaesthesia with sufentanil and desflurane as maintenance. On the PACU a piritramide bolus of 2 mg IV was administered every 5 minutes until patients indicated no pain on the verbal rating scale (0-4). Statistical analysis was performed with two-tailed unpaired Student-t test and Fisher's Exact test. A $P < 0.05$ value was considered to be significant. Data are presented as mean \pm standard deviation.

Results

Total time for nerve mapping and needle puncture in group B was not different from total puncture time in group A. Time for needle puncture itself however was lower ($P = 0.03$) in the nerve mapping group. All blocks in group B were successful with 1 puncture, while 2 punctures were required in group A in 3 of the patients (NS, $P = 0.217$). The lowest amperage reached during needle puncture was not different between the 2 groups. Global assessment of pain for the interscalenus block indicated significantly lower VAS scores in group B ($P = 0.01$).

Group	Transcutaneous nerve location (sec)	Needle puncture (sec)	Total time (sec)	VAS pain during puncture (scale 0-10)	Lowest mA at skin	Lowest mA at nerve
A	-	125 \pm 79	125 \pm 79	4.8 \pm 2.4	-	0.35 \pm 0.04
B	110 \pm 71	75 \pm 45	185 \pm 45	2.3 \pm 1.8	3.4 \pm 1.3	0.37 \pm 0.06
		$P = 0.0294$	NS	$P = 0.0113$		NS

Conclusion

Transcutaneous prelocation is an easy and non-invasive technique that significantly decreases needle puncture time and patients discomfort during the interscalenus block. The eventual decrease in incidence of nerve damage should be investigated in a study setting with more patients.

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Predictors of the quality of Basic Life Support by hospital nurses. T. VERPLANCKE*, M. DE REGGE*, P. CALLE*, P. DE PAEPE*, G. VAN MAELE**, K. G. MONSIEURS*. *Departments of Emergency Medicine and **Medical Statistics, Ghent University Hospital, De Pintelaan 185, 9000 Ghent, Belgium.

Background and purpose

Studies have shown that good quality Basic Life Support (BLS) results in better survival (1). It has also been shown that the quality of BLS delivered by hospital nurses is often poor (2), but the reasons for this are unknown. We therefore investigated the reasons for this variability.

Materials and methods

Preceding a standard BLS refresher course, 292 nurses from non critical care wards of Ghent University Hospital completed a questionnaire including demographical data (gender, age, years since graduation, working experience, time since last BLS training, time since last CPR) and a "self-confidence" score. Subsequently, they performed a BLS test on a manikin connected to a PC using Skillreporting System software (Laerdal, Norway). To detect independent predictors of BLS skills, a univariate (Chi-squared/Fisher Exact) and a multivariate analysis (logistical regression) were performed, with as "grouping variables": number of ventilations/min, tidal volume, number of compressions/min, compression rate, compression depth, "good ventilations" ($n \geq 4/\text{min}$ AND tidal volume = 700-1000 ml), "good compressions" ($n \geq 40/\text{min}$ AND rate = 80-120/min AND depth = 40-50 mm).

Results

Mean age was 37 (± 10) years, working experience 14 (± 10) years, time since last BLS training 13 (± 8) months, 82% were female. BLS skills varied greatly between nurses. A lower number of good compressions was seen in female nurses ($p < 0.001$) and also in nurses with low self-confidence ($p < 0.03$). Nurses with low self-confidence also achieved fewer good ventilations ($p < 0.004$) mainly because of a lower number of ventilations.

Conclusions

Despite regular refresher training, many nurses had insufficient BLS skills. Gender and self-confidence of nurses were identified as the main determinants of quality of BLS. We therefore recommend increasing self-confidence of trainees and focussing on chest compression depth during training and real resuscitation events.

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