

EFFECT OF IMMUNOMODULATING MEDICATION IN CRPS: A SYSTEMATIC REVIEW

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Background

Different mechanisms are involved in a complex network of interactions resulting in the painful and impairing disorder CRPS. There is convincing evidence that inflammation plays a pivotal role in the pathophysiology of CRPS. Immunomodulating medication reduces the manifestation of inflammation by acting on the mediators of inflammation. Therefore, as inflammation is involved in the pathophysiology of CRPS, immunomodulating medication in CRPS patients may prove beneficial.

Objectives

To describe the current empirical evidence for the efficacy of administering the most commonly used immunomodulating medication (i.e. glucocorticoids, TNF- α antagonists, thalidomide, bisphosphonates and immunoglobulins) in CRPS patients.

Methods

PubMed was searched for original articles which investigated CRPS and the use of one of the above-mentioned immunomodulating agents.

Results

The search yielded 39 relevant articles: from these, information on study design, sample size, duration of disease, type and route of medication, primary outcome measures and results was examined.

Discussion

Theoretically, the use of immunomodulating medication could counteract the ongoing inflammation and might be an important step in improving a disabled hand or foot, leading to further recovery. However, more high-quality intervention studies are needed.

Keywords

Complex Regional Pain Syndrome (CRPS), immunomodulating medication, efficacy.

LONG TERM FOLLOW UP(LTFU) OF CONTINUOUS INTRATHECAL MORPHINE ADMINISTRATION(CIMA) TO TREAT CHRONIC NON-MALIGNANT PAIN(CNMP).

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Background and aims

Several CNMP syndromes do not respond to conservative or invasive nerve blockade therapies. This study was undertaken to investigate the efficacy of CIMA in CNMP.

Methods

In this open prospective longitudinal study CNMP patients were selected for CIMA. Inclusion criteria were: no pain relief after conservative or invasive therapies and good response to continuous epidural morphine administration (during 30 days). An Indura catheter (Medtronic, Inc.) was introduced into the intrathecal space. The catheter was connected to a subcutaneous implanted Isomed (35/0.5) or Synchromed-II pump (Medtronic, Inc.). The initial morphine dose (0.5 mg/day) was increased, if necessary. Visual Analogue Scales from 0-100 (VAS) were scored before implantation (VASBF), after 1 month (VAS1M), and at long term follow up (LTFU, VASLTFU). Results were assessed as excellent (pain free), good ($\geq 50\%$ improvement), moderate ($< 50\%$ improvement) and unchanged (no pain relief). Hormonal concentrations were monitored. Finally, complications were recorded.

Results

19 Patients, 6 M, 13 F, age 58 ± 12 (mean \pm s.d.) could be included. Indications were: a) Low back pain and sciatica (LBPAS) after spinal surgery (N=8), b) LBPAS without surgery (N=5), c) CRPS type 1 (N=4), d) Spinal pain associated with Multiple Sclerosis (N=1), e) Spinal pain after ischemic spinal cord lesion (N=1). VASBF, VAS1M and VASLTFU were 84 ± 12 , 23 ± 15 , 32 ± 21 , respectively. The drop in VAS was highly significant ($p < 0.001$). At LTFU (43 ± 40 , min. 1.1, max. 161 months), in 18 patients, results were excellent in 1 (5.6%), good in 13 (72.2%), and moderate in 4 (22.2%). One patient (5.3%) developed a partial cauda equina syndrome 4 weeks after implantation which partially recovered after removal of the intrathecal catheter. Another patient (5.3%) had a pump rotation which needed surgical correction. The hormonal axis at LTFU remained within normal limits in all patients. The number of additional treatments after CIMA dropped significantly ($p < 0.001$) to 0.7 ± 1.4 compared to 15.0 ± 12.0 before implantation.

Conclusions

In experienced hands, CIMA offers good pain relief in predefined CNMP syndromes. Complication rate proved to be low, however can be a matter of concern. Further study is needed to determine the precise indications for this procedure in CNMP.

IMPACT OF COMPLEX REGIONAL PAIN SYNDROME ON PROFESSIONAL FUNCTIONING AND DAILY ACTIVITIES DURING THE FIRST YEAR OF TREATMENT.

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Objective

Complex regional pain syndrome (CRPS) is a neuropathic pain disorder which course varies from mild and self-limiting to chronic, with a high impact on the quality life. Few studies have described the long term outcome of CRPS patients in terms of professional functioning and daily activities during the first year of treatment.

Methods

CRPS patients fulfilling the IASP criteria were evaluated every three months with regard to perceived limitations in professional and daily activities using a standardized 25 item questionnaire for the duration of one year. The treatment received was in line with CBO guidelines, and consisted of oral N-acetylcysteine, DMSO crème, pain medication up to step two of the WHO analgesic ladder and standardized physiotherapy or occupational therapy. Chi Square and Wilcoxon Signed Ranks tests were used for statistical analyses.

Results

134 CRPS patients (44 male, 90 female, mean age 50, SD 14.75; median CRPS duration 89 days (IQR 61-136). At baseline 72 patients (53.7%) had a paid job, of which 62% missed at least one day of work in two weeks prior to intake because of CRPS. After one year this decreased to 31% ($p=0.077$). At inclusion, 81% of patients stated they were moderately to severely impaired in their work by CRPS, which decreased to 45.9% ($p=0.001$) after one year. At baseline 76,1% of all patients stated they were limited by CRPS in performing domestic work, 12,7% stated they were unable to fulfil their tasks at all. After one year of treatment 46,7% of patients still experienced limitations, however, only 2.6% of patients were completely unable to perform their household tasks.

Conclusion

Although the intensity in which CRPS patients experience limitations in paid and domestic work decreases, many patients still experience restrictions after one year of treatment.

SPINAL CORD STIMULATION FOR FBSS WITH SIGNIFICANT LOW BACK PAIN COMPONENT

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Introduction

Spinal Cord Stimulation (SCS) for Failed Back Surgery Syndrome (FBSS) patients is a proven method of therapy, especially in persistent leg pain. Often, lower back pain, which is up until now no indication for SCS, is also present and influences both the therapy results and the number of patients suitable for SCS selection. To evaluate the value of a new plate electrode used for stimulation and pain relief of the lower back pain component we performed a prospective (observational) case series study.

Materials and methods

A group of twenty patients with FBSS were included. All patients suffered from neuropathic back- and bilateral leg pain (in a ratio of minimal 60% back pain to 40% bilateral leg pain) and were implanted with a Medtronic Specify 5-6-5 lead. The lead was placed in the posterior epidural space via a minimally invasive laminotomy at level T9-T10. Implantation was facilitated with an intrathecal dose of 15 mg Bupivacaine 0,5% in glucose at level L1-L2. Demographic data was noted. Intraoperative testing time, duration of implantation, stimulation parameters, lead tip placement, and pocket location were noted. Postoperative records were kept for complications, including infection, nerve damage, bleeding, lead dislocation, pocket revision and programming attempts. Records regarding pain characteristics were kept (VAS of leg and back pain, duration of pain, ratio between back- and leg pain, previous therapies, including surgeries). All patients were tested at 0, 3 and 6 months with the Oswestry Low Back Pain Score, the Roland Morris Disability Score and the SF-36.

Results

Demographics: 11 female and 9 male patients. Average age was 53 with a range of 36 to 75. In all patients, it was possible to place the electrode in the desired position (T6-7) and to produce stimulation in the full pain area of both of the legs. In 88 % of cases, low back stimulation was also achieved during the procedure. All patients were subsequently implanted with a subcutaneous Internal Pulse Generator. One patient suffered from a reoccurring lead displacement due to an anatomical anomaly and was finally explanted. Pain relief regarding the leg pain was excellent (VAS reduction 5 points) in the rest of the group; the back pain component required frequent reprogramming in the first 3 months (VAS reduction of 4,1) but is still good in the majority of patients after 6 months. Pain scores, the Disability scores, and Quality of life scores improved significantly in the whole patient group.

Conclusion

We demonstrated that a specific patient group, defined as suffering from significant back pain as a component of FBSS and implanted with a 5-6-5 lead via a minimally invasive laminotomy, achieved sustainable low back stimulation, and as a result, improved pain relief, with an acceptable success rate. In this series of patients, few complications were observed.

