
ABSTRACTS

presented at the

Annual Scientific Meeting

of

The Joint Faculty of Intensive Care Medicine

and

The Australian and New Zealand Intensive Care Society

Sepsis: surviving the guidelines

9–11 June 2006

Sofitel, Melbourne, VIC

Entries for the Felicity Hawker Medal



The use of continuous positive airway pressure in status asthmaticus: single centre experience

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Introduction

Middlemore Hospital has a general intensive care unit which sees a large number of patients with severe asthma. The treatment of status asthmaticus in this ICU from 2000 to 2003 is described, with particular emphasis on the use of continuous positive airway pressure (CPAP).

Methods

The notes of all adults admitted to the ICU with a diagnosis of asthma were reviewed. Patients were excluded if their primary diagnosis was likely not to be asthma (eg, congestive heart failure or chronic respiratory disease). Data were gathered according to a template and included information on demographics, severity and duration of the attack, treatments and outcome.

Results

57 patients were identified as being admitted to the ICU with a diagnosis of asthma; 37 (65%) were treated with CPAP, of whom one later required intubation, nine (16%)

underwent initial intubation, and 11 (19%) were managed with medical treatment only. Virtually all patients received large doses of salbutamol, both as boluses (mean, 2.5 mg) and as an infusion. There were no deaths, and the median ICU stay was 18 h (2–60 h).

Those requiring intubation were more unwell on admission (mean pre-treatment pH, 6.89; and PaCO₂, 18.85 kPa) compared with the CPAP group (pH, 7.23; PaCO₂, 8.24 kPa) and the medical treatment group (pH, 7.27; PaCO₂, 7.25 kPa). Of note, six patients with a Glasgow Coma Score of 10 or less were managed with CPAP only.

Apart from one patient who underwent early intubation, CPAP was well tolerated. CPAP was required for a mean of 7 hours, resulting in a mean ICU length of stay of 23 hours and a mean hospital stay of 4.6 days. Those intubated had a ventilation time of 9 hours. Hospital length of stay was similar for all three groups.

Discussion

The treatment of status asthmaticus appears safe and is associated with short ICU lengths of stay. CPAP is used in most cases and appears effective.

C-reactive protein concentration as a predictor of post-ICU discharge in-hospital mortality

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Purpose

To assess the ability of potential clinical predictors and inflammatory markers to predict in-hospital mortality after ICU discharge.

Methods

1272 patients who survived their index admission to a 22-bed multidisciplinary ICU of a university hospital in 2004. This nested case-control study utilised two concurrent controls for each case of post-ICU discharge in-hospital mortality.

Results

There were 29 unexpected in-hospital deaths after ICU discharge (2.3%). C-reactive protein (CRP) concentrations within 24 hours of ICU discharge were available in 14 cases of post-ICU deaths and 22 concurrent controls. CRP con-

centration at ICU discharge was associated with mortality after ICU discharge (mean CRP concentrations: cases = 204 mg/L v controls = 63 mg/L; $P=0.001$). When using CRP > 100 mg/L as a cut-off point, the odds ratio for mortality after ICU discharge was 16.5 (95% confidence interval [CI], 3.1–88.0; $P=0.001$). The area under the receiver operating characteristic curve for the CRP concentrations to predict in-hospital mortality was 0.87 (95% CI, 0.73–0.99; $P=0.001$). The destination and timing of ICU discharge, Sequential Organ Failure Assessment (SOFA) scores, white cell counts and fibrinogen concentrations at ICU discharge were not significantly associated with in-hospital mortality after ICU discharge.

Conclusion

A high CRP concentration at ICU discharge is an independent predictor of in-hospital mortality after ICU discharge.

Note: Dr Litton's presentation won the 2006 Felicity Hawker Medal.

Free paper abstracts



Cost-effectiveness of Xigris (drotrecogin alfa activated) in the treatment of patients with sepsis

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Objective

To determine the cost effectiveness of Xigris (drotrecogin alfa activated; Eli Lilly) therapy for patients with sepsis in Australia. Conventional antibiotics have been the treatment of choice for patients with sepsis.

Methods

Economic evaluation was based on the international, multi-centre, randomised, double-blind trial (PROWESS¹) of Xigris versus placebo (n = 1690). Based on a non-stratified mortality analysis, relative to the placebo treatment group, the Xigris treatment group experienced improved 28-day survival. At 28 days, 259 of the 840 patients (30.8%) in the placebo treatment group and 210 of 850 patients (24.7%) in the Xigris treatment group had died (non-stratified P = 0.005). The result represents a reduction in the relative risk of death of 19.4% (95% confidence interval, 6.6–30.5) in association with treatment with Xigris as compared with placebo. The absolute risk reduction was 6.1%. Bleeding was the most common adverse event associated with the administration of Xigris. There were no other safety concerns associated with the administration of Xigris. Using the patient demographic data reported in the trial, published literature and Australian life tables, a method was developed to calculate life-years saved. The costs used in the economic evaluation comprised drug costs and other resource costs. Drug costs were calculated using data reported in the PROWESS trial. Other

resource use costs included hospital stay costs and nursing care costs, which were also taken from the PROWESS trial. The estimation of survival in a population of patients with severe sepsis is based on a publication by Quartin et al.² A threshold of <\$50 000 per life-year gained was considered cost-effective. Discount rate of 5% was applied to both cost and outcome.

