

读书报告



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Original Research: COPD

+ Total and State-Specific Medical and Absenteeism Costs of COPD Among Adults Aged ≥ 18 Years in the United States for 2010 and Projections Through 2020

Earl S. Ford, MD, MPH, Louise B. Murphy, PhD, Olga Khavjou, MA, Wayne H. Giles, MD, James B. Holt, PhD and Janet B. Croft, PhD

Chest. 2015;147(1):31-45. doi:10.1378/chest.14-0972

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+ Association Between Pathogens Detected Using Quantitative Polymerase Chain Reaction With Airway Inflammation in COPD at Stable State and Exacerbations

Bethan L. Barker, BMBS, Koirobi Haldar, MSc, Hemu Patel, BSc, Ian D. Pavord, MD, Michael R. Barer, PhD, Christopher E. Brightling, PhD, FCCP and Mona Bafadhel, PhD

Chest. 2015;147(1):46-55. doi:10.1378/chest.14-0764

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+ Urinary Albumin-Creatinine Ratio, Estimated Glomerular Filtration Rate, and All-Cause Mortality Among US Adults With Obstructive Lung Function

Earl S. Ford, MD, MPH

A Prospective Evaluation of Ventilator-Associated Conditions and Infection-Related Ventilator-Associated Conditions

Anthony F. Boyer, MD, Noah Schoenberg, MD, Hilary Babcock, MD, MPH, Kathleen M. McMullen, MPH, Scott T. Micek, PharmD and Marin H. Kollef, MD, FCCP

Chest. 2015;147(1):68-81. doi:10.1378/chest.14-0544

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Factors Associated With Family Satisfaction With End-of-Life Care in the ICU: A Systematic Review

Laura J. Hinkle, MD, Gabriel T. Bosslet, MD, FCCP and Alexia M. Torke, MD

Chest. 2015;147(1):82-93. doi:10.1378/chest.14-1098

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Delirium Detection Using EEG: What and How to Measure

Arendina W. van der Kooi, PhD, Irene J. Zaal, MD, Francina A. Klijn, MD, Huiberdina L. Koek, MD, PhD, Ronald C. Meijer, MD, Frans S. Leijten, MD, PhD and Arjen J. Slooter, MD, PhD

Chest. 2015;147(1):94-101. doi:10.1378/chest.13-3050

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Would Triage Predictors Perform Better Than First-Come, First-Served in Pandemic Ventilator Allocation?

Robert K. Kanter, MD



A Prospective Evaluation of Ventilator-Associated Conditions and Infection-Related Ventilator-Associated Conditions Ventilator-Associated Conditions

- METHODS: This study was a prospective 12-month cohort study (January 2013 to December 2013).
 - RESULTS: We prospectively surveyed 1,209 patients ventilated for ≥ 2 calendar days.
 - VAC ----67 (7 per 1000 ventilator days%)
 - IVAC----34 (3.6 per 1000 ventilator days%)
 - VAP-----86 (10 per 1000 ventilator days%)
 - The sensitivity of the VAC criteria for the detection of VAP was 25.9% (95% CI, 16.7%–34.5%).
 - The **mortality rate** of patients having a VAC was **significantly greater** than that of patients without a VAC (**65.7% vs 14.4%, $P < .001$**).
 - The most **common causes** of VACs included IVACs (50.7%), ARDS (16.4%), pulmonary edema (14.9%), and atelectasis (9.0%).
 - CONCLUSIONS: Although relatively uncommon, VACs are associated with greater mortality and morbidity when they occur. the VAC criteria capture a minority of VAP episodes.
-

Original Research: Cardiovascular Disease

Prevalence, Incidence, and Lifetime Risk of Atrial Fibrillation in China: New Insights Into the Global Burden of Atrial Fibrillation

Yutao Guo, MD, PhD, Yingchun Tian, MD, Hao Wang, MD, Quanjin Si, MD, PhD, Yutang Wang, MD, PhD and Gregory Y. H. Lip, MD

Chest. 2015;147(1):109-119. doi:10.1378/chest.14-0321

Original Research: Sleep Disorders

Sex and Acetazolamide Effects on Chemoreflex and Periodic Breathing During Sleep at Altitude

Sergio Caravita, MD, Andrea Faini, PhD, Carolina Lombardi, MD, PhD, Mariaconsuelo Valentini, MD, Francesca Gregorini, MSc, Jessica Rossi, MD, Paolo Meriggi, PhD, Marco Di Rienzo, MSc, Grzegorz Bilo, MD, PhD, Piergiuseppe Agostoni, MD, PhD and Gianfranco Parati, MD, PhD

Chest. 2015;147(1):120-131. doi:10.1378/chest.14-0317

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Endothelial Function in Children With OSA and the Effects of Adenotonsillectomy