AORTIC VALVE SCLEROSIS AND STENOSIS IN VASCULAR SURGERY PATIENTS: INFLUENCE ON CARDIAC OUTCOME

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Aim

Vascular surgery patients are at increased risk for perioperative and long-term adverse cardiovascular events due to (a)symptomatic coronary artery disease. The Revised Cardiac Risk Index is commonly used for risk stratification. Aortic valve sclerosis and stenosis are associated with an increased cardiovascular risk in the general population. The present study evaluates the prognostic implications of aortic valve sclerosis and stenosis on 30-day postoperative and long-term outcome after major vascular surgery.

Materials and Methods

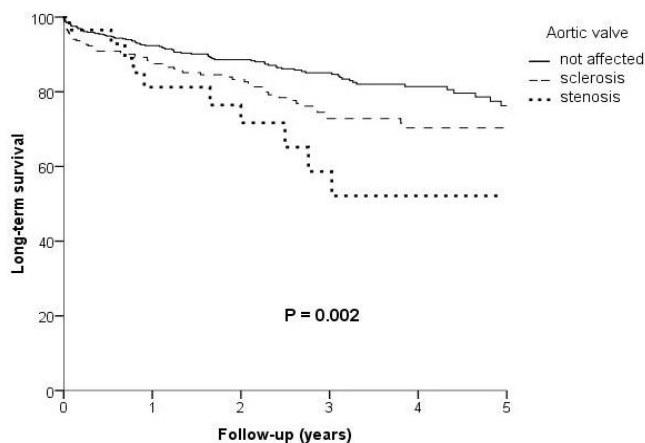
Echocardiography was performed preoperatively in 1005 elective major vascular surgery patients. Aortic valve sclerosis was defined by thickening and/or calcification of one or more leaflets of a tricuspid aortic valve not inducing stenosis, i.e. with a maximal velocity at continuous Doppler < 2.5 m/sec, and stenosis was defined by measuring a maximal velocity > 2.5 m/sec. Troponin-T measurements and ECG's were performed routinely after surgery and during late follow-up. Survival status was completed using the civil registry. Study endpoints were the composite of postoperative MI and cardiac death and long-term cardiovascular death. Multivariable regression analyses were adjusted for Revised Cardiac Risk Index, age, gender, hypertension, hypercholesterolemia and COPD.

Results

Aortic valve sclerosis was present in 305 (30%) patients and aortic valve stenosis in 29 (2.9%) patients. Aortic valve sclerosis was not associated with postoperative cardiac events and a trend for increased long-term cardiac outcome (HR 1.3; 95% CI 0.9-1.8) was observed. In contrast, aortic valve stenosis was associated with a higher postoperative and long-term cardiac event rate (HR: 1.9; 95% CI:1.01-3.60 and HR: 2.4; 95% CI:1.22-4.61, respectively).

Conclusions

This study shows that aortic valve disease is common in vascular surgery patients. Aortic valve stenosis but not sclerosis is associated with postoperative and long-term cardiovascular outcome. These data support standard preoperative aortic valve screening with echocardiography in non-cardiac vascular surgery patients.



EFFECTS OF R-BNP (RECOMBINANT BRAIN NATRIURETIC PEPTIDE), NITROGLYCERINE AND DI-HYDRALAZINE ON GASTRIC MUCOSAL MICROVASCULAR OXYGENATION

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Goal of Study

Adequate gastrointestinal mucosal oxygenation is crucial in prevention and therapy of critical illness. r-BNP is a neuro-endocrine natriuretic peptid (NP) with promising potential as vasodilator in anaesthesia/critical care; however, data on splanchnic circulatory effects of NP's are limited and contradictory. We hypothesized that r-BNP as vasodilator increases gastric mucosal microvascular oxygenation (μHbO_2) and compared it to two current vasodilators, di-hydralazine (DIHYD, as 'arterio-dilator') and nitroglycerine (NITRO, as 'veno-dilator').

Materials & Methods

In a randomized, cross-over study, chronically instrumented dogs (18 experiments) were repeatedly anaesthetized (propofol), mechanically ventilated ($\text{FiO}_2=0.3$; $\text{etCO}_2=35\text{mmHg}$) and received equi-hypotensive doses of r-BNP, DIHYD or NITRO. We measured microvascular gastric mucosal haemoglobin oxygenation (μHbO_2 , reflectance spectrophotometry, systemic DO_2 and systemic hemodynamics. Statistics: Data presented as means \pm sem, ANOVA, Fisher PLSD, $p<0.05$.

Results

Vasodilators were titrated to the same target MAP, which was decreased from ~ 80 to ~ 65 mmHg in all groups. Both r-BNP (64 ± 4 to $69\pm 3\%$; $p<0.05$) and DIHYD (64 ± 2 to $70\pm 2\%$; $p<0.05$) increased μHbO_2 , whereas NITRO did not (63 ± 2 vs. $61\pm 3\%$). At the systemic level, DIHYD almost doubled DO_2 (15 ± 1 to 26 ± 2 ml $\text{kg}^{-1}\text{min}^{-1}$; $p<0.05$), whereas r-BNP (17 ± 1 vs. 18 ± 2 ml $\text{kg}^{-1}\text{min}^{-1}$) and NITRO (14 ± 1 vs. 16 ± 1 ml $\text{kg}^{-1}\text{min}^{-1}$) did not change DO_2 .

Conclusions

r-BNP increased μHbO_2 selectively, i.e. without concomitant increase in DO_2 , suggesting redistribution of perfusion towards gastric mucosa. The other drugs did not increase μHbO_2 at all (NITRO) or in adjunction with marked systemic effects, i.e. DO_2 (DIHYD). Our data suggest that r-BNP increases gastric mucosal microcirculatory oxygenation without increasing DO_2 ; further studies should address these findings in patients.

RESPONSE-SURFACE MODELING VAN DE FARMACODYNAMISCHE INTERACTIE TUSSEN PROPOFOL EN MIDAZOLAM VOOR SEDATIE EN HEMODYNAMIEK

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Doel

Farmacokinetische interacties tussen midazolam en propofol induceren een toename van 25% in de bloedconcentraties wanneer deze hypnotica gecombineerd toegediend worden. Deze studie heeft als doel om de optimale propofol-midazolam combinatie te bepalen waarbij bewusteloosheid en hemodynamische stabiliteit verzekerd zijn.

Materiaal en methode

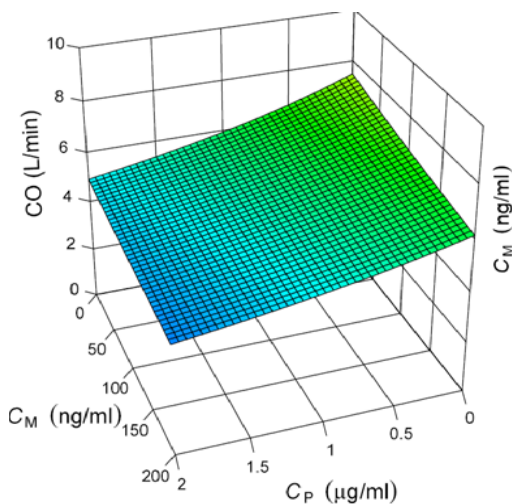
De invloed van een 435 minuten durende target control infusie (TCI) van midazolam (gemeten arteriële C_m 0-334 ng/ml) of propofol (gemeten arteriële C_p 0-1,5 $\mu\text{g/ml}$) werd onderzocht op de farmacokinetiek en farmacodynamie van respectievelijk propofol (1 mg/kg in 1 min, gevolgd door een continue infusie van 2,5 $\text{mg}\cdot\text{kg}^{-1}\cdot\text{h}^{-1}$ gedurende 59 min) en midazolam (0.035-0.05 mg/kg in 1 minuut gevolgd door een continue infuus van 0.035-0.05 $\text{mg}\cdot\text{kg}^{-1}\cdot\text{h}^{-1}$ gedurende 59 min) in 16 vrijwilligers gedurende 32 sessies. Nonlineaire mixed-effect modellen werden geconstrueerd van de farmacokinetische-farmacodynamische interactie tussen propofol en midazolam voor sedatie (BIS en Ramsay sedatie score) en hemodynamiek (MAP, hartfrequentie, CO, en SVR) als eindpunten.

