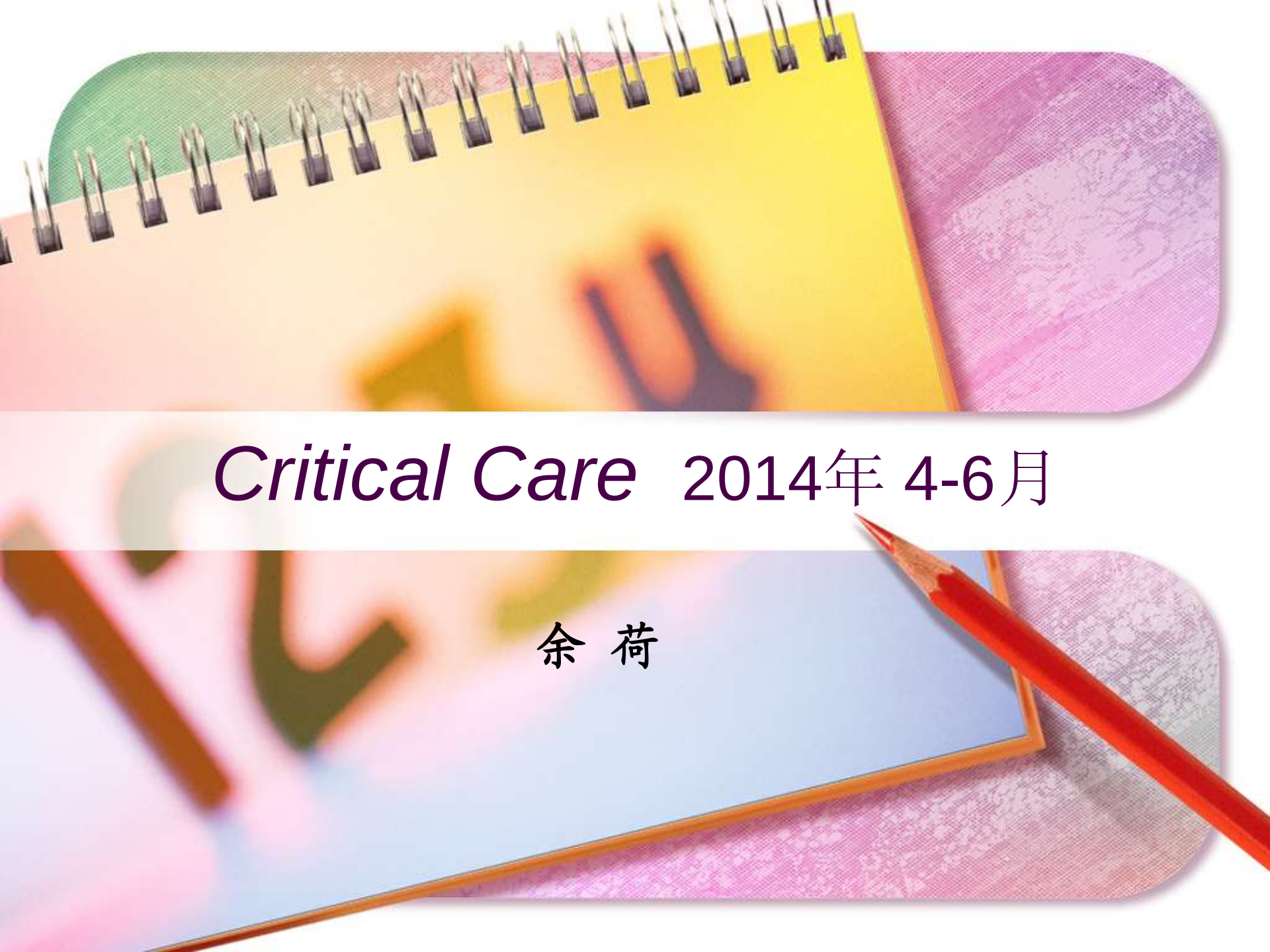

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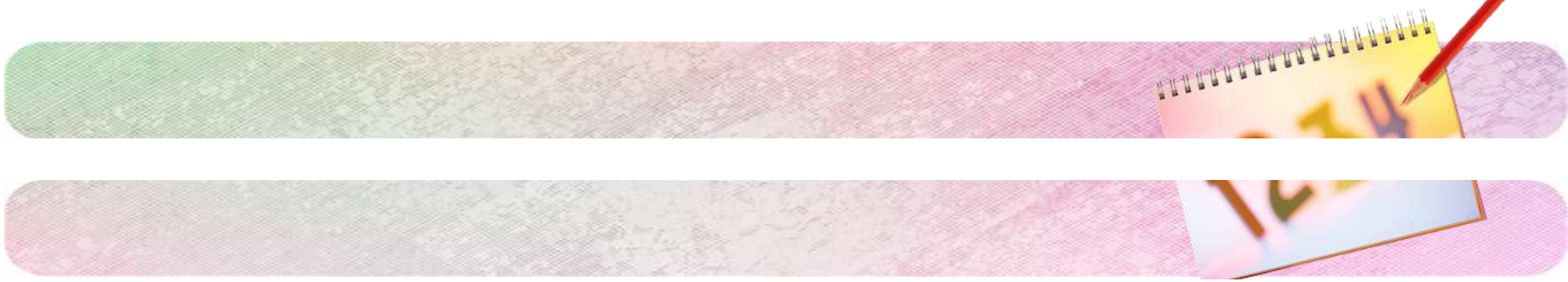

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Continuous endotracheal tube cuff pressure control system protects against ventilator-associated pneumonia

Leonardo Lorente, María Lecuona, Alejandro Jiménez, Lisset Lorenzo, Isabel Roca, Judith Cabrera, Celina Llanos, María L Mora

Critical Care 2014, **18**:R77 (21 April 2014)

Abstract | Full text | PDF | PubMed

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Parenteral glutamine supplementation in critical illness: a systematic review