Kate C. C. Chan, MB, Chun T. Au, MPhil, Ping Chook, MD, Dennis L. Y. Lee, MB, Hugh S. Lam, MB, Yun K. Wing, MB and Albert Martin Li, MD

Original Research: Asthma

+ Rates and Correlates of Relapse Following ED Discharge for Acute Asthma: A Canadian 20-Site Prospective Cohort Study

Brian H. Rowe, MD, FCCP, Cristina Villa-Roel, MD, Sumit R. Majumdar, MD, MPH, Riyad B. Abu-Laban, MD, MHSc, Shawn D. Aaron, MD, Ian G. Stiell, MD, Jeffrey Johnson, PhD, Ambikaipakan Senthilselvan, PhD and for the AIR Investigators

Original Research: Pulmonary Vascular Disease

+ Sex Differences in Response to Tadalafil in Pulmonary Arterial Hypertension

Stephen C. Mathai, MD, MHS, FCCP, Paul M. Hassoun, MD, FCCP, Milo A. Puhan, MD, PhD, Yi Zhou, PhD and Robert A. Wise, MD, FCCP

Chest. 2015;147(1):188-197. doi:10.1378/chest.14-0263

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+ Echocardiographic Assessment of Estimated Right Atrial Pressure and Size Predicts Mortality in Pulmonary Arterial Hypertension

Christopher Austin, MD, Khadija Alassas, MD, Charles Burger, MD, FCCP, Robert Safford, MD, PhD, Ricardo Pagan, MD, Katherine Duello, MD, Preetham Kumar, MD, Tonya Zeiger, RRT and Brian Shapiro, MD

Chest. 2015;147(1):198-208. doi:10.1378/chest.13-3035

Echocardiographic Assessment of Estimated Right Atrial Pressure and Size Predicts Mortality in Pulmonary Arterial Hypertension

Estimated Right Atrial Pressure Predicts Mortality

- METHODS: A **retrospective analysis** of 121 consecutive patients with PAH based on right-sided heart **catheterization and echocardiography** was performed. The eRAP was calculated by inferior vena cava diameter and collapse using 2005 and 2010 American Society of Echocardiography (ASE) definitions. Accuracy and correlation of eRAP to RAP was assessed. Kaplan-Meier survival analysis by eRAP, right atrial area.
- RESULTS:
 - Elevation of eRAP was associated with decreased survival time compared with lower eRAP ($P < .001$, relative risk = 7.94 for **eRAP > 15 mm Hg vs eRAP ≤ 5 mm Hg**).
 - **Univariate analysis** : eRAP > 15 mm Hg, right atrial area > 18 cm², presence of pericardial effusion, right ventricular fractional area change < 35%, and at least moderate tricuspid regurgitation was **predictive of poor survival**.
 - **multivariate analysis** revealed that eRAP > 15 mm Hg was the only echocardiographic risk factor that was predictive of mortality (hazard ratio = 2.28, $P = .037$).
- CONCLUSIONS: **Elevation of eRAP by echocardiography** at baseline assessment was strongly **associated with increased risk of death** or transplant in patients with PAH. This measurement may represent an important prognostic component in the comprehensive echocardiographic evaluation of PAH.

Original Research: Lung Cancer

Endosonography for Mediastinal Nodal Staging of Clinical N1 Non-small Cell Lung Cancer: A Prospective Multicenter Study

Christophe Doms, MD, PhD, Kurt G. Tournoy, PhD, Olga Schuurbiens, PhD, Herbert Decaluwe, MD, Frédéric De Ryck, MD, Ad Verhagen, MD, Roel Beelen, MD, Erik van der Heijden, PhD and Paul De Leyn, PhD

Chest. 2015;147(1):209-215. doi:10.1378/chest.14-0534

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Validation of a Scoring System to Predict Recurrence of Resected Solitary Fibrous Tumors of the Pleura

Luis F. Tapias, MD, Olaf Mercier, MD, PhD, Maria R. Ghigna, MD, Benoit Lahon, MD, Hang Lee, PhD, Douglas J. Mathisen, MD, FCCP, Philippe Dartevelle, MD and Michael Lanuti, MD, FCCP

Chest. 2015;147(1):216-223. doi:10.1378/chest.14-1180

+ Risk Factors for Cardiovascular Disease in People With Idiopathic Pulmonary Fibrosis: A Population-Based Study

William Dalleywater, BMBS, Helen A. Powell, PhD, Richard B. Hubbard, MD and Vidya Navaratnam, PhD

Chest. 2015;147(1):150-156. doi:10.1378/chest.14-0041

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+ The Impact of Lung Cancer on Survival of Idiopathic Pulmonary Fibrosis