Resultaten

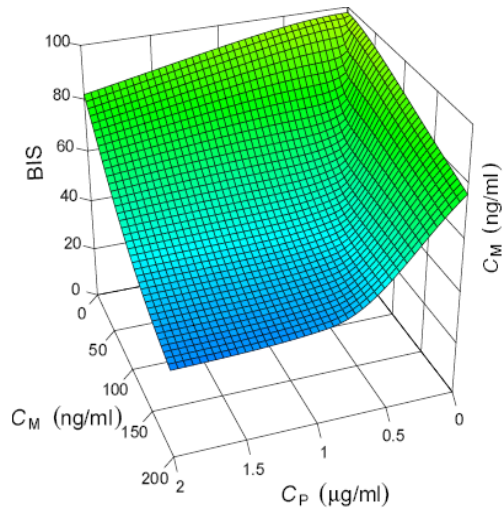
De plasmaconcentratie waarbij midazolam sedatie geeft ($EC_{50,M\text{ BIS}} = 532 \text{ ng/ml}$) was 13,1 maal lager dan die van propofol ($EC_{50,P\text{ BIS}} = 6.98 \mu\text{g/ml}$). Bij deze equihypnotische concentraties was de daling in MAP en CO in aanwezigheid van propofol 3.1 maal zo sterk in vergelijking met midazolam. Optimale sedatie werd bereikt met een propofol-midazolam combinatie volgens de vergelijking $C_p \text{ (ng/ml)} = 4.688 * C_m \text{ (ng/ml)}$. De sedatie door deze propofol-midazolam gaat met significant minder hemodynamische depressie gepaard dan wanneer propofol of midazolam alleen werden gegeven.

Conclusie:

Propofol en midazolam vertonen een synergistische interactie wat betreft de sedatieve effecten en een additieve interactie m.b.t. de hemodynamische bijwerkingen. Door gebruik te maken van een optimale propofol-midazolam concentratie is het mogelijk om sedatie te bereiken samengaand met een stabiele hemodynamiek.



Figuur 1: Response oppervlak van de interactie tussen propofol en midazolam t.o.v Cardiac Output (CO).



Figuur 2: Response oppervlak van de interactie tussen propofol en midazolam t.o.v bispectral index (BIS).

CHANGES IN RED BLOOD CELL RHEOLOGY AFTER CARDIOPULMONARY BYPASS IN RATS.

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Introduction

Cardiopulmonary bypass (CPB) is associated with organ damage, resulting in increased morbidity and mortality. Optimal microcirculation of the vulnerable organs is essential. Microcirculation is influenced by endothelial function, vascular smooth muscle tone and by circulating blood components. Recently, in critically ill patients (ref.1) changes in red blood cell rheology were observed, contributing to microcirculatory alternations. We hypothesized that the use of CPB affects the rheology of red blood cells.

Methods

After IACUC approval male Wistar rats underwent CPB (n=16) or sham (n=16) treatment (all invasive procedures except CPB). Anesthesia consisted of induction with isoflurane, followed by fentanyl and midazolam during CPB. Normothermic CPB (flow: 140 ml.kg⁻¹.min⁻¹) was applied for 60 min. Eight animals of each group were sacrificed after 1 hour of recovery, the rest after 24 hours. Red blood cell rheology (aggregation and elongation) was determined by a laser assisted optical rotational red cell analyzer (LORCA, Mechatronics Instruments, Hoon). Data are expressed as mean ± SD and analyzed using t-test and ANOVA with Bonferroni correction where appropriate. Statistical significance was accepted at p<0.05.

Results

At 1 h following CPB, the aggregation index of CPB treated animals was significantly decreased compared to Sham (59.1 ± 7.8 % and 75.6 ± 16.0 %). At 24 h after CPB, aggregation index did not differ between the groups. Elongation of red blood cells measured at different shear stress levels did not differ between groups at both time points.

Conclusions

Anesthesia and experimental procedures did not change rheology of red blood cells in sham animals. In contrast, aggregation of red blood cells was markedly impaired immediately following CPB. This impairment of red blood cell rheology may be an additional contribution to postoperative disturbances in microcirculation.

Referentie:

1. Crit Care Med 2009; 37,3041-46

DEVELOPMENT OF A PAEDIATRIC DIFFICULT AIRWAY ALGORITHM.

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Objectives

To make a proposal for a Dutch paediatric difficult airway algorithm.

Methods/Materials

To make a proposal for a Dutch paediatric difficult airway algorithm, we conducted an online survey among members of the paediatric section of the Dutch Society of Anaesthesia. We investigated how often a difficult airway occurs, how anaesthetists act when confronted with a difficult airway, which airway instruments and techniques they have at their disposal and how confident they are with certain airway instruments. The data we collected in this survey was used to develop the proposed paediatric difficult airway algorithm.

Results

Of a total of 202 members of the paediatric section of the Dutch Society of Anaesthesia, 45 completed the questionnaire. 17% of the respondents estimated that they encountered children with a difficult airway once a week, 28% once a month and 54% thought that this occurred less than once a month. The airway devices most commonly present in paediatric sizes were oropharyngeal airways, nasopharyngeal airways, Miller laryngoscope blades, gum elastic bougies, lighted stylets, flexible fiberoscopes, classic laryngeal mask airways and tube exchangers. Respondents were (highly) confident with laryngeal mask airways, video laryngoscopy and flexible fiberoptic intubation. Respondents were not confident with optical stylet, Combitube/ Easytube, retrograde intubation, digital intubation, surgical cricothyroidotomy and tracheotomy. The proposed difficult airway algorithm is shown in the figure.

Conclusion

The arsenal of paediatric sized difficult airway equipment available for most paediatric anaesthetists is limited, as is their confidence with the use of certain difficult airway instruments in children. The paediatric difficult airway algorithm we designed has therefore a limited number of difficult airway tools.

COMMUNICATION OF INDIVIDUAL TIME-OUT RESULTS LEADS TO BETTER PROCEDURAL ADHERENCE

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Introduction

Implementation of perioperative check procedures (i.e. time-out) has been proven to decrease the number of complications¹. To improve procedural adherence we introduced monthly reports about the performance of OR time-outs in 2010, on an individual basis. We studied whether the use of these individual reports would increase time-out adherence.

Materials and methods

All OR procedures and subsequent timeout procedures, were registered in our AIMS. To decrease non-adherence to the time-out- procedures, we installed an automated reminder that would remind the care provider if a timeout procedure was not registered after 10 minutes. In April 2010 we started sending monthly reports with the percentages of completed time-out procedures. These reports showed totals and individual performance for all anesthesiologists. In addition, these reports were discussed by the group of anesthesiologists on a regular basis.

Results

In 2010 a total of 12752 procedures were performed in the OR, 10603 elective and 2149 urgent. Before introduction of the monthly reports adherence to the timeout procedure was 85,5% (elective 89,5%, urgent 64,2%) in the first quarter of 2010. The adherence improved to 98.4% (elective 99.1%, urgent 95.1%) in the last quarter of 2010 (chi square: $p < 0,001$).

	Elective		Urgent		Total	
	Interventions	Time-out performed	Interventions	Time-out performed	Interventions	Time-out performed
1 st quarter	2878	2576(89.5%)	533	342(64.2%)	3411	2918(85.5%)
2 nd quarter	2522	2329(92.3%)	559	383(68.5%)	3081	2712(88.0%)
3 rd quarter	2510	2437(97.1%)	505	466(92.3%)	3015	2903(96.3%)
4 th quarter	2693	2668(99.1%)	552	525(95.1%)	3245	3193(98.4%)

Conclusion

Monthly communication of data regarding the individual performances of timeout procedures may lead to increased adherence to time-out procedures.