Paul E Wischmeyer, Rupinder Dhaliwal, Michele McCall, Thomas R Ziegler, Daren K Heyland

Critical Care 2014, **18**:R76 (18 April 2014)

Abstract | Full text | PDF | PubMed

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A systematic review of therapeutic hypothermia for adult patients following traumatic brain injury

Samantha Crossley, Jenny Reid, Rachel McLatchie, Judith Hayton, Clair Clark, Margaret MacDougall, Peter JD Andrews

Critical Care 2014, **18**:R75 (17 April 2014)

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Ventriculoarterial decoupling in human septic shock

Fabio Guarracino, Baldassare Ferro, Andrea Morelli, Pietro Bertini, Rubia Baldassarri, Michael R Pinsky

Critical Care 2014, **18**:R80 (24 April 2014)

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Comparison of outcomes from sepsis between patients with and without pre-existing left ventricular dysfunction: a case-control analysis

Daniel R Ouellette, Sadia Z Shah

Critical Care 2014, **18**:R79 (23 April 2014)

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中性粒细胞明胶酶脂质运载蛋白

The plasma level and biomarker value of neutrophil gelatinase-associated lipocalin in critically ill patients with acute kidney injury are not affected by continuous venovenous hemofiltration and anticoagulation applied

Louise Schilder, S Nurmohamed, Pieter M ter Wee, Nanne J Paauw, Armand RJ Girbes, Albertus Beishuizen, Robert HJ Beelen, AB Groeneveld

Critical Care 2014, **18**:R78 (22 April 2014)

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Effect of intensive care after cardiac arrest on patient outcome: a database analysis

Andreas Schober, Michael Holzer, Helene Hochrieser, Martin Posch, Rene Schmutz, Philipp Metnitz

Critical Care 2014, **18**:R84 (29 April 2014)

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Impact of prior statin therapy on the outcome of patients with suspected ventilator-associated pneumonia: an observational study

Rémi Bruyere, Clara Vigneron, Sébastien Prin, André Pechinot, Jean-Pierre Quenot, Serge Aho, Laurent Papazian, Pierre-Emmanuel Charles

Critical Care 2014, **18**:R83 (28 April 2014)

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Thromboprophylaxis patterns and determinants in critically ill patients: a multicenter audit

François Lauzier, John Muscedere, Éric Deland, Demetrios Kutsogiannis, Michael Jacka, Diane Heels-Ansdell, Mark Crowther, Rodrigo Cartin-Ceba, Michael J Cox, Nicole Zytaruk, Denise Foster, Tasnim Sinuff, France Clarke, Patrica Thompson, Steven Hanna, Deborah Cook, the Co-operative Network of Critical Care Knowledge Translation for Thromboprophylaxis (CONECCKT-T) Investigators and the Canadian Critical Care Trials Group

Critical Care 2014, **18**:R82 (25 April 2014)

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Guideline-concordant administration of prothrombin complex concentrate and vitamin K is associated with decreased mortality in patients with severe bleeding under vitamin K antagonist treatment (EPAHK study)

Karim Tazarourte, Bruno Riou, Benjamin Tremey, Charles-Marc Samama, Éric Vicaut, Bernard Vigué, EPAHK study group

Critical Care 2014, **18**:R81 (24 April 2014)

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Hyperglycemia-induced diaphragm weakness is mediated by oxidative stress

Leigh A Callahan, Gerald S Supinski

Critical Care 2014, **18**:R88 (3 May 2014)

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Time from admission to initiation of surgery for source control is a critical determinant of survival in patients with gastrointestinal perforation with associated septic shock

Takeo Azuhata, Kosaku Kinoshita, Daisuke Kawano, Tomonori Komatsu, Atsushi Sakurai, Yasutaka Chiba, Katsuhisa Tanjho

Critical Care 2014, **18**:R87 (2 May 2014)

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Coefficient of glucose variation is independently associated with mortality in critically ill patients receiving intravenous insulin

Michael J Lanspa, Justin Dickerson, Alan H Morris, James F Orme, John Holmen, Eliotte L Hirshberg

Critical Care 2014, **18**:R86 (30 April 2014)

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Immunomodulation by fish-oil containing lipid emulsions in murine acute respiratory distress syndrome

Matthias Hecker, Juliane Ott, Christoph Sondermann, Martina Barbara Schaefer, Martin Obert, Andreas Hecker, Rory Morty, Istvan Vadasz, Susanne Herold, Bernhard Rosengarten, Martin Witzenrath, Werner Seeger, Konstantin Mayer

Critical Care 2014, **18**:R85 (29 April 2014)

2014-5

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Erythrocyte selenium concentration predicts intensive care unit and hospital mortality in patients with septic shock: a prospective observational study

Nara Costa, Ana Gut, José Alexandre Pimentel, Silvia Maria Cozzolino, Paula Azevedo, Ana Angélica Fernandes, Bertha Polegato, Suzana Tanni, Rafael Gaiolla, Leonardo Antonio Zornoff, Sergio Alberto de Paiva, Marcos Minicucci

Critical Care 2014, **18**:R92 (7 May 2014)

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Systemic glucose variability predicts cerebral metabolic distress and mortality after subarachnoid hemorrhage: a retrospective observational study

Pedro Kurtz, Jan Claassen, Raimund Helbok, J Schmidt, Luis Fernandez, Mary Presciutti, R Stuart, E Connolly, Kiwon Lee, Neeraj Badjatia, Stephan A Mayer

Critical Care 2014, **18**:R89 (4 May 2014)

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Elevated plasma thrombomodulin and angiopoietin-2 predict the development of acute kidney injury in patients with acute myocardial infarction

Kuan-Liang Liu, Kuang-Tso Lee, Chih-Hsiang Chang, Yung-Chang Chen, Shu-Min Lin, Pao-Hsien Chu

Critical Care 2014, **18**:R100 (16 May 2014)