Sara Tomassetti, MD, Christian Gurioli, MD, Jay H. Ryu, MD, FCCP, Paul A. Decker, MS, Claudia Ravaglia, MD, Paola Tantalocco, BME, Matteo Buccioli, BME, Sara Piciocchi, MD, Nicola Sverzellati, MD, Alessandra Dubini, MD, Giampaolo Gavelli, MD, Marco Chilosi, MD and Venerino Poletti, MD, FCCP

Chest. 2015;147(1):157-164. doi:10.1378/chest.14-0359

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+ Interstitial Pneumonia Related to Undifferentiated Connective Tissue Disease: Pathologic Pattern and Prognosis

+ Outcomes After Hospitalization in Idiopathic Pulmonary Fibrosis: A Cohort Study

A. Whitney Brown, MD, Chelsea P. Fischer, BS, Oksana A. Shlobin, MD, Russell G. Buhr, MD, Shahzad Ahmad, MD, Nargues A. Weir, MD, FCCP and Steven D. Nathan, MD, FCCP

Chest. 2015;147(1):173-179. doi:10.1378/chest.13-2424

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+ Retrospective Review of Combined Sirolimus and Simvastatin Therapy in Lymphangioleiomyomatosis

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Original Research: Critical Care

+ A Scoping Review of Patient Discharge From Intensive Care: Opportunities and Tools to Improve Care

+ Preintubation Application of Oral Chlorhexidine Does Not Provide Additional Benefit in Prevention of Early-Onset Ventilator-Associated Pneumonia



+ Single-Dose Etomidate Does Not Increase Mortality in Patients With Sepsis: A Systematic Review and Meta-analysis of Randomized Controlled Trials and Observational Studies



+ Impact of Diagnostic Criteria on the Incidence of Ventilator-Associated Pneumonia

+ Noninvasive Positive Pressure Ventilation Following Esophagectomy: Safety Demonstrated in a Pig Model



Preintubation Application of Oral Chlorhexidine Does Not Provide Additional Benefit in Prevention of Early-Onset Ventilator-Associated Pneumonia

Preintubation Oral Chlorhexidine

- BACKGROUND: Daily application of oral chlorhexidine gluconate (CHX) following intubation to reduce the risk of ventilator-associated pneumonia (VAP) is now the standard of care in many ICUs. This randomized clinical trial evaluated the benefit of adding a preintubation CHX dose to the known benefit of postintubation CHX to reduce the risk of early-onset VAP. A secondary aim was to test the effect of a preintubation oral application of CHX on early endotracheal tube (ETT) colonization.
- METHODS:
 - N = 314, from two teaching hospitals
 - oral application of 5 mL CHX 0.12% solution before intubation (intervention group, n = 157), or not control group (n = 157).
 - All subjects received CHX bid after intubation. Clinical Pulmonary Infection Score (CPIS) as the response variable. ETTs were cultured at extubation.
- RESULTS: Application of a preintubation dose of CHX did not provide benefit over the intervention period beyond that afforded by daily oral CHX following intubation. ETT colonization at extubation was < 20% in both groups (no statistically significant difference). Mean CPIS remained < 6 (VAP threshold score) in both groups.
- CONCLUSIONS: preintubation CHX may be inconsequential when the ventilator bundle, including daily oral CHX, is in place. During the preintubation period, providers should focus their attention on other critical activities.

Single-Dose Etomidate Does Not Increase Mortality in Patients With Sepsis

Etomidate on Mortality in Patients With Sepsis: A Systematic Review and Meta-analysis of Randomized Controlled Trials and Observational Studies

- **BACKGROUND:** The effect of single-dose etomidate on mortality in patients with sepsis **remains controversial**. We systematically reviewed the literature to investigate whether a single dose of etomidate for rapid sequence intubation increased mortality in patients with sepsis.
- **METHODS:** PubMed, Embase, and CENTRAL (Cochrane Central Register of Controlled Trials) were searched for randomized controlled trials (RCTs) and observational studies regarding the effect of single-dose etomidate on mortality in adults with sepsis. The primary outcome was all-cause mortality.
- **RESULTS:**
 - single-dose etomidate was **not associated with increased mortality** in patients with sepsis in both the RCTs (RR, 1.20; 95% CI, 0.84–1.72; $P = .31$; $I^2 = 0\%$) and the observational studies (RR, 1.05; 95% CI, 0.97–1.13; $P = .23$; $I^2 = 25\%$).
 - Single-dose etomidate **increased the risk of adrenal insufficiency** in patients with sepsis (eight studies; RR, 1.42; 95% CI, 1.22–1.64; $P < .00001$).
- **CONCLUSIONS:** Current evidence indicates that single-dose etomidate does not increase mortality in patients with sepsis. However, this finding largely relies on data from observational studies and is potentially subject to selection bias; hence, high-quality and adequately powered RCTs are warranted.