Literatuur

1. Effect of a comprehensive surgical safety system on patient outcomes. De Vries et al. New. Eng. J Med. 2010; 363: 1928-1937

POSTOPERATIEVE PIJN IN DAGBEHANDELING

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Doel

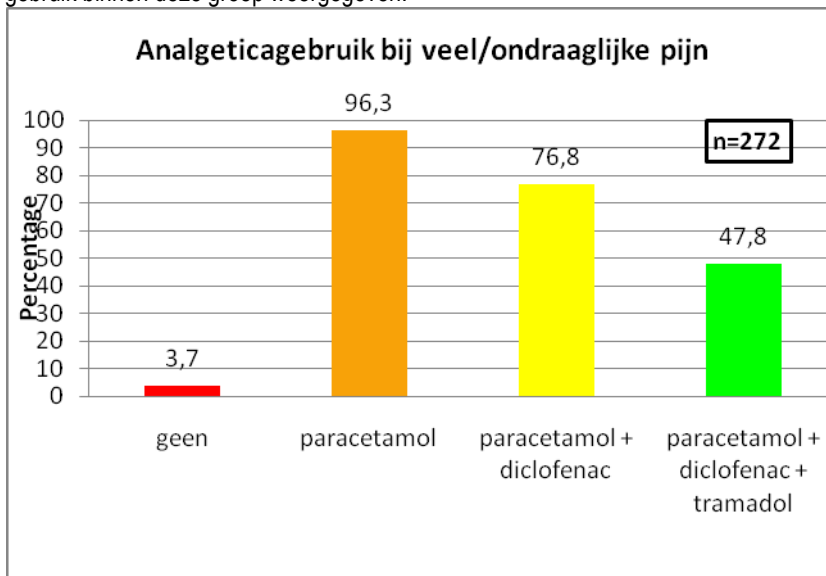
Binnen de perioperatieve zorg is postoperatieve pijnbestrijding zeer essentieel. Het is onvoldoende duidelijk in welke mate pijnbestrijding volgens de WHO pijnladder leidt tot adequate pijnstilling. Het doel van deze studie is te onderzoeken of de stappen in de pijnladder adequaat worden gevolgd en welke typen ingrepen in dagbehandeling desondanks als zeer pijnlijk worden ervaren.

Methode en Materiaal

Deze retrospectieve studie bekeek patiënten die tussen 1-1-2005 en 31-1-2009 op het dagbehandelcentrum van het Universitair Medisch Centrum Groningen werden geopereerd. Eén dag postoperatief werd de patiënten telefonisch gevraagd naar de postoperatief ervaren pijn, alsmede gebruikte analgetica. De pijnscore werd vastgesteld met een gemodificeerde Rating Scale. Mogelijke pijnstillers volgens protocol waren: paracetamol (4 dd 1 gram), diclofenac (50 mg 4 dd 1) en tramadol (50 mg 4 dd 1). Deze gegevens werden verwerkt in een database evenals het type uitgevoerde ingreep.

Resultaten

Van de 11295 geïncludeerde patiënten hadden 15 ondraaglijke pijn en 257 veel pijn. In grafiek 1 wordt het analgetica gebruik binnen deze groep weergegeven.



Grafiek 1

Van de patiënten met veel of ondraaglijke pijn gebruikte 47,8% paracetamol, diclofenac én tramadol (n=130). Ondanks een adequaat voorschrijfbeleid, waren er een aantal procedures waarbij in méér dan 5% van de gevallen veel of ondraaglijke pijn bestond: arthroscopische/open schouder OK's (11.6%), orthopedische OK's bovenste extremiteit (10.8%), orthopedische OK's onderste extremiteit (7%), mamma augmentatie (6.25%) en correctie aangeboren afwijking vingers (5.26%). Van deze patiënten had één patiënt de perioperatieve zorg als "kan beter" ervaren. De overige patiënten hadden hierover "geen klachten", of waren "buitengewoon tevreden".

Conclusie

Bij dagbehandelingpatiënten met veel of ondraaglijke pijn, wordt in meer dan de helft van de gevallen niet optimaal gebruik gemaakt van de pijnbestrijding volgens de WHO pijnladder. Er werd een aantal ingrepen geïdentificeerd waarbij het gebruik van sterkere opioïden kan worden overwogen.

De opvallende discrepantie tussen pijnervaring en patiënttevredenheid is een eerder beschreven fenomeen [1] waarbij de pijnervaring het effectieve pijnmanagement weerspiegelt. Patiënttevredenheid is een subjectieve parameter waarbij factoren als acceptatie van pijn, toelichting over en vertrouwen in pijnbehandeling een rol spelen.

Literatuur

1. Afilalo M, Tselios C: Pain relief versus patient satisfaction. *Ann Emerg Med.* 1996 Apr;27(4):436-8.

A NATIONAL SURVEY OF THE PREOPERATIVE SCREENING UNIT IN THE NETHERLANDS

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Objective

To compare the organizational structure of the Preoperative Assessment Clinic (PAC) between all Dutch hospitals.

Method

All anesthesiology departments in Dutch hospitals received a questionnaire in April 2010. The questionnaire on the organization of the preoperative screening by non-anesthesiologists was focussed on the following aspects:

- who executes the anesthetic preoperative examination
- the training and education of these healthcare professionals
- the supervision of these healthcare professionals
- the reason for deploying non-anesthesiologist screeners at the PAC

Results

In 48% (N = 40) of the hospitals, the preoperative examination is performed by physician assistants, nurse practitioners, nurses and nurse anaesthetists, largely in addition with anesthesiologists. In 78% (N = 29) of these hospitals the non-anesthesiologists are screening independently according to a protocol. The empowerment in screening tasks by non-anesthesiologists is different between hospitals, as is the supervision by anesthesiologists.

There is no uniformity in training for screening practice of non-anesthesiologists. The reasons non-anesthesiologists are screening at the PAC are:

- career opportunities for healthcare professionals,
- shortage of anesthesiologists
- inadequate funding for a PAC by anesthesiologists

Conclusion

This study shows that there is no uniformity in the organization of the preoperative screening by non-anesthesiologists in Dutch hospitals. This concerns education, training, supervision and empowerment in screening tasks of non-anesthesiologist screeners.

Recommendation

The investigators are advocates for a guideline concerning the training requirements and allocation of non-anesthesiologist screeners at the PAC, and envision a role for the Dutch Association of Anesthesiology herein.

DOES IMPLEMENTING A RAPID RESPONSE SYSTEM DECREASE THE NUMBER OF IN-HOSPITAL CARDIAC ARRESTS ?

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Introduction

Resulting from the Dutch VMS Safety Program 'Prevent injury, work safely' we recently started to implement a Rapid Response System (RRS) in our hospital, which has three basic limbs: an afferent limb (RRS activation card), a physician-led medical emergency team (MET) and an evaluation/ feedback limb. The purpose of the RRS is to recognize and treat the patients with clinical warning signs early on the ward to reduce preventable hospital-wide "avoidable injury". We present the first "outcome" data of the implementation of the RRS.

Methods

From may 1st 2008 – may 1st 2009 we implemented on two both clinical locations of our hospital a rapid response system. A special multidisciplinary change team (ICU nurses, general ward nurses, A&E physician, intensivist and a quality & safety officer) coordinated this process.

We collected data regarding all MET-calls from may 1st 2008 – october 1st 2010 and we focussed on the number of in-hospital cardiac arrests (CA).

Results

		2007	2008	2009	2010
Number of MET calls Per 1000 discharged patients	Dordrecht	0	1,2	3,2	3,8
	Zwijndrecht	0	6,4	11,8	12,1
Number of in-hospital CA Per 1000 discharged patients	Dordrecht	1,4	1,2	1,4	1,2
	Zwijndrecht	2,6	1,3	0,6	0,6

Conclusions

Implementation of a rapid response system can decrease the number of in-hospital cardiac arrests dramatically and thus avoid (serious) adverse events and possible deaths.

Possible success factors include:

- timely activation of the rapid response system
- degree of implementation of the rapid response system
- timely agree restrictive measurements on the general ward

CONTINUOUS NON-INVASIVE MEASUREMENT OF TOTAL HEMOGLOBIN CONCENTRATION DURING MAJOR LIVER RESECTION BY PULSE CO-OXIMETRY

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Goal of the study

The Masimo Radical 7 (V7.6.0.1, Masimo Corp, Irvine, USA) pulse co-oximeter® uses multi-wave length spectrophotometric analysis (sensor R2-25) to calculate total hemoglobin concentration (SpHb). SpHb is monitored continuously and non-invasively, which may reveal advantages over invasive, snap-shot hemoglobin concentration (Hbin) monitoring. We compared SpHb and Hbin during major hepatic resections.

Materials and Methods

After local EC approval, 19 patients undergoing hepatic resection were included. Central venous blood samples were drawn every 30 min and analyzed using ABL 800 Flex (Radiometer GmbH, Copenhagen, Denmark). SpHb and Hbin were correlated and a regression curve was plotted. Prediction error analysis was done. Change in trend direction between consecutive Hbin measures in correspondence with a change in SpHb trend direction was studied.