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Implementing a multifaceted tailored intervention to improve nutrition adequacy in critically ill patients: results of a multicenter feasibility study

Naomi E Cahill, Lauren Murch, Deborah Cook, Daren K Heyland

Critical Care 2014, **18**:R96 (11 May 2014)

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Detection of 'best' positive end-expiratory pressure derived from electrical impedance tomography parameters during a decremental positive end-expiratory pressure trial

Paul Blankman, Djo Hasan, Erik Groot Jebbink, Diederik Gommers

Critical Care 2014, **18**:R95 (10 May 2014)

Abstract | Provisional PDF

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Efficacy of ultrasound-guided radial artery catheterization: a systematic review and meta-analysis of randomized controlled trials

Wan-Jie Gu, Hong-Tao Tie, Jing-Chen Liu, Xian-Tao Zeng

Critical Care 2014, **18**:R93 (8 May 2014)

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Circulating cytokines in predicting development of severe acute pancreatitis

Anne Nieminen, Mikael Maksimow, Panu Mentula, Lea Kyhälä, Leena Kylänpää, Pauli Puolakkainen, Esko Kemppainen, Heikki Repo, Marko Salmi

Critical Care 2014, **18**:R104 (21 May 2014)

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Is pentobarbital safe and efficacious in the treatment of super-refractory status epilepticus: a cohort study

Deborah Pugin, Brandon Foreman, Gian Marco De Marchis, Andres Fernandez, J Michael Schmidt, Barry M Czeisler, Stephan A Mayer, Sachin Agarwal, Christine Lesch, Hector Lantigua, Jan Claassen

Critical Care 2014, **18**:R103 (21 May 2014)

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Low plasma selenium concentrations in critically ill children: the interaction effect between inflammation and selenium deficiency

Simone Brasil de Oliveira Iglesias, Heitor Pons Leite, Ângela Tavares Paes, Susyane Vieira de Oliveira, Roseli Oselka Sarni

Critical Care 2014, **18**:R101 (19 May 2014)

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Age and decisions to limit life support for patients with acute lung injury: a prospective cohort study

Alison E Turnbull, Bryan M Lau, A Parker Ruhl, Pedro A Mendez-Tellez, Carl B Shanholtz, Dale M Needham

Critical Care 2014, **18**:R107 (26 May 2014)

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beta-lactam antibiotic concentrations during continuous renal replacement therapy

Marjorie Beumier, Giuseppe Stefano Casu, Maya Hites, Lucie Seyler, Frederic Cotton, Jean-Louis Vincent, Frédérique Jacobs, Fabio Silvio Taccone

Critical Care 2014, **18**:R105 (22 May 2014)

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Predicting outcomes after blunt chest wall trauma: development and external validation of a new prognostic model

Ceri Elisabeth Battle, Hayley Hutchings, Simon Lovett, Omar Bouamra, Sally Jones, Aruni Sen, James Gagg, David Robinson, Jake Hartford-Beynon, Jeremy Williams, Adrian Evans

Critical Care 2014, **18**:R98 (14 May 2014)

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Serum cystatin C predicts vancomycin trough levels better than serum creatinine in hospitalized patients: a cohort study

Erin N Frazee, Andrew D Rule, Sandra M Herrmann, Kianoush B Kashani, Nelson Leung, Abinash Virk, Nikolay Voskoboev, John C Lieske

Critical Care 2014, **18**:R110 (29 May 2014)

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Intensive care unit admission in chronic obstructive pulmonary disease: patient information and the physician's decision-making process

Matthieu Schmidt, Alexandre Demoule, Emmanuelle Boutmy-Deslandes, Marine Chaize, Sandra de Miranda, Nicolas Bèle, Nicolas Roche, Elie Azoulay, Thomas Similowski

Critical Care 2014, **18**:R115 (4 June 2014)

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Clinical assessment of peripheral perfusion to predict postoperative complications after major abdominal surgery early: a prospective observational study in adults

Michel E van Genderen, Jorden Paauwe, Jeroen de Jonge, Ralf JP van der Valk, Alexandre Lima, Jan Bakker, Jasper van Bommel

Critical Care 2014, **18**:R114 (3 June 2014)

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The role of CXCL10 in the pathogenesis of experimental septic shock

Daniela S Herzig, Liming Luan, Julia K Bohannon, Tracy E Toliver-Kinsky, Yin Guo, Edward R Sherwood

Critical Care 2014, **18**:R113 (2 June 2014)

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Higher brain extracellular potassium is associated with brain metabolic distress and poor outcome after aneurysmal subarachnoid hemorrhage

Ana Patrícia Antunes, Alois Josef Schiefecker, Ronny Beer, Bettina Pfausler, Florian Sohm, Marlene Fischer, Anelia Dietmann, Peter Lackner, Werner O Hackl, Jean-Pierre Ndayisaba, Claudius Thomé, Erich Schmutzhard, Raimund Helbok

Critical Care 2014, **18**:R119 (11 June 2014)

Abstract | Provisional PDF

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Higher clinical success in patients with ventilator-associated pneumonia due to methicillin-resistant Staphylococcus aureus treated with linezolid compared with vancomycin: results from the IMPACT-HAP study

Paula Peyrani, Timothy L Wiemken, Robert Kelley, Marcus J Zervos, Daniel H Kett, Thomas M File, Gary E Stein, Kimbal D Ford, Ernesto G Scerpella, Verna Welch, Julio A Ramirez

Critical Care 2014, **18**:R118 (10 June 2014)

Abstract | Provisional PDF

Research Open Access

Prognostic and diagnostic value of eosinopenia, C-reactive protein, procalcitonin, and circulating cell-free DNA in critically Ill patients admitted with suspicion of sepsis

Jose Garnacho-Montero, María J Huici-Moreno, Antonio Gutiérrez-Pizarraya, Isabel López, Juan Antonio Márquez-Vácaro, Hada Macher, Juan Manuel Guerrero, Antonio Puppo-Moreno