Noninvasive Positive Pressure Ventilation Following Esophagectomy Esophagectomy Anastomosis Pressure Tolerance: Safety Demonstrated in a Pig Model

■ METHODS:

- created esophagogastric anastomosis. With continuous intraluminal pressure monitoring, we progressively insufflated the anastomosis with a syringe until we detected an anastomotic leak, and recorded the maximum pressure before leakage.
- in 10 esophageal specimens and 10 live pigs.
- laryngeal mask airway (LMA) to five live pigs and measured the pressure in the proximal esophagus with increasing ventilatory pressures.

■ RESULTS:

- The perforation was always at the anastomosis.
- The ex vivo and in vivo anastomoses tolerated a mean of 101 ± 44 cm H₂O and 84 ± 38 cm H₂O before leak, respectively ($P = .51$).
- When 20, 30, and 40 cm H₂O of positive pressure via LMA were delivered, the esophagus sensed 5 ± 4 cm H₂O (25%), 11 ± 11 cm H₂O (37%), and 15 ± 9 cm H₂O (38%), respectively.

- CONCLUSIONS: Our pig model suggests that an esophagectomy anastomosis can tolerate a considerably higher pressure than is transmitted to the esophagus during NPPV. NPPV may be a safe alternative to ET after esophagectomy.

Original Research: Sleep Disorders

Is a Raised Bicarbonate, Without Hypercapnia, Part of the Physiologic Spectrum of Obesity-Related Hypoventilation?

Ari R. G. Manuel, MBBS, Nicholas Hart, PhD and John R. Stradling, MD

Chest. 2015;147(2):362-368. doi:10.1378/chest.14-1279

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Original Research: COPD

Factors Predictive of Airflow Obstruction Among Veterans With Presumed Empirical Diagnosis and Treatment of COPD

Bridget F. Collins, MD, Laura C. Feemster, MD, Seppo T. Rinne, MD, PhD and David H. Au, MD

Chest. 2015;147(2):369-376. doi:10.1378/chest.14-0672

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Quality of Well-being Outcomes in the National Emphysema Treatment Trial

Original Research: Asthma

What Is the Role of Tiotropium in Asthma?: A Systematic Review With Meta-analysis

Gustavo J. Rodrigo, MD and José A. Castro-Rodríguez, MD, PhD

Chest. 2015;147(2):388-396. doi:10.1378/chest.14-1698

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The Effect of Omega-3 Fatty Acids on Bronchial Hyperresponsiveness, Sputum Eosinophilia, and Mast Cell Mediators in Asthma

John D. Brannan, PhD, Johan Bood, PhD, Ahmad Alkhabaz, MD, David Balgoma, PhD, Joceline Otis, BSc, Ingrid Delin, BSc, Barbro Dahlén, MD, PhD, Craig E. Wheelock, PhD, Parameswaran Nair, MD, PhD, Sven-Erik Dahlén, MD, PhD and Paul M. O'Byrne, MB, FCCP

Chest. 2015;147(2):397-405. doi:10.1378/chest.14-1214

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Improved Management of Acute Asthma Among Pregnant Women Presenting to the ED

Original Research: Diffuse Lung Disease

- + **The Clinical Course of Diffuse Idiopathic Pulmonary Neuroendocrine Cell Hyperplasia**

 - + **Palliative Care and Location of Death in Decedents With Idiopathic Pulmonary Fibrosis**

 - + **Validation of the GAP Score in Korean Patients With Idiopathic Pulmonary Fibrosis**

 - + **Racial Difference in Sarcoidosis Mortality in the United States**

 - + **CT Scan Findings of Probable Usual Interstitial Pneumonitis Have a High Predictive Value for Histologic Usual Interstitial Pneumonitis**

 - + **The *MUC5B* Promoter Polymorphism Is Associated With Idiopathic Pulmonary Fibrosis in a Mexican Cohort but Is Rare Among Asian Ancestries**

 - + **Association Between Occupational Dust Exposure and Prognosis of Idiopathic Pulmonary Fibrosis: A Korean National Survey**
-

Original Research: Pulmonary Vascular Disease

Direct Oral Anticoagulants in Patients With VTE and Cancer: A Systematic Review and Meta-analysis

Maria Cristina Vedovati, MD, Federico Germini, MD, Giancarlo Agnelli, MD and Cecilia Becattini, MD, PhD

Chest. 2015;147(2):475-483. doi:10.1378/chest.14-0402

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Hospitalization and Survival in Patients Using Epoprostenol for Injection in the PROSPECT Observational Study