Results

346 data points were obtained. Mean duration of surgery was 392 min (± 97 min) and median blood loss was 420 ml (range 50 – 1500 ml). Hbin ranged from 4.8 to 9.5 mmol/L and SpHb ranged from 4.5 to 9.5 mmol/L. Mean Hbin and SpHb was 7.4 ± 1.0 mmol/L and 7.2 ± 1.0 mmol/L, respectively. Regression was significant between SpHb and Hbin ($p < 0.01$, R^2 linear=0.396). Pearson Correlation=0.63. Compared to Hbin, SpHb showed a median prediction error (=bias) of 2.7% (SD 1.0%) revealing a slight underestimation. Median absolute prediction error is 8.9% (SD 5.7%) revealing a moderate bias. Pulse co-oximetry failed to adequately predict the trend of changes in hemoglobin concentration at a threshold value of 0.3 mmol/L (good trend=51.7%; false trend=48.3%).

Conclusion

SpHb showed a significant relation and moderate correlation with Hbin. SpHb slightly underestimated Hbin with moderate bias. In patients undergoing major hepatic resection, SpHb might become an alternative for Hbin. Further studies have to reveal if SpHb might replace Hbin in its current version.

A RANDOMIZED STUDY COMPARING THREE BRONCHIAL BLOCKERS, ARNDT, COOPDECH AND EZ-BLOCKER AND A DOUBLE-LUMEN TUBE FOR LUNG ISOLATION: A MANIKIN STUDY.

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Goal of Study

Double-lumen tubes (DLT) and bronchial blockers (BB) are used for lung isolation during thoracic surgery. Recently (ref.1) a new Y shaped bronchial blocker was developed, the EZ-Blocker, with two distal extensions to be placed in the two main stem bronchi. In a manikin model we compared lung isolation with this new Y shaped blocker to the conventional Arndt and Coopdech BB, and a left sided DLT.

Methods

After instruction, 20 anesthesiologists intubated a manikin (Laerdal, Norway) with a single lumen tube (SLT) and a DLT as training. Next the sequence of the SLT (8.0) versus DLT (37Fr, leftsided) and BB (Arndt 9 Fr, Cook Critical Care, USA; Coopdech BB, Smith Medical, Rosmalen; EZ-blocker, AnaesthetIQ, Rotterdam) were randomized. Intubation time and success rate (checked by fiber optic bronchoscopy, FOB) were recorded. The different BB were introduced under guidance of a FOB into the left main stem bronchus. Time from introduction of the BB in the SLT until reaching appropriate position was recorded and position was checked. Data are expressed as mean \pm SD, failure rate as percentage and compared using T-test and χ^2 test, with $p < 0.05$ considered statistically different.

Results

Lung isolation with a DLT was achieved much faster. Isolation time between the blockers did not differ. Blockers had a higher success rate compared to the DLT (55%). The Arndt BB was the least successful.

Conclusion

Because of the high success rates the EZ-Blocker and the Coopdech BB seem to be preferable to both the Arndt BB and the DLT.

1. BJA 2010;104:119-120

	Time (sec.)	Success rate (%)
DLT	9.7 \pm 2.4*	55#
Arndt	56.5 \pm 17.5	75#
EZ-blocker	59.9 \pm 33.3	100
Coopdech	55.0 \pm 29.8	100
p values	* $p < 0.01$	# $p < 0.05$

ISOFLURANE SENSITIVITY IN COMPLEX I DEFICIENT MICE

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Introduction

Children with mitochondrial disease are frequently anesthetized for diagnostic muscle biopsy, but also for a wide range of other operations. There are indications that these children are more sensitive to volatile anesthetic agents. Mutations in the NDUFS4-gene cause mitochondrial complex-I dysfunction. NDUFS4 knockout (KO) mice show clinical signs and symptoms resembling those of patients with mitochondrial complex-I disease. We examined isoflurane sensitivity in the NDYFS4-KO mouse model, which exhibit an isolated mitochondrial complex-I deficiency.

Methods

We investigated seven NDUFS4 KO-mice and five wild type (WT) mice. Measurements took place at day of life 22-24 and 32-35. Animals were placed inside an airtight box, breathing spontaneously while isoflurane was administered. After equilibration of isoflurane concentration, the response to electrical stimulation at the hind paw was recorded. When a response was noticed the anesthetic concentration was increased stepwise, until there was no response. At this point the anesthetic concentration was decreased until there was a return of response. The minimum alveolar concentration (MAC) was determined as the average concentration of isoflurane at the loss and return of response to pedal electrical stimulation.

Results

Preliminary results show a lower MAC for isoflurane in the KO mice compared to wild type mice. Furthermore, unlike the wild type mice, the KO mice show severe respiratory depression at isoflurane concentrations below the MAC, which is most prominent at advanced age.

Conclusion

Our study showed profound hypersensitivity to isoflurane in mitochondrial complex-I deficient mice.

ADENOSINE, ZO GEK NOG NIET.

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Inleiding

Endovasculaire technieken ter behandeling van thoracale aneurysmata worden steeds frequenter toegepast wegens een lagere mortaliteit en morbiditeit dan open technieken. Plaatsen kan echter bemoeilijkt worden door systolische pulsatie flow met migratie van de stent. Adenosine zou dit op een veilige manier kunnen voorkomen.

Casus

Een patiënte krijgt tijdens een mediastinoscopie een aorta descendens bloeding welke bevestigd wordt middels een CTA-thorax. Een ogenschijnlijk ongecompliceerde stentplaatsing volgt.

Bij toenemende dyspnoe wordt opnieuw een CTA-thorax gemaakt. Deze toont een endovasculaire lekkage met compressie van de trachea door een hematoom. Een zeer nauwkeurige plaatsing van een nieuwe stent is vereist. Met adenosine iv. wordt derhalve een asystolie bewerkstelligd. 25 (0,4 mg/kg) respectievelijk 50 mg (0,8 mg/kg) adenosine iv. wordt toegediend zonder voldoende resultaat. Tenslotte geeft 100 mg (1.6 mg/kg) wel een asystolie (40 seconden). Stentplaatsing volgt, waarna patiënte snel herstelt.

Discussie

Adenosine bindt aan adenosine-receptoren en inhibeert adenylaatcyclase en productie van cAMP. Hierdoor wordt de SA-knoop onderdrukt en de AV-geleiding geïnhibeerd. $T_{1/2}$ is 10 seconden.

Bij embolisatie van arterioveneuze malformaties wordt adenosine 0.24 – 1.76 mg/kg iv. gebruikt voor een asystolie van 5 – 11 seconden¹. Bij endovasculaire stentplaatsing is adenosine 0.6 – 1.8 mg/kg iv. nodig voor een asystolie van 18 tot 58 seconden².

Beide studies vinden een lineair verband en tonen dat het gebruik van adenosine simpel, veilig en voorspelbaar is. De bijwerkingen van adenosine zijn zeldzaam en self-limiting.

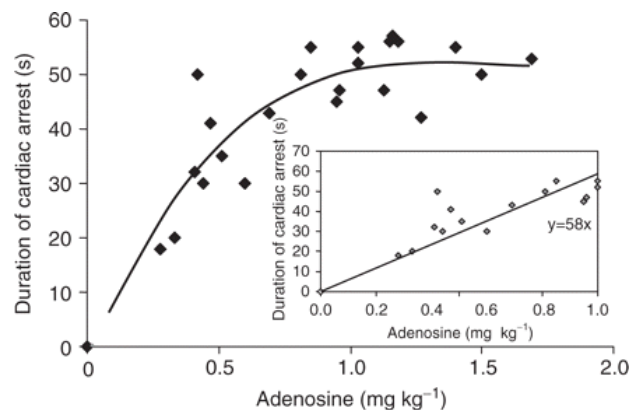
Conclusie

Dankzij adenosine iv. is het bij deze acute patiënt mogelijk gebleken zeer nauwkeurig een thoracale endovasculaire stent te plaatsen.

Adenosine 0.6 mg/kg iv. had hierbij, tevens conform de literatuur, een veilige uitgangsdosering kunnen zijn.

Referenties

1. Hashimoto et al., *Anesthesiology* 2000; 93 (4)
2. Plaschke et al., *BrJ Anaesthesia* 2006; 96 (3)



ARTERIAL PRESSURE WAVEFORM DERIVED CARDIAC OUTPUT IN PATIENTS SUFFERING FROM SEPTIC SHOCK AND MULTIORGAN FAILURE. THIRD GENERATION FLOTRAC SOFTWARE VERSUS INTERMITTENT BOLUS THERMODILUTION CARDIAC OUTPUT.