Critical Care 2014, **18**:R116 (5 June 2014)

Abstract | Provisional PDF | PubMed

①

Research

Open Access

The effect of prone positioning on mortality in patients with acute respiratory distress syndrome: a meta-analysis of randomized controlled trials

Shu Ling Hu, Hong Li He, Chun Pan, Ai Ran Liu, Song Qiao Liu, Ling Liu, Ying Zi Huang, Feng Mei Guo, Yi Yang and Hai Bo Qiu

Introduction

Prone positioning (PP) has been reported to improve the survival of patients with severe acute respiratory distress syndrome (ARDS). However, it is uncertain whether the beneficial effects of PP are associated with positive end-expiratory pressure (PEEP) levels and long durations of PP. In this meta-analysis, we aimed to evaluate whether the effects of PP on mortality could be affected by PEEP and the duration of PP and to identify which patients might benefit the most from PP.

Methods

Randomized controlled trials (RCTs) that compared prone and supine ventilation were retrieved by searching the following electronic databases: PubMed/MEDLINE, the Cochrane Library, the Web of Science, and Elsevier Science (inception to May 2013). Two investigators independently selected RCTs and assessed their quality. The data extracted from the RCTs were combined in a cumulative meta-analysis and were analyzed using the methods recommended by the Cochrane Collaboration.

Results

A total of nine RCTs with 2,242 patients were included. All of the studies received scores of three points using the methods recommended by Jadad. One trial did not conceal allocation. This meta-analysis revealed that, compared with supine positioning (SP), PP decreased the 28- to 30-day mortality of ARDS patients with a partial pressure of arterial oxygen/fraction of inspired oxygen (P/F) <=100 mm Hg (risk ratio (RR) = 0.71; 95% confidence interval (CI): 0.57 to 0.89; P = 0.003; n = 508). PP was shown to reduce both 60-day (RR = 0.82; 95% CI: 0.68 to 0.99; P = 0.04; n = 518) and 90-day (RR = 0.57; 95% CI: 0.43 to 0.75; P <0.0001; n = 516) mortality in ARDS patients ventilated with PEEP >=10 cm H2O. Moreover, PP reduced 28- to 30-day mortality when the duration of PP was greater than 12 h/d (RR = 0.73; 95% CI: 0.54 to 0.99; P = 0.04; n = 1,067).

Conclusions

PP reduced mortality among severe ARDS patients and patients receiving relatively high PEEP levels. Moreover, long-term PP improved the survival of ARDS patients.

②

Research Open Access

Efficacy and adverse events of high frequency oscillatory ventilation in adult patients with acute respiratory distress syndrome: a meta-analysis

Chun-Ta Huang, Hsien-Ho Lin, Sheng-Yuan Ruan, Meng-Sui Lee, Yi-Ju Tsai, Chong-Jen Yu

Critical Care 2014, **18**:R102 (20 May 2014)

Abstract | Provisional PDF

- **Introduction**

  Theoretically, high frequency oscillatory ventilation (HFOV) achieves all goals of a lung-protective ventilatory mode and seems ideal for the treatment of adult patients with acute respiratory distress syndrome (ARDS). However, its effects on mortality and adverse clinical outcomes remain uncertain given the paucity of high-quality studies in this area. This meta-analysis was performed to evaluate the efficacy and adverse events of HFOV in adults with ARDS.

- **Methods**

  We searched PubMed, EMBASE and Cochrane Central Register of Controlled Trials through February 2014 to retrieve randomized controlled trials of HFOV in adult ARDS patients. Two independent reviewers extracted data on study methods, clinical and physiological outcomes and adverse events. The primary outcome was 30-day or hospital mortality. Risk of bias was evaluated with the Cochrane Collaboration's tool. Mortality, oxygenation and adverse effects of HFOV were compared to those of conventional mechanical ventilation. A random-effects model was applied for meta-analysis.

②

Research Open Access

Efficacy and adverse events of high frequency oscillatory ventilation in adult patients with acute respiratory distress syndrome: a meta-analysis

Chun-Ta Huang, Hsien-Ho Lin, Sheng-Yuan Ruan, Meng-Sui Lee, Yi-Ju Tsai, Chong-Jen Yu

Critical Care 2014, **18**:R102 (20 May 2014)

Abstract | Provisional PDF

- **Results**

  A total of five trials randomly assigning 1,580 patients met inclusion criteria. Pooled data showed that HFOV significantly improved oxygenation on day one of therapy (4 studies; 24% higher; 95% confidence interval (CI) 11 to 40%; P <0.01). However, HFOV did not reduce mortality risk (5 studies; risk ratio (RR) 1.04; 95% CI 0.83 to 1.31; P = 0.71) and two early terminated studies suggested a harmful effect of HFOV in ARDS (2 studies; RR 1.33; 95% CI 1.09 to 1.62; P <0.01). Safety profiles showed that HFOV was associated with a trend towards increased risk of barotrauma (5 studies; RR 1.19; 95% CI 0.83 to 1.72; P = 0.34) and unfavorable hemodynamics (5 studies; RR 1.16; 95% CI 0.97 to 1.39; P = 0.12).

- **Conclusions**

  HFOV improved oxygenation in adult patients with ARDS; however, it did not confer a survival benefit and might cause harm in the era of lung-protective ventilation strategy. The evidence suggests that HFOV should not be a routine practice in ARDS and further studies specifically selecting patients for this ventilator mode should be pursued.

③ Research Open Access

In adult acute respiratory distress syndrome patients, is high-frequency oscillatory ventilation more effective and safer than conventional protective ventilation? a meta-analysis of randomized controlled trials

Xiao-ling Gu, Guan-nan Wu, Yan-wen Yao, Dong-hong Shi, Yong Song

Critical Care 2014, **18**:R111 (30 May 2014)

Abstract | Provisional PDF | ▸Editor's summary

❖ **Introduction**

Comprehensively evaluating the efficacy and safety of high-frequency oscillatory ventilation (HFOV) is important to allow clinicians who are using or considering this intervention to make appropriate decisions.