Robert P. Frantz, MD, Robert J. Schilz, DO, PhD, FCCP, Murali M. Chakinala, MD, FCCP, David B. Badesch, MD, FCCP, Adaani E. Frost, MD, FCCP, Vallerie V. McLaughlin, MD, FCCP, Robyn J. Barst, MD, Daniel M. Rosenberg, PhD, Dave P. Miller, MS, Brian K. Hartline, MD, Wade W. Benton, PharmD and Harrison W. Farber, MD, FCCP

Chest. 2015;147(2):484-494. doi:10.1378/chest.14-1004

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Pulmonary Arterial Hypertension in the Southern Hemisphere: Results From a Registry of Incident Brazilian Cases

Original Research: Disorders of the Pleura

Accuracy of Fluorodeoxyglucose-PET Imaging for Differentiating Benign From Malignant Pleural Effusions: A Meta-analysis

José M. Porcel, MD, FCCP, Paula Hernández, MD, Montserrat Martínez-Alonso, BSc, Silvia Bielsa, MD and Antonieta Salud, MD

Chest. 2015;147(2):502-512. doi:10.1378/chest.14-0820

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Derivation and Validation of a CT Scan Scoring System for Discriminating Malignant From Benign Pleural Effusions

José M. Porcel, MD, FCCP, Marina Pardina, MD, Silvia Bielsa, MD, Antonio González, MD and Richard W. Light, MD, FCCP

Chest. 2015;147(2):513-519. doi:10.1378/chest.14-0013

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Original Research: Chest Infections

Optimal Duration of Anti-TB Treatment in Patients With Diabetes: Nine or Six Months?

March 2015; 147(3) ----- 20

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 - Education, Research, and Quality Improvement ----- 1
 - Pediatrics ----- 1
 - Diffuse Lung Disease ----- 2
 - Pulmonary Physiology ----- 1
-

Original Research: Critical Care

Platelet Count Mediates the Contribution of a Genetic Variant in *LRRC16A* to ARDS Risk

Yongyue Wei, PhD, Zhaoxi Wang, PhD, Li Su, BSc, Feng Chen, PhD, Paula Tejera, PhD, Ednan K. Bajwa, MD, Mark M. Wurfel, MD, PhD, Xihong Lin, PhD and David C. Christiani, MD, FCCP

Chest. 2015;147(3):607-617. doi:10.1378/chest.14-1246

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Comparison of Hospital Mortality and Long-term Survival in Patients With Acute Lung Injury/ARDS vs Cardiogenic Pulmonary Edema

Christopher N. Schmickl, MD, MPH, Michelle Biehl, MD, Gregory A. Wilson, RRT and Ognjen Gajic, MD, FCCP

Chest. 2015;147(3):618-625. doi:10.1378/chest.14-1371

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Assessing the Utility of ICU Readmissions as a Quality Metric: An Analysis of Changes Mediated by Residency Work-Hour Reforms

+ Impact of COPD on the Mortality and Treatment of Patients Hospitalized With Acute Decompensated Heart Failure: The Worcester Heart Failure Study

Kimberly A. Fisher, MD, Mihaela S. Stefan, MD, Chad Darling, MD, Darleen Lessard, MS and Robert J. Goldberg, PhD

Chest. 2015;147(3):637-645. doi:10.1378/chest.14-0607

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+ Self-Management Following an Acute Exacerbation of COPD: A Systematic Review

Samantha L. Harrison, PhD, Tania Janaudis-Ferreira, PhD, Dina Brooks, PhD, Laura Desveaux, MSc and Roger S. Goldstein, MD, FCCP

Chest. 2015;147(3):646-661. doi:10.1378/chest.14-1658

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+ Family-Based Psychosocial Support and Education as Part of Pulmonary Rehabilitation in COPD: A Randomized Controlled Trial

Alda Marques, PhD, PT, Cristina Jácome, MSc, Joana Cruz, MSc, Raquel Gabriel, MSc, Dina Brooks, PhD and Daniela Figueiredo, PhD

+ Is Quadriceps Endurance Reduced in COPD?: A Systematic Review

Rachael A. Evans, MBChB, PhD, Eric Kaplovitch, MD, Marla K. Beauchamp, PhD, Thomas E. Dolmage, MSc, Roger S. Goldstein, MBChB, FCCP, Clare L. Gillies, PhD, Dina Brooks, PhD and Sunita Mathur, PhD

Original Research: Pulmonary Vascular Disease

The Prognostic Value of Undetectable Highly Sensitive Cardiac Troponin I in Patients With Acute Pulmonary Embolism

Emad U. Hakemi, MD, Tareq Alyousef, MD, Geetanjali Dang, MD, Jalal Hakmei, MD and Rami Doukky, MD

Chest. 2015;147(3):685-694. doi:10.1378/chest.14-0700

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Original Research: Pulmonary Procedures

Treatment of Alveolar-Pleural Fistula With Endobronchial Application of Synthetic Hydrogel