Results

Total cost per patient on the Xigris arm was \$44 432 (\$31 412 for resource cost and \$13 020 for Xigris). Total cost per patient on the placebo arm was \$29 488 (resource cost). The incremental cost was \$14 944 (\$44 432 – \$29 488). The incremental outcome was 0.535 (based on life expectancy of sepsis patients adjusted for Quartin et al.²). Cost per life-year gained for Xigris was \$27 933.

Conclusion

This survival benefit is a highly patient-relevant outcome for sepsis. This economic evaluation found that Xigris offers an acceptable cost-effectiveness ratio and good value for money for patients with sepsis in Australia. The cost effectiveness ratio improves (\$13 153) for patients with severe sepsis (APACHE II \geq 5).

References

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- 2 Quartin AA, Schein RMH, Daniel H, Peduzzi PN. Magnitude and duration of the effect of sepsis on survival. *JAMA* 1997; 277: 1058-63.

Endothelin but not vasopressin is modulated by endogenous nitric oxide during epidural anaesthesia

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Introduction

The maintenance of mean arterial blood pressure (MAP) during high-epidural anaesthesia differs substantially from physiological conditions, as neither the sympathetic nervous system nor the renin-angiotensin system is specifically activated.¹ MAP therefore results from the balance and interaction of major endogenous vasoactive systems, mainly

between the vasoconstrictors endothelin and vasopressin and the opposing vasodilator nitric oxide.

Subjects and settings

We studied the interaction between nitric oxide and endothelin during high-epidural anaesthesia in conscious dogs, in comparison to the interaction of nitric oxide and vasopressin.

Method

The data derived from 36 experiments on conscious dogs (n = 6) studied with approval of the District Governmental Animal Investigation Committee. The trained animals were

randomly assigned to each of the following six experimental groups: L-NAME, 0.3–10 mg kg⁻¹, under physiological conditions or during high-epidural anaesthesia (lidocaine, 1%); or L-NAME, 0.3–10 mg kg⁻¹, after preceding endothelin (tezosentan) or vasopressin-receptor blockade, under physiological conditions or during high-epidural anaesthesia. ($\bar{x} \pm s_{\bar{x}}$, paired *t* test, *P* < 0.05).

Results

L-NAME increased MAP dose-dependently in all groups. However, the increase in MAP was substantially reduced in the presence of endothelin-receptor blockade. In detail, L-NAME increased MAP by only 17 mmHg (from 77 ± 3 to 94 ± 4 mmHg) during high-epidural anaesthesia and endothelin-receptor blockade, compared with 30 mmHg (from 85 ± 3 to 115 ± 4 mmHg) without preceding receptor blockade. This effect resulted from a small increase in systemic vascular resistance and was accompanied by a parallel reduction in cardiac output and heart rate. In

contrast, blockade of vasopressin showed no similar relationship.

Conclusion

Endogenous nitric oxide inhibits the action of endothelin during high-epidural anaesthesia. However, vasopressin showed no similar relationship and remains therefore the predominant vasoconstrictor system for the maintenance of arterial blood pressure during high-epidural anaesthesia, as it is not only specifically released to counteract hypotension,² but also not impaired by endogenous nitric oxide.

References

- 1 Hopf H-B, Schlaghecke R, Peters J. Sympathetic neural blockade by thoracic epidural anesthesia suppresses renin release in response to arterial hypotension. *Anesthesiology* 1994; 80: 992-9.
- 2 Picker O, Schindler AW, Scheeren TWL. Endogenous endothelin and vasopressin support blood pressure during epidural anaesthesia in conscious dogs. *Anesth Analg* 2001; 93: 1580-6.

“Mission accomplished — mission impossible?”

In complex humanitarian emergencies, is intensive care a luxury or a necessity?

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Introduction

Medécins Sans Frontières (MSF) is an independent international humanitarian aid organisation that provides emergency medical assistance to populations in danger in more than 70 countries. MSF has been performing emergency medical aid missions around the world since 1971. In the past few years, the level of surgical and medical care it provides has become increasingly sophisticated.

Aim

This paper explores both the need for an intensive care service in MSF missions and the feasibility of providing such a service in complex, difficult environments.

Setting

Four MSF missions will be described:

- Port-au-Prince, Haiti — urban guerilla warfare
- Bouake, Ivory Coast — civil war
- Mansehra, Pakistan — earthquake zone
- Monrovia, Liberia — civil war

Observations

Reasons for patients requiring intensive care in these missions include: post-thoracotomy for multiple gunshot wounds; multiple trauma; major burns; severe head injury; septic shock; cardiogenic shock; organophosphate poisoning; eclampsia; peripartum cardiomyopathy; children with decompensated cardiac failure due to falciparum malaria; and neonatal sepsis.

Conclusion

Intensive care is both necessary and feasible in some MSF missions. The lack of trained local staff, and uncertain water and electricity supplies and other infrastructure make this goal very challenging. While complex technical equipment and expensive drugs are not required, there is a minimum level of infrastructure below which it is not possible to operate an intensive care unit. Some equipment currently available lends itself particularly well to functioning in harsh environments. Furthermore, MSF aims not only to adapt existing procedures and materials to difficult settings, but also to campaign for and promote the development of new techniques and materials appropriately designed for poorly resourced settings. The treatment of a number of conditions which have a reasonable prognosis in a resource-rich intensive care setting is futile in an MSF context. MSF has recently established an intensive-care database to provide information on which to base treatment protocols and guidelines for use in the field. □