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Introduction

Since the introduction of the new minimal invasive cardiac output measurement device, FloTrac/Vigileo™ system (Edwards Lifesciences Irvine, Calif, USA), 4 new software versions have been released. Under hemodynamic stable conditions like cardiac surgery the performance of the device has improved. In clinical conditions associated with vasoplegic states like liver surgery or septic shock, the agreement compared with PAC intermittent bolus cardiac output has been questioned. Recently the newest software version has been released (3.02) targeting the patient in septic shock.

Methods

This observational clinical study was approved by the Medical Ethics Review Committee (NTR 2072). All patients had to be admitted to ICU with septic shock and organ failure. Patients had to be intubated and ventilated, had to be in sinus rhythm and receive invasive hemodynamic monitoring with a pulmonary artery catheter (PAC) to optimize the hemodynamic profile. The existing arterial catheter was connected to the arterial waveform cardiac output monitoring device FloTrac v3.02, if not already in place. Informed consent was obtained from the next of kin. Thermodilution cardiac output measurements were performed in triplicate measurements. Values were averaged. FloTrac cardiac output was recorded during triplicate bolus measurement and also averaged.

Results

Nineteen patients are included in this study [30-90 years]. A total of 304 paired measurements have been obtained during the clinical treatment of these severely ill patients. The average APACHE II score is 31 [16-50]. Cardiac output measured by PAC ranged from 3.8 – 17.3 L min⁻¹ and FloTrac CO ranged from 4.0 to 13.7 L min⁻¹. Mean average Cardiac Output was 7.7 L min⁻¹. The SVR ranged from 254- 1102 dyn·s·cm⁻⁵. Bland Altman plot shows a mean bias of 1.7 L min⁻¹ and precision of 2.4 L min⁻¹ leading to a percentage of error 62%.

Conclusion

The FloTrac CO measurements using the third generation software are influenced by extremely low SVR. The measurements performed in the SVR range < 500 dyn·s·cm⁻⁵ are responsible for the overall high percentage of error.

FEMORAL VENOUS OXYGEN SATURATION NO SURROGATE FOR CENTRAL VENOUS OXYGEN SATURATION.

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Background

Shock is defined as global tissue hypoxia secondary to an imbalance between systemic oxygen delivery (DO_2) and oxygen demand (VO_2), reflected by mixed venous oxygen saturation (SvO_2). Intervention based on markers of tissue hypoperfusion may improve outcome. Central venous oxygen saturation ($ScvO_2$) has been used as a surrogate marker for mixed venous oxygen saturation (SvO_2). In order to monitor $ScvO_2$ during resuscitation, an internal jugular or subclavian line must be inserted. However, sometimes the femoral vein is the preferred or *only* possible site for access. The purpose of our study is to determine if $ScvO_2$ and femoral venous oxygen saturation ($SfvO_2$) can be used interchangeably.

Study design

Prospective controlled observational single centre study

Methods

Patients: elective or emergency high risk surgery (n=30; ASA >2)

Control group: 100 stable outclinic cardiac patients who underwent elective right heart catheterization in day care. We determined $SfvO_2$ and $ScvO_2$ simultaneously at the start (T=0) and at the end (T=1) of the procedure. For each time point we calculated the agreement and difference between both values.

Results

Control group: $ScvO_2$ en $SfvO_2$ correlated significantly ($r=0.67$, 95% CI 0.50-0.80; $p<0.0001$) with large limits of agreement (bias 2.0 ± 7.1 ; -11.8 to 15.9). In the surgical patients at T=0 mean values were similar ($SfvO_2$ $82.5\pm 6.6\%$ vs. $ScvO_2$ 81.1 ± 8.1 ; $p=0.28$), but there was no significant correlation ($p=0.27$). Changes in $SfvO_2$ and $ScvO_2$ between T=0 and T=1 were similar in control and surgery patients ($p=0.45$).

Conclusions

Absolute values of $SfvO_2$ are unsuitable as surrogate for absolute values of $ScvO_2$. Also, the trends of both values are not interchangeable.

EPIDURAL ANESTHESIA IS ASSOCIATED WITH A REDUCED INCIDENCE OF CARDIAC COMPLICATIONS AFTER VASCULAR SURGERY

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Background

Vascular surgery patients are at risk of perioperative cardiac complications, despite recent surgical, anesthesiological and medical advances. Previous studies suggest a beneficial effect of neuraxial anesthesia on postoperative cardiovascular and respiratory complications.

Methods

632 patients undergoing elective abdominal aortic repair or infrainguinal vascular surgery under general or epidural anesthesia were included in this cohort study. Medical history, echocardiography, pulmonary function testing, anesthesia technique and follow-up data were obtained. The primary outcome measure was 30-day MACE (cardiac death and non-fatal MI). Multivariate analyses were used to assess the risk of MACE in patients undergoing general(GA), epidural(EA) and combined(CA) general and epidural anesthesia.

Results

380, 83, and 169 patients had GA, EA, and CA, respectively. Abdominal and endovascular surgery, hypertension, ASA-class ≥ 3 , baseline NT-proBNP $>50\mu\text{mol/L}$ and anticoagulant and antiplatelet therapy were more common, and left ventricular dysfunction and COPD were less common in patients receiving GA/CA, as compared to patients receiving only EA. In multivariate analysis, GA/CA was associated with a significant increased risk of 30-day MACE (OR 2.6; 95%CI 1.1–6.3). No difference was found (OR 1.1; 95%CI 0.7–1.8) comparing EA/CA to GA. Other factors independently associated with MACE were CVA, renal failure, heart failure, baseline NT-proBNP $>50\mu\text{mol/L}$, and aortic surgery. In a subanalysis of 127 patients undergoing infrarenal EVAR, GA/CA was associated with a significantly increased risk of MACE (OR 6.7; 95%CI 1.5–30).

Conclusions

In this study of high-risk vascular surgery patients, general or combined anesthesia is associated with an increased risk of 30-day MACE, as compared with only epidural anesthesia. Selection bias is likely despite multivariable analysis correcting for baseline differences between groups. The association between general anesthesia and MACE in the subgroup of EVAR patients warrants a randomized trial of epidural and general anesthesia in these patients.

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Introductie

Cerebrale autoregulatie betekent dat de cerebrale doorbloeding constant blijft ondanks veranderingen in bloeddruk (BD). Echter, meerdere studies laten zien dat een verhoging van de BD door toediening van de α_1 -receptor agonist fenylefrine een lichte maar significante daling van de cerebrale oxygenatie (cO_2Hb) veroorzaakt. Het is onduidelijk of dit komt door α_1 -gemedieerde cerebrale vasoconstrictie, of door een baro-reflex gestuurde daling van het hartminuutvolume (HMV). In deze studie wordt bij mensen aan de hartlongmachine de invloed van het HMV bepaald door de cO_2Hb te meten tijdens een verhoging en verlaging van de pompsnelheid. Daarnaast wordt de invloed van cerebrale α_1 -receptoren bepaald door bij een constante pompsnelheid de BD te verhogen met fenylefrine (een α_1 -agonist) en vasopressine (een niet α_1 -gemedieerde vasoconstrictor).

Materiaal en methoden

Bij 7 patiënten aan de hartlongmachine is de cO_2Hb (INVOS 5100, Somanetics Corp.) gemeten tijdens vier interventies in willekeurige volgorde. De BD werd medicamenteus verhoogd met 50 tot 100 μg fenylefrine en 0.1 tot 0.4 EH vasopressine. Daarnaast is de pompsnelheid gedurende 5 minuten met 0,5 L/m² verhoogd en met 0,5 L/m² verlaagd.

Resultaten

Fenylefrine en vasopressine gaven een stijging van de gemiddelde BD van respectievelijk 17 ± 7 en 17 ± 4 mmHg. De cO_2Hb daalde $2 \pm 1\%$ na toediening van fenylefrine en $2 \pm 2\%$ bij vasopressine. Verhoging van de pompsnelheid gaf een BD stijging van 12 ± 5 mmHg met een stijging van de cO_2Hb van $3 \pm 1\%$ en verlaging gaf een BD daling van 13 ± 6 mmHg en een daling in cO_2Hb van $2 \pm 1\%$.