Hiren J. Mehta, MD, Paras Malhotra, MD, Abbie Begnaud, MD, Andrea M. Penley, BSN, RN and Michael A. Jantz, MD, FCCP

Chest. 2015;147(3):695-699. doi:10.1378/chest.14-0823

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High Yield of Bronchoscopic Transparenchymal Nodule Access Real-Time Image-Guided Sampling in a Novel Model of Small Pulmonary Nodules in Canines

Original Research: Sleep Disorders

Treatment of OSA Reduces the Risk of Repeat Revascularization After Percutaneous Coronary Intervention

Xiaofan Wu, MD, Shuzheng Lv, MD, Xiaohong Yu, MD, Linyin Yao, MD, Babak Mokhlesi, MD, FCCP and Yongxiang Wei, MD

Chest. 2015;147(3):708-718. doi:10.1378/chest.14-1634

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Misclassification of OSA Severity With Automated Scoring of Home Sleep Recordings

R. Nisha Aurora, MD, Rachel Swartz, BA and Naresh M. Punjabi, MD, PhD, FCCP

Chest. 2015;147(3):719-727. doi:10.1378/chest.14-0929

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Sitting and Television Viewing: Novel Risk Factors for Sleep Disturbance and Apnea Risk? Results from the 2013 National Sleep Foundation *Sleep in America* Poll

Original Research: Asthma

Poor Symptom Control Is Associated With Reduced CT Scan Segmental Airway Lumen Area in Smokers With Asthma

Neil C. Thomson, MD, Rekha Chaudhuri, MD, Mark Spears, PhD, Claudia-Martina Messow, PhD, William MacNee, MD, Martin Connell, BSc, John T. Murchison, MD, Michael Sproule, MBChB and Charles McSharry, PhD

Chest. 2015;147(3):735-744. doi:10.1378/chest.14-1119

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Original Research: Signs and Symptoms of Chest Diseases

Children With Chronic Cough: When Is Watchful Waiting Appropriate? Development of Likelihood Ratios for Assessing Children With Chronic Cough

Anne B. Chang, PhD, Peter P. Van Asperen, MD, Nicholas Glasgow, MD, Colin F. Robertson, MD, Craig M. Mellis, MD, I. Brent Masters, PhD, Louis I. Landau, MD, Laurel Teoh, MD, Irene Tjhung, MD, Helen L. Petsky, PhD and Peter S. Morris, PhD

Original Research: Education, Research, and Quality Improvement

Development of a Novel, Multilayered Presentation Format for Clinical Practice Guidelines

Annette Kristiansen, MD, Linn Brandt, MD, Pablo Alonso-Coello, MD, PhD, Thomas Agoritsas, MD, Elie A. Akl, MD, PhD, MPH, Tara Conboy, RGN, MSc, Mahmoud Elbarbary, MD, PhD, Mazen Ferwana, MD, PhD, Wedad Medani, MSc, Mohammad Hassan Murad, MD, MPH, David Rigau, MD, Sarah Rosenbaum, PhD, Frederick A. Spencer, MD, Shaun Treweek, PhD, Gordon Guyatt, MD, FCCP and Per Olav Vandvik, MD, PhD

Chest. 2015;147(3):754-763. doi:10.1378/chest.14-1366

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Original Research: Pediatrics

Bardet Biedl Syndrome: Motile Ciliary Phenotype

Amelia Shoemark, PhD, Mellisa Dixon, PhD, Philip L. Beales, MD and Claire L. Hogg, MBChB

Original Research: Diffuse Lung Disease

Antibody α PEP13h Reacts With Lymphangioliomyomatosis Cells in Lung Nodules

Julio C. Valencia, MD, Wendy K. Steagall, PhD, Yi Zhang, PhD, Patricia Fetsch, BS, Andrea Abati, MD, Katsuya Tsukada, MD, PhD, Eric Billings, PhD, Vincent J. Hearing, MD, PhD, Zu-Xi Yu, MD, PhD, Gustavo Pacheco-Rodriguez, PhD and Joel Moss, MD, PhD, FCCP

Chest. 2015;147(3):771-777. doi:10.1378/chest.14-0380

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Sarcoidosis and Cancer Risk: Systematic Review and Meta-analysis of Observational Studies

Martina Bonifazi, MD, Francesca Bravi, PhD, Stefano Gasparini, MD, FCCP, Carlo La Vecchia, MD, Armando Gabrielli, MD, Athol U. Wells, MD and Elisabetta A. Renzoni, MD

Chest. 2015;147(3):778-791. doi:10.1378/chest.14-1475

▶  PDF

Original Research: Pulmonary Physiology

Secular Changes in Relative Leg Length Confound Height-Based Spirometric Reference Values