❖ **Methods**

To find randomized controlled trials (RCTs) comparing HFOV with conventional mechanical ventilation (CMV) as an initial treatment for adult ARDS patients, we searched electronic databases (including PubMed, MedLine, Springer Link, Elsevier Science Direct, ISI web of knowledge, and EMBASE) with the following terms: "acute respiratory distress syndrome", "acute lung injury", and "high frequency oscillation ventilation". Additional sources included reference lists from the identified primary studies and relevant meta-analyses. Two investigators independently screened articles and extracted data. Meta-analysis was conducted using random-effects models.

❖ **Results**

We included 6 RCTs with a total of 1,608 patients in this meta-analysis. Compared with CMV, HFOV did not significantly reduce the mortality at 30 or 28 days. The pooled relative risk (RR) was 1.051 (95% confidence interval (CI) 0.813 to 1.358). ICU mortality was also not significantly reduced in HFOV group, with a pooled RR of 1.218 (95% CI 0.925 to 1.604). The pooled effect sizes of HFOV for oxygenation failure, ventilation failure and duration of mechanical ventilation were 0.557 (95% CI 0.351 to 0.884), 0.892 (95% CI 0.435 to 1.829) and 0.079 (95% CI -0.045 to 0.203), respectively. The risk of barotrauma and hypotension were similar between the CMV group and HFOV group, with a RR of 1.205 (95% CI 0.834 to 1.742) and a RR of 1.326 (95% CI 0.271 to 6.476), respectively.

❖ **Conclusions**

Although HFOV seems not to increase the risk of barotrauma or hypotension, and reduces the risk of oxygenation failure, it does not improve survival in adult acute respiratory distress syndrome patients.

④

Research Open Access Highly accessed

New insights into the mechanisms involved in B-type natriuretic peptide elevation and its prognostic value in septic patients

John Papanikolaou, Demosthenes Makris, Maria Mpaka, Eleni Palli, Paris Zygoulis, Epaminondas Zakynthinos

Critical Care 2014, **18**:R94 (9 May 2014)

- **Introduction**

  Elevated plasma B-type natriuretic peptide (BNP) levels in patients with critical sepsis (severe sepsis/septic shock) may indicate septic cardiomyopathy. However, multiple heterogeneous conditions may also be involved in BNP rise. In addition, the prognostic value of BNP in sepsis remains debatable. This study sought for potential independent determinants of BNP elevation in critical sepsis; the prognostic value of BNP was also evaluated.

- **Methods**

  In this observational study, we enrolled mechanically ventilated critically septic patients requiring hemodynamic monitoring through a pulmonary artery catheter. All clinical, laboratory and survival data were prospectively collected. Plasma BNP concentrations were measured daily for five consecutive days. Septic cardiomyopathy was assessed on day-1, by left and right ventricular ejection fraction (EF) derived from echocardiography and thermodilution respectively. Mortality was recorded at day-28.

④

Research Open Access Highly accessed

New insights into the mechanisms involved in B-type natriuretic peptide elevation and its prognostic value in septic patients

John Papanikolaou, Demosthenes Makris, Maria Mpaka, Eleni Palli, Paris Zygoulis, Epaminondas Zakynthinos

Critical Care 2014, **18**:R94 (9 May 2014)

❖ **Results**

Forty-two patients with severe sepsis (N = 12) and septic shock (N = 30) were finally enrolled. Daily BNP levels were significantly elevated in septic shock compared to severe sepsis (P <= 0.002). Critical illness severity (assessed by APACHE II and maximum SOFA scores), and peak noradrenaline dose on day-1 were independent determinants of BNP elevation (P < 0.05). Bi-ventricular EFs were inversely correlated with longitudinal BNP measurements (P < 0.05), however non-independently. Pulmonary capillary wedge pressures (PCWP) and volume expansion showed no correlation with BNP. In septic shock, increased CVP (central venous pressure) and CVP/PCWP ratio were independently associated with early BNP values (P < 0.05).Twenty-eight-day mortality was 47.6% (20/42). Daily BNP values poorly predicted outcome; BNP on day-1 > 800 pg/mL (the best cutoff point) fairly predicted mortality, with a sensitivity%, specificity%, and area under the curve [AUC(95%CI)] of 65, 64 and 0.70(0.54-0.86),P = 0.03, respectively. Plasma BNP levels declined faster in survivors than in non-survivors, either in critical sepsis or in septic shock (P <= 0.002). In septic shock, BNP/CVP ratio > 126 pg.mmHg-1.mL-1 on day-2 and inability to reduce BNP below 500 pg/mL implied increased mortality (P <= 0.036).

❖ **Conclusions**

The severity of critical illness rather than septic cardiomyopathy is probably the major determinant of BNP elevation. Daily BNP values are of limited prognostic value in predicting 28-day mortality; however, fast BNP decline over time and a decrease of BNP below 500 pg/mL may imply favourable outcome.

⑤

Research Open Access Highly accessed

High dose tigecycline in critically ill patients with severe infections due to multidrug-resistant bacteria

Gennaro De Pascale, Luca Montini, Mariano Pennisi, Valentina Bernini, Riccardo Maviglia, Giuseppe Bello, Teresa Spanu, Mario Tumbarello, Massimo Antonelli

Critical Care 2014, **18**:R90 (5 May 2014)

Introduction

The high incidence of multidrug-resistant (MDR) bacteria among patients admitted to ICUs has determined an increase of tigecycline (TGC) use for the treatment of severe infections. Many concerns have been raised about the efficacy of this molecule and increased dosages have been proposed. Our purpose is to investigate TGC safety and efficacy at higher than standard doses.