Conclusie

Bij patiënten aan de hartlongmachine volgt de cO_2Hb veranderingen van de pompsnelheid, ofwel het HMV. Bij een constante pompsnelheid leidt een α_1 -gemedieerde bloeddrukstijging (fenylefrine) tot een identieke oxygenatiedaling als een niet- α_1 -gestuurde bloeddrukstijging (vasopressine). Deze data suggereren dat de cO_2Hb -daling bij de toediening van fenylefrine niet verklaard kan worden door een α_1 -receptor gemedieerde vasoconstrictie in het brein.

ASSOCIATION BETWEEN INTRAOPERATIVE TISSUE OXYGENATION, ARTERIAL BLOOD PRESSURE AND NORADRENALIN USE IN UROLOGICAL PATIENTS

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Introduction and goal of the study

Inadequate tissue oxygenation should be prevented during surgery as it might cause postoperative morbidity. In this observational study we looked at factors that might influence tissue oxygenation (S_tO_2).

Material and methods

In 159 anesthetized, mechanically ventilated urological patients, we measured S_tO_2 intraoperatively on the thenar eminence (InSpectra, Hutchinson Tech., USA) along with (non)invasive blood pressure and recorded noradrenalin use. We correlated S_tO_2 and MAP as recorded at defined moments during surgery. In addition, we looked at the effects of low blood pressure (as defined by the areas under the curve (AUC) while MAP was <65 mmHg) on S_tO_2 . Furthermore, we related S_tO_2 to different noradrenalin dosages: none, low (<0.03 $\mu\text{g}/\text{kg}/\text{min}$) and high dose (≥ 0.03 $\mu\text{g}/\text{kg}/\text{min}$).

Results

At all time points when blood pressure was in the normal range, there was no correlation between S_tO_2 and MAP. However, the lowest recorded MAP per patient did correlate with the corresponding S_tO_2 ($R=0.206$, $p<0.01$; Pearson's correlation, 2-tailed). Similarly, a higher MAP AUC <65 mmHg was associated with a lower average S_tO_2 ($R=-0.189$, $p<0.05$; Spearman's correlation, 2-tailed). These results support the hypothesis of intact autoregulation of tissue blood flow to preserve S_tO_2 in the normal range of blood pressure, whereas this autoregulation fails during lowest pressures. Furthermore, S_tO_2 was higher without noradrenalin (88.4%) than during high dose noradrenalin (85.2%) ($p<0.001$; ANOVA, Bonferroni post hoc analysis). Possibly, the vasoconstrictive effect of noradrenalin decreases blood flow through the observed tissue.

Conclusions

Tissue oxygenation is not influenced by blood pressure in the normal range during anesthesia, whereas it becomes partially dependent when MAP drops below 65 mmHg. In addition, noradrenalin use may jeopardize peripheral tissue oxygenation intraoperatively.

LUNG MANAGEMENT DURING CARDIOPULMONARY BYPASS: A SYSTEMATIC REVIEW OF RANDOMIZED TRIALS

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Background and Goal of study

During cardiopulmonary bypass (CPB) a variety of methods are used to minimize postoperative pulmonary complications and preserve pulmonary function. To investigate the current evidence for potential beneficial effects of various manoeuvres ("lung management") during or following CPB, we performed a quantitative systematic review of the literature.

Material and Methods

A systematic search of Medline, Biosys, Embase and the Cochrane Library (1966 – July 2010) was performed to identify randomised controlled trials (RCTs) that focused on lung management during cardiopulmonary bypass. Without any language restrictions, a search with the following terms was performed: cardiopulmonary bypass, continuous positive airway pressure, CPAP, positive pressure ventilation, PEEP, vital capacity manoeuvre. Identified studies were then hand-searched for further relevant literature. Interventions that were compared in at least 3 trials were analysed using a fixed effect model.

Results and Discussion

Data from 15 RCT's were analysed (N=739 patients). Use of CPAP 5 -10 mmHg during CPB resulted in a significant higher oxygenation index ($\text{PaO}_2/\text{FiO}_2$) immediately post CPB ($p < 0.00001$). It also resulted in lower AaDO_2 and a lower shunt fraction immediately post CPB ($p = 0.003$ and $p < 0.00001$, respectively). 4 hours after weaning from CPB the AaDO_2 was not significantly improved compared to control. Positive pressure ventilation during CPB PEEP following CPB and vital capacity manoeuvre, were not analysed.

Conclusion

Results from this systematic review imply that the use of CPAP during cardiopulmonary bypass may improve oxygenation and pulmonary gas exchange immediately after weaning from CPB and reduces the pulmonary shunt fraction. No significant benefit was found 4 hours after CPB. Other interventions were sparsely investigated. The documentation of clinically relevant (long term) outcomes, e.g. ventilator hours, ICU length of stay, was lacking, which supports the need for further trials in this field.

REMIFENTANIL PATIENT-CONTROLLED ANALGESIA IN LABOUR: A SAFE ALTERNATIVE?

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Goal of study

Remifentanyl is an effective opioid for pain relief in labour. However, its safety profile has not been established for this application. We describe experiences with patient-controlled analgesia (PCA) in our hospital.

Material and methods

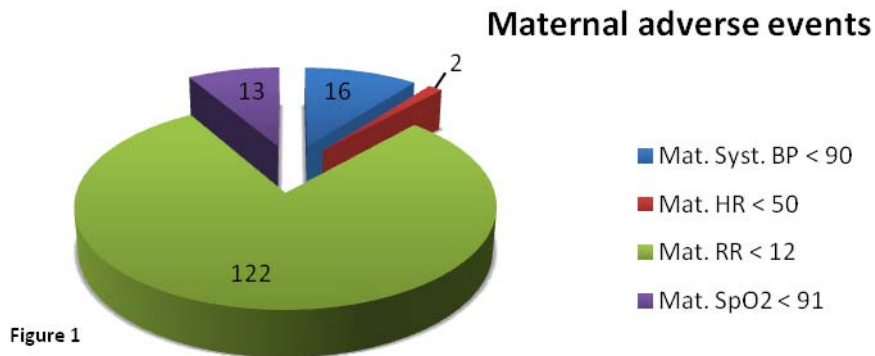
A retrospective observational unicentre analysis of acquired data was performed. Parturients requesting analgesia were offered PCA with remifentanyl. The analgesic was administered using a syringe pump (IVAC p5000®) connected with a PCA extension set (flo-saver®) and a continuous back-up infusion pump (arsena®, 42 cc/hr) with occlusion alarm. Patients were divided in three protocols (A < 80 kg, B 80-100 kg, C > 100 kg) with different continuous background infusion rates: A 80 mcg/hr, B 100 mcg/hr, C 120 mcg/hr. All patients received 25 mcg in one minute after pushing the PCA-button. Lock out time was set at four minutes.

Patients' blood pressure, heart rate, respiratory rate and oxygen saturation were continuously monitored. Maternal adverse events were defined as systolic blood pressure < 90 mm Hg, heart rate < 50/min, respiratory rate < 12/min and pulseoximeter value < 91%. Fetal adverse events were defined as umbilical cord pH < 7.1 and APGAR at 5 minutes < 7.

Results and discussion

From October 2007 to October 2010 a total of 904 patients received PCA with remifentanyl. In 763 cases the data were complete, only these were used for the analysis. There was no fetal or maternal mortality or serious morbidity. No interventions such as assisted breathing or naloxon IV were necessary.

A total of 153 maternal adverse events in 146 patients occurred as seen in figure 1.



A total of 59 fetal adverse events were observed in 55 patients as depicted in figure 2.

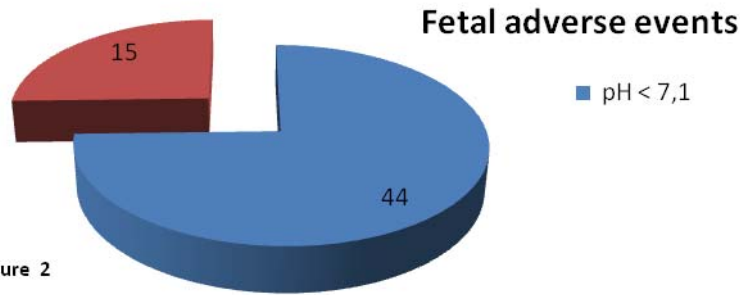


Figure 2

In 17 cases (in 13 babies) of the 59 registered fetal adverse events there was also an adverse maternal event. Figures 3 and 4 show the combinations of these 17.