RESEARCH

Open Access

Central venous-to-arterial carbon dioxide difference combined with arterial-to-venous oxygen content difference is associated with lactate evolution in the hemodynamic resuscitation process in early septic shock

Jaume Mesquida^{*}, Paula Saludes, Guillem Gruartmoner, Cristina Espinal, Eva Torrents, Francisco Baigorri and Antonio Artigas

Background

- Current guidelines for hemodynamic management of severe sepsis and septic shock recommend the use of global markers, central venous oxygen saturation (ScvO2) normalization or/and lactate clearance as resuscitation endpoints.
- ScvO2
 - more real-time;
 - capillary shunting---ScvO2 ↑---mortality↑
- Lac
 - Single value-----trend? -----unnecessary interventions
 - Lactate clearance-----delay

-
- Oxygen supply and oxygen consumption?
 - some authors have advocated that the mixed central venous-to-arterial carbon dioxide difference (**PcvaCO₂ gap**) might be complementary tools to identify patients with persistent global hypoperfusion .
 - a cutoff value of 6 mmHg seems to reflect whether global flow is adequate
 - some authors have suggested that correcting the PcvaCO₂ gap by an approximation of the oxygen consumption, the **PcvaCO₂/arterial-to-venous oxygen content difference (CavO₂) ratio**, might be superior to the PcvaCO₂ gap to detect anaerobic metabolism

Object

- whether the PcvaCO₂ gap and the PcvaCO₂/CavO₂ ratio are useful
 - in predicting the evolution of lactate,
 - reflecting the persistence of tissue hypoperfusion
 - anaerobic metabolism.

Methods

- a retrospective observational study
- Patients: septic shock patients within the first 24 hours of ICU admission
- Exclusion criteria: age under 18 years, and the presence of an uncontrolled source of infection

Data

- **Once** $\text{MAP} \geq 65$ mmHg and $\text{ScvO}_2 \geq 70\%$ were achieved, and the medical team in charge decided not to perform further resuscitation interventions (such as volume expansion and/or changes in inotropic or vasopressor drugs); and **within the following 24 hours**
- **Paired blood samples** were obtained from a central venous line and an arterial catheter
- Measured variables: PO_2 、 PCO_2 、 SO_2 、lactate、Hb (both blood samples)
- Calculated: CaO_2 、 CvO_2 、 Ca-vO_2 、oxygen extraction ratio (O_2ER)、 **PcvaCO_2 gap**、 **$\text{PcvaCO}_2/\text{CavO}_2$ ratio**

Formulas

- $CaO_2 = (1.34 \times SaO_2 \times Hb) + (0.003 \times PaO_2)$
- $CcvO_2 = (1.34 \times ScvO_2 \times Hb) + (0.003 \times PcvO_2)$
- $Ca-vO_2 = CaO_2 - CcvO_2$

- $PcvaCO_2 \text{ gap} = PcvCO_2 - PaCO_2$

- $PcvaCO_2 / CavO_2 \text{ ratio} = PcvaCO_2 \text{ gap} / Ca-vO_2$

- $O_2ER = Ca-vO_2 / CaO_2$

-
- **demographics, diagnosis** at ICU admission, sepsis **origin**, and Simplified Acute Physiology Score II **score** were recorded at inclusion. **Hemodynamic variables** (heart rate and arterial pressure)
 - **ICU length** of stay and ICU **mortality**
 - lactate improvement was defined as the decrease of **at least 10%** of the previous lactate value

Results-----35 septic shock patients

Table 1 Patient demographic, hemodynamic, and metabolic characteristics at inclusion

	All (n = 35)	Lactate improvers (n = 17)	Lactate nonimprovers (n = 18)	P value
Age (years)	65 ± 13	63 ± 14	69 ± 11	0.2
Male	22 (63)	10 (59)	12 (67)	0.8
Etiology				
Respiratory	8 (23)	4 (24)	4 (22)	
Abdominal	14 (40)	7 (41)	7 (39)	0.8
Urinary tract	4 (11)	3 (18)	1 (6)	
Soft tissue	5 (14)	1 (6)	4 (22)	
Other	4 (11)	2 (12)	2 (11)	
SAPS II	49 ± 11	47 ± 9	50 ± 12	0.5
SOFA score (day 1)	9 ± 3	9 ± 3	9 ± 3	0.6
Mechanical ventilation	28 (80)	14 (82)	14 (78)	0.5
Heart rate (beats per minute)	103 ± 14	103 ± 17	104 ± 13	0.8
MAP (mmHg)	78 ± 12	82 ± 11	71 ± 10	0.08
Norepinephrine use (%)	100	100	100	1
Norepinephrine dose (µg/kg/minute)	0.86 ± 0.65	0.66 ± 0.5	1.01 ± 0.75	0.05
Hemoglobin (g/dl)	11.2 ± 2.0	12.2 ± 1.7	9.9 ± 2.0	0.02