Methods

We conducted a retrospective study of prospectively collected data in the ICU of a teaching hospital in Rome. Data from all patients treated with TGC for a microbiologically confirmed infection were analyzed. The safety profile and efficacy of high dosing regimen use were investigated.

Results

Over the study period, 54 patients (pts) received TGC at a standard dose (SD group: 50 mg every 12 hours) and 46 at a high dose (HD group: 100 mg every 12 hours). Carbapenem-resistant *Acinetobacter.baumannii* (blaOXA-58 and blaOXA-23 genes) and*Klebsiella pneumoniae* (blaKPC-3 gene) were the main isolated pathogens (n = 79). There were no patients requiring TGC discontinuation or dose reduction because of adverse events. In the ventilation-associated pneumonia population (VAP) subgroup (63 patients: 30 received SD and 33 HD), the only independent predictor of clinical cure was the use of high tigecycline dose (odds ratio (OR) 6.25; 95% confidence interval (CI) 1.59 to 24.57; $P = 0.009$) whilst initial inadequate antimicrobial treatment (IIAT) (OR 0.18; 95% CI 0.05 to 0.68; $P = 0.01$) and higher Sequential Organ Failure Assessment (SOFA) score (OR 0.66; 95% CI 0.51 to 0.87; $P = 0.003$) were independently associated with clinical failure.

Conclusions

TGC was well tolerated at a higher than standard dose in a cohort of critically ill patients with severe infections. In the VAP subgroup the high-dose regimen was associated with better outcomes than conventional administration due to Gram-negative MDR bacteria.

⑥

Research Open Access

A 10 second fluid challenge guided by transthoracic echocardiography can predict fluid responsiveness

Yunfan Wu, Shusheng Zhou, Zhihua Zhou, Bao Liu

Critical Care 2014, **18**:R108 (27 May 2014)

Introduction

The accurate assessment of intravascular volume status for the therapy of severe hypovolemia and shock is difficult and critical to critically ill patients. Noninvasive evaluation of fluid responsiveness by the rapid infusion of a very limited amount of volume is an important clinical goal. This study aimed to test if echocardiographic parameters could predict fluid responsiveness in critically ill patients following a low-volume (50ml crystalloid solution) infusion over 10 seconds.

Methods

We prospectively studied 55 mechanically ventilated patients. Echocardiography was performed during a 50 ml infusion of crystalloid solution over 10 seconds and a further 450 ml over 15 minutes. Cardiac output (CO), stroke volume (SV), aortic velocity time index (VTI), and left ventricular ejection fraction (LVEF) were recorded. Patients were classified as responders (R) if CO increased by at least 15% following the 500 ml volume expansion or were classified as non-responders (NR) if CO increased by less than 15%. Area under the receiver operating characteristic curves (AUC) compared CO variations after 50 ml over 10 seconds ([increment]CO50) and 500 ml over 15 minutes ([increment]CO500) and the variation of VTI after infusion of 50 ml fluid over 10 seconds ([increment]VTI50).

Results

In total, 50 patients were enrolled, of which 27 (54%) were R. General characteristics, LVEF, HR and CVP were similar between responders and nonresponders (NR). In the R group, the AUC for [increment]CO50 was 0.95 +/- 0.03 ($P < 0.01$; best cut-off value, 6%; sensitivity, 93%; specificity, 91%). Moreover, [increment]CO50 and [increment]CO500 were strongly correlated (($r = 0.87$; $P < 0.01$). The AUC for [increment]VTI50 was 0.91 +/- 0.04 ($P < 0.01$; best cut-off value, 9%; sensitivity, 74%; specificity, 95%). [increment]VTI50 and [increment]CO500 were positively correlated ($r = 0.72$; $P < 0.01$).

Conclusion

In critically ill patients, the variation of CO and VTI after the administration of 50ml crystalloid solution over 10 seconds ([increment]CO50 and [increment]VTI50) can accurately predict fluid responsiveness.

⑦

Research Open Access

Inflammation biomarkers and delirium in critically ill patients

Cristiane Ritter, Cristiane D Tomasi, Felipe Dal-Pizzol, Bernardo Bollen Pinto, Alex Dyson, Aline S de Miranda, Clarissa M Comim, Márcio Soares, Antonio L Teixeira, João Quevedo, Mervyn Singer

Critical Care 2014, **18**:R106 (23 May 2014)

❖ Introduction

Delirium is a common occurrence in critically ill patients and is associated with an increase in morbidity and mortality. Septic patients with delirium may differ from a general critically ill population. The aim of this investigation was to study the relationship between systemic inflammation and the development of delirium in septic and non-septic critically ill patients.

❖ Methods

We performed a prospective cohort study in a 20-bed mixed intensive care unit (ICU) including 78 (delirium = 31; non-delirium = 47) consecutive patients admitted for more than 24 hours. At enrollment, patients were allocated to septic or non-septic groups according to internationally agreed criteria. Delirium was diagnosed using the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) during the first 72 hours of ICU admission. Blood samples were collected within 12 hours of enrollment for determination of tumor necrosis factor (TNF)-alpha, soluble TNF Receptor (STNFR)-1 and -2, interleukin (IL)-1beta, IL-6, IL-10 and adiponectin.

❖ Results

Out of all analyzed biomarkers, only STNFR1 ($P = 0.003$), STNFR2 ($P = 0.005$), adiponectin ($P = 0.005$) and IL-1beta ($P < 0.001$) levels were higher in delirium patients. Adjusting for sepsis and sedation, these biomarkers were also independently associated with delirium occurrence. However, none of them were significant influenced by sepsis.

❖ Conclusions

STNFR1, STNFR2, adiponectin and IL-1beta were associated with delirium. Sepsis did not modify the relationship between the biomarkers and delirium occurrence.