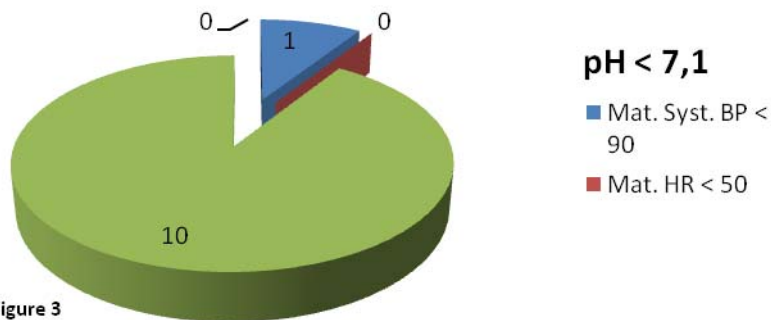


Figure 3

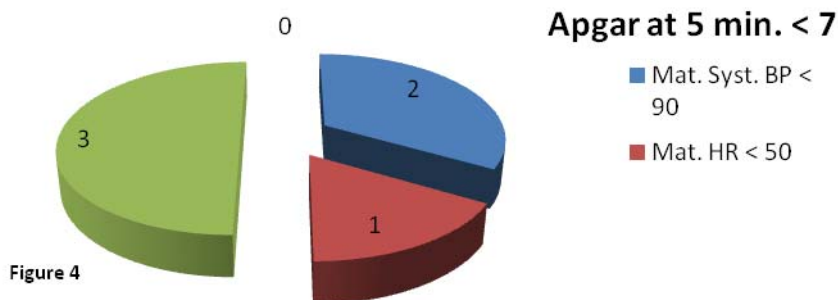


Figure 4

Conclusion

Remifentanyl PCA protocols during labour in this study appear to be safe for mother and child. In most cases there are no measurable fetal adverse events even though there might have been maternal adverse events. Continuous maternal monitoring still seems to be recommended for the safety of the mother as, in particular, respiratory depression seems to occur fairly often.

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SUGAMMADEX COMPARED TO NEOSTIGMINE DOES NOT DECREASE POSTOPERATIVE COMPLICATIONS

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Objective

Neostigmine and sugammadex are used to reverse nondepolarizing neuromuscular blocking agents (NMBAs) such as rocuronium or vecuronium. Different pharmacological backgrounds of these substances would suggest that sugammadex compared to neostigmine may have a different adverse events profile. The aim of the study was to compare the occurrence of postoperative complications and the duration of hospital admission of patients treated with neostigmine or sugammadex.

Method

A retrospective cohort study of the incidence of postoperative complications, surgical and non-surgical, and hospital admission in surgical patients. From 2008 tot mid 2010 patients, receiving rocuronium, who were reversed with sugammadex or neostigmine were included. Choice of substance was left to the discretion of the anaesthesiologist. Patient charts were reviewed for postoperative complications, chart viewer was blinded for sugammadex or neostigmine. To determine baseline complication risk, the ASA score was obtained and the IRIS score was calculated. (The Identification of Risk In Surgical patients, IRIS- score, accurately predicts mortality after general or trauma surgery.)

Results

Data on 252 patients receiving neostigmine and 193 patients receiving sugammadex were collected (table 1). There was no difference in number of patients with complications, surgical and non-surgical, between sugammadex or neostigmine (11,9% vs 12,4% p = 0,865). The occurrence of surgical, cardiac, pulmonary or other complications was not different between groups. Adjustment for ASA and IRIS score did not alter the results. There was no significant difference in mean duration of hospital admission between sugammadex or neostigmine (5,07 vs 4,42 days p = 0,308).

Table 1

	neostigmine (n =252)	sugammadex (n = 193)	P value
Patients with complications (%)	30 (11,9)	24 (12,4)	0,865 ^a
Surgical complications [†]	15	13	0,736 ^a
Cardial complications [†]	8	4	0,565 ^b
Pulmonary complications [†]	5	5	0,669 ^a
Other complications [†]	7	5	0,904 ^a
Mean duration of hospital stay (days)	4,42	5,07	0,308 ^c

[†] complications don't add up to 'patients with complications' because some patients had more than one complication. a) chi-square test b) Fisher's exact test c) independent samples Students T test.

Conclusion

Duration of hospital stay and the occurrence of postoperative complications is equal for sugammadex and neostigmine when administered to reverse nondepolarizing neuromuscular blocking agents (NMBAs).

PATIENT-CONTROLLED REMIFENTANIL VERSUS PETHIDINE ANALGESIA DURING OOCYTE RETRIEVAL FOR IVF/ICSI PROCEDURES

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Background

Pethidine with midazolam as standard analgesia during oocyte retrieval for IVF/ICSI is frequently associated with oversedation. Here we investigated the efficacy and safety of remifentanil as alternative for standard care during IVF/ICSI procedures.

Methods

Patients were randomized for pethidine (2 mg/kg i.m.) with midazolam (7.5 mg per os; n=21) or remifentanil (0.05 microgram/kg/min, bolus 0.5 microgram/kg, lock-out 3 min). Patients received diclofenac (50 mg supp; n=17) to compensate for the short time of action of remifentanil. The remifentanil group did not receive sedatives for safety reasons. Safety parameters for hemodynamic instability and respiratory depression included blood pressure, heart rate and pulse oximetry (Nexfin CC). The Numeric Rating Scale (NRS), McGill pain questionnaire (MPQ) and Ramsey Sedation Scale (RSS) were used to evaluate pain and sedation levels. Anxiety and nausea were registered using the Pain Catastrophizing Scale (PCS).

Results

There were no differences in baseline characteristics, vital parameters, anxiety, nausea and the IVF/ICSI success rate between groups. Pain scores during the puncture were similar for pethidine and remifentanil (6 (4-7) vs 4 (3-7); (left ovary)) and 6 (3.5-7) vs 4 (3-6.5; right ovary)). The RSS sedation levels were higher in the pethidine group when compared to remifentanil (4 (2-4) vs 2 (2-2), respectively; $p < 0.01$). Women in the remifentanil group had a lower MPQ or RSS score with higher patient satisfaction, while there were no differences in safety profiles between both analgesics.

Conclusion

Although a mixture of analgesic and sedative strategies complicated our study, our results suggest that remifentanil is non-inferior for the treatment of oocyte puncture pain, with less sedation and better patient satisfaction. However, due to its short time of action an alternative analgesic needs to be added. Future studies should further evaluate the additional value of remifentanil for pain relief during oocyte retrieval.

Does preoperative analgesic use and quality of life predict postoperative pain after outpatient surgery?

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Background

Previous studies have shown that moderate to severe pain after ambulatory surgery varies between 20 and 40%. The focus of this study was to assess the prevalence of postoperative pain after ambulatory surgery at the Maastricht University Medical Centre+. Also, the association of preoperative analgesic use and preoperative quality of life (QoL) with the severity of postoperative pain was determined.

Methods

Over a period of eighteen months, 1259 patients undergoing ambulatory surgery were prospectively included in our study when visiting the outpatient clinic for preoperative assessment. They were asked to complete a questionnaire one week before surgery to determine preoperative analgesic use and QoL. QoL was measured by the EuroQol-5D questionnaire, resulting in a score between -0.59 and 1.00 (Dolan et al., 1997). Furthermore, patients were asked to complete a second questionnaire four days after surgery to measure postoperative pain by using an 11-point numeric rating scale (NRS).

Results

Of all patients, mean NRS was 2.4 (SD 2.3), whereas 249 patients (19.8%) experienced moderate to severe pain (defined as NRS>4) on day four. Preoperatively, 930 patients (73.9%) used no analgesics, 155 (12.3%) used acetaminophen, 71 (5.6%) used NSAIDs, 15 (1.2%) used opioids, 26 (2.1%) used other analgesics, and 62 (4.9%) used a combination of the above. Patients who used preoperative analgesics experienced statistically more often moderate to severe pain compared to patients who used no medication ($\chi^2=65$, $p<0,001$). Furthermore, mean preoperative QoL was 0.77 (SD 0.23). Patients with NRS 0-4 had a mean QoL of 0.80 (SD 0.21), compared to a mean QoL of 0.67 (SD 0.29) in patients with NRS > 4. The difference in preoperative QoL was statistically significant (independent t -test, $p < 0.001$).

Conclusion

Our study confirmed that postoperative pain in ambulatory surgery remains a problem, as a large amount of the patients still experienced moderate to severe pain four days after surgery. These results also demonstrated that preoperative use of analgesics as well as preoperative QoL may be considered as predictors for the severity of postoperative pain.