⑧

Research Open Access Highly accessed

Does contemporary vancomycin dosing achieve therapeutic targets in a heterogeneous clinical cohort of critically ill patients? Data from the multinational DALI Study

Stijn Blot, Despoina Koulenti, Murat Akova, Matteo Bassetti, Jan J De Waele, George Dimopoulos, Kirsi-Maija Kaukonen, Claude Martin, Philippe Montravers, Jordi Rello, Andrew Rhodes, Therese Starr, Steven C Wallis, Jeffrey Lipman, Jason A Roberts

Critical Care 2014, **18**:R99 (15 May 2014)

- **Introduction**

  The objective of this study was to describe the pharmacokinetics of vancomycin in ICU patients and to examine whether contemporary antibiotic dosing results in concentrations that have been associated with favourable response.

- **Methods**

  The Defining Antibiotic Levels in Intensive Care (DALI) study was a prospective, multicentre pharmacokinetic point-prevalence study. Antibiotic dosing was as per the treating clinician either by intermittent bolus or continuous infusion. Target trough concentration was defined as ≥15mg/L and target pharmacodynamic index was defined as an area under the concentration-time curve over a 24-hour period divided by the minimum inhibitory concentration of the suspected bacteria (AUC_{0-24}/MIC ratio) >400 (assuming MIC ≤1mg/L).

⑧

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Does contemporary vancomycin dosing achieve therapeutic targets in a heterogeneous clinical cohort of critically ill patients? Data from the multinational DALI Study

Stijn Blot, Despoina Koulenti, Murat Akova, Matteo Bassetti, Jan J De Waele, George Dimopoulos, Kirsi-Maija Kaukonen, Claude Martin, Philippe Montravers, Jordi Rello, Andrew Rhodes, Therese Starr, Steven C Wallis, Jeffrey Lipman, Jason A Roberts

Critical Care 2014, **18**:R99 (15 May 2014)

❖ **Results**

Data of 42 patients from 26 ICUs were eligible for analysis. A total of 24 patients received vancomycin by continuous infusion (57%). Daily dosage of vancomycin was 27mg/kg (interquartile range (IQR) 18 to 32), and not different between patients receiving intermittent or continuous infusion. Trough concentrations were highly variable (median 27, IQR 8 to 23mg/L). Target trough concentrations were achieved in 57% of patients, but more frequently in patients receiving continuous infusion (71% versus 39%; P=0.038). Also the target AUC_{0-24}/MIC ratio was reached more frequently in patients receiving continuous infusion (88% versus 50%; P=0.008). Multivariable logistic regression analysis with adjustment by the propensity score could not confirm continuous infusion as an independent predictor of an AUC_{0-24}/MIC >400 (odds ratio (OR) 1.65, 95% confidence interval (CI) 0.2 to 12.0) or a C_{min} ≥15mg/L (OR 1.8, 95% CI 0.4 to 8.5).

❖ **Conclusions**

This study demonstrated large interindividual variability in vancomycin pharmacokinetic and pharmacodynamic target attainment in ICU patients. These data suggests that a re-evaluation of current vancomycin dosing recommendations in critically ill patients is needed to more rapidly and consistently achieve sufficient vancomycin exposure.

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Timing of vasopressor initiation and mortality in septic shock: a cohort study

Vance Beck, Dan Chateau, Gregory L Bryson, Amarnath Pisipati, Sergio Zanotti, Joseph E Parrillo, Anand Kumar, The Cooperative Antimicrobial Therapy of Septic Shock (CATSS) Database Research Group

Critical Care 2014, **18**:R97 (12 May 2014)

Abstract | Provisional PDF

- **Introduction**

  Despite recent advances in the management of septic shock, mortality remains unacceptably high. Earlier initiation of key therapies including appropriate antimicrobials and fluid resuscitation appears to reduce the mortality in this condition. This study examined whether early initiation of vasopressor therapy is associated with improved survival in fluid therapy-refractory septic shock.

- **Methods**

  Utilizing a well-established database, relevant information including duration of time to vasopressor administration following the initial documentation of recurrent/persistent hypotension associated with septic shock was assessed in 8,670 adult patients from 28 ICUs in Canada, the United States of America, and Saudi Arabia. The primary endpoint was survival to hospital discharge. Secondary endpoints were length of ICU and hospital stay as well as duration of ventilator support and vasopressor dependence. Analysis involved multivariate linear and logistic regression analysis.

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Critical Care 2014, **18**:R97 (12 May 2014)

Abstract | Provisional PDF

- **Results**

In total, 8,640 patients met the definition of septic shock with time of vasopressor/inotropic initiation documented. Of these, 6,514 were suitable for analysis. The overall unadjusted hospital mortality rate was 53%. Independent mortality correlates included liver failure (odds ratio (OR) 3.46, 95% confidence interval (CI), 2.67 to 4.48), metastatic cancer (OR 1.63, CI, 1.32 to 2.01), AIDS (OR 1.91, CI, 1.29 to 2.49), hematologic malignancy (OR 1.88, CI, 1.46 to 2.41), neutropenia (OR 1.78, CI, 1.27 to 2.49) and chronic hypertension (OR 0.62 CI, 0.52 to 0.73). Delay of initiation of appropriate antimicrobial therapy (OR 1.07/hr, CI, 1.06 to 1.08), age (OR 1.03/yr, CI, 1.02 to 1.03), and Acute Physiology and Chronic Health Evaluation (APACHE) II Score (OR 1.11/point, CI, 1.10 to 1.12) were also found to be significant independent correlates of mortality. After adjustment, only a weak correlation between vasopressor delay and hospital mortality was found (adjusted OR 1.02/hr, 95% CI 1.01 to 1.03, P <0.001). This weak effect was entirely driven by the group of patients with the longest delays (>14.1hours). There was no significant relationship of vasopressor initiation delay to duration of vasopressor therapy (P=0.313) and only a trend to longer duration of ventilator support (P=0.055) among survivors.

- **Conclusion**

Marked delays in initiation of vasopressor/inotropic therapy are associated with a small increase in mortality risk in patients with septic shock.

⑩

Research Open Access Highly accessed

Early fluid loading in acute respiratory distress syndrome with septic shock deteriorates lung aeration without impairing arterial oxygenation: a lung ultrasound observational study

Fabiola Caltabeloti, Antoine Monsel, Charlotte Arbelot, Hélène Brisson, Qin Lu, Wen-Jie Gu, Guang-Ju Zhou, José O C Auler, Jean-Jacques Rouby

Critical Care 2014, **18**:R91 (6 May 2014)

❖ **Introduction**

The study was designed to assess the impact of fluid loading on lung aeration, oxygenation and hemodynamics in patients with septic shock and acute respiratory distress syndrome (ARDS).

❖ **Methods**

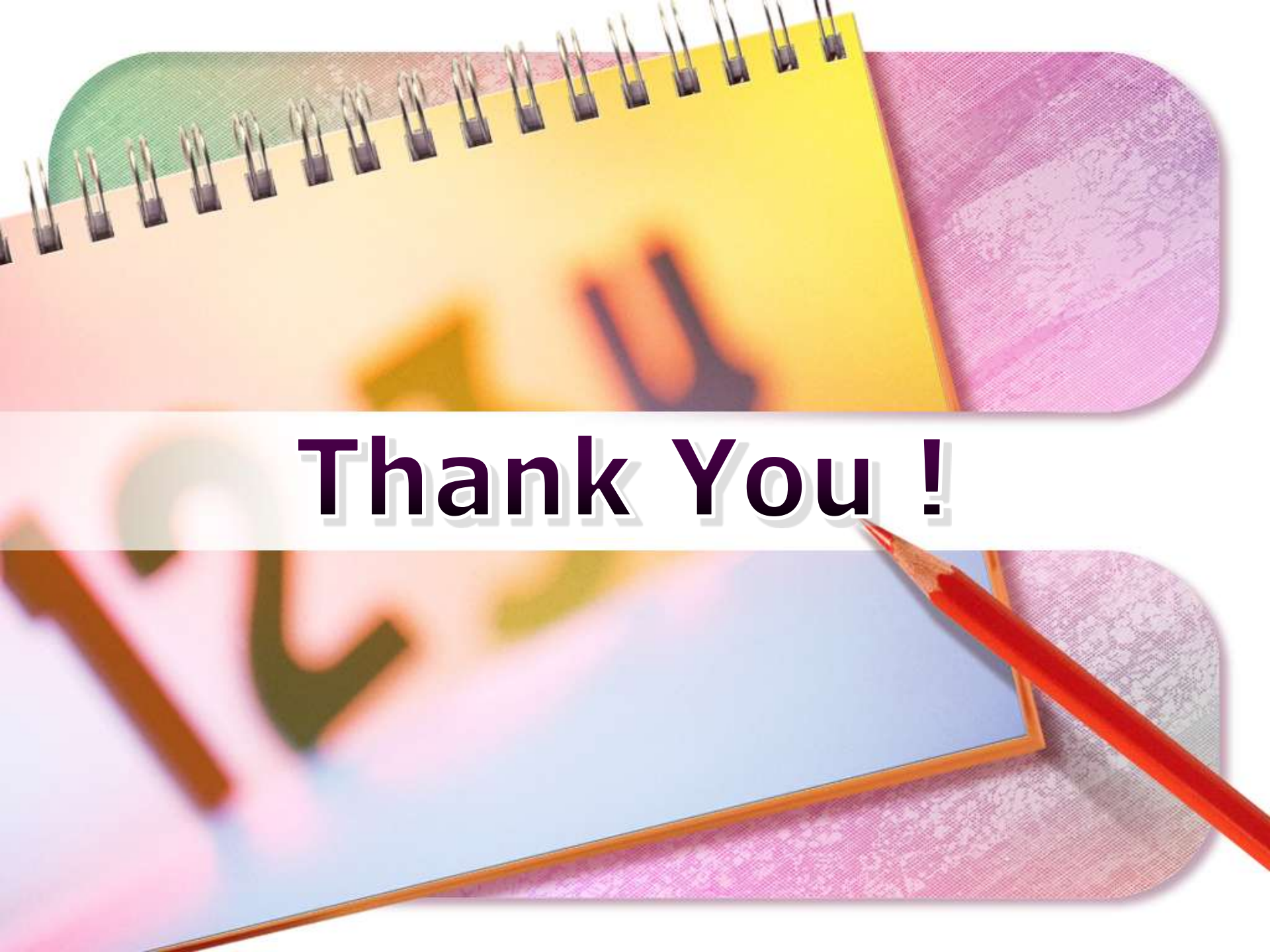
During a 1-year period, a prospective observational study was performed in 32 patients with septic shock and ARDS. Cardiorespiratory parameters were measured using Swan Ganz (n = 29) or PiCCO catheters (n = 3). Lung aeration and regional pulmonary blood flows were measured using bedside transthoracic ultrasound. Measurements were performed before (T0), at the end of volume expansion (T1) and 40 minutes later (T2), consisting of 1-L of saline over 30 minutes during the first 48 h following onset of septic shock and ARDS.

❖ **Results**

Lung ultrasound score increased by 23% at T2, from 13 at baseline to 16 ($P < 0.001$). Cardiac index and cardiac filling pressures increased significantly at T1 ($P < 0.001$) and returned to control values at T2. The increase in lung ultrasound score was statistically correlated with fluid loading-induced increase in cardiac index and was not associated with increase in pulmonary shunt or regional pulmonary blood flow. At T1, PaO2/FiO2significantly increased ($P < 0.005$) from 144 (123 to 198) to 165 (128 to 226) and returned to control values at T2, whereas lung ultrasound score continued to increase.

❖ **Conclusions**

Early fluid loading transitorily improves hemodynamics and oxygenation and worsens lung aeration. Aeration changes can be detected at the bedside by transthoracic lung ultrasound, which may serve as a safeguard against excessive fluid loading.


Thank You !