- lactate improvement was defined as the decrease of **at least 10%** of the previous lactate value

Table 1 Patient demographic, hemodynamic, and metabolic characteristics at inclusion

	All (n = 35)	Lactate improvers (n = 17)	Lactate nonimprovers (n = 18)	P value
S _{cv} O ₂ (%)	71 ± 8	71 ± 8	72 ± 8	0.7
Lactate (mg/dl)	38 ± 48	30 ± 15	46 ± 65	0.8
P _{cva} CO ₂ gap (mmHg)	5.6 ± 2.1	5.1 ± 1.9	6.1 ± 2.3	0.09
P _{cva} CO ₂ /C _{av} O ₂ ratio (mmHg · dl/ml O ₂)	1.6 ± 0.7	1.3 ± 0.4	1.8 ± 0.8	0.02
O ₂ ER	0.26 ± 0.09	0.25 ± 0.09	0.25 ± 0.08	0.9
ICU length of stay (days)	15 ± 10	17 ± 14	13 ± 10	0.5
Mortality	10 (29)	3 (18)	7 (39)	0.2

- The P_{cva}CO₂/C_{av}O₂ ratio **ROC analysis** showed an AUC of 0.75 (95% confidence interval = 0.6 to 0.92, P= 0.01) for adequate initial **lactate clearance prediction**

Twenty-four-hour follow-up

	All (n = 35)	Lactate improvers (n = 17)	Lactate nonimprovers (n = 18)	P value
S _{cv} O ₂ (%)		68 ± 9%	73 ± 8%	0.01
P _{cva} CO ₂ gap (mmHg)		5.0 ± 2.1	6.0 ± 2.3	0.08
P _{cva} CO ₂ /C _{av} O ₂ ratio (mmHg · dl/ml O ₂)		1.2 ± 0.4	1.9 ± 0.9	<0.001

The elapsed time between consecutive measurements was 3 ± 2 hours

- P_{cva}CO₂/C_{av}O₂ ratio **ROC analysis** showed an AUC of 0.82 (P<0.001), and a cutoff value of 1.4 (sensitivity 0.8 and specificity 0.75) .

- ❑ no correlation between simultaneous ScvO₂ and lactate
- ❑ the P_{cva}CO₂ gap at inclusion was inversely correlated to ScvO₂ ($r = -0.7, P < 0.001$)
- ❑ the P_{cva}CO₂/C_{av}O₂ ratio directly correlated to lactate values ($r = 0.73, P < 0.001$)

Table 2 Patients' main characteristics according to ICU survival

	Survivors (n = 25)	Nonsurvivors (n = 10)	P value
Age (years)	65 ± 13	67 ± 13	0.6
SAPS II	47 ± 10	53 ± 12	0.5
SOFA (day 1)	9 ± 3	9 ± 3	0.7
Heart rate (beats per minute)	103 ± 15	103 ± 12	0.9
MAP (mmHg)	81 ± 11	69 ± 12	0.07
Norepinephrine dose (mcg/kg/min)	0.85 ± 0.65	0.93 ± 0.73	0.7
Hemoglobin (g/dl)	11.7 ± 1.8	9.6 ± 2.1	0.1
S _{cv} O ₂ (%)	71 ± 9	71 ± 6	0.9
Lactate (mg/dl)	25 ± 10	69 ± 83	0.8
P _{cva} CO ₂ gap (mmHg)	5.4 ± 2.3	6.0 ± 1.5	0.3
P _{cva} CO ₂ /C _{av} O ₂ ratio (mmHg · dl/ml O ₂)	1.4 ± 0.5	1.9 ± 0.9	0.03
ΔSOFA (day 4)	-3 ± 3	1 ± 4	0.02

- Patients who died had similar lactate, ScvO₂, and P_{cva}CO₂gap values at inclusion
- but showed significantly increased P_{cva}CO₂/C_{av}O₂ ratio values

Conclusion

- septic shock patients with normalized MAP and ScvO₂
- elevated P_{cva}CO₂/CavO₂ ratio values significantly reduced the odds of adequate lactate clearance during the following hours
- real-time information on the adequacy of tissue perfusion, helping in the decision making process , continue resuscitating and/or stop interventions, despite high lactate levels

Discussion

- respiratory quotient (呼吸商) -----the relationship between **global carbon dioxide production** and global **oxygen consumption (VO₂)**.
- **VO₂** =CO and CavO₂.
- **global carbon dioxide production** =CO and CcvaCO₂ (the central venous-to-arterial carbon dioxide content difference) .
- respiratory quotient = CvaCO₂ /CavO₂ ratio.
- Since over the physiological range of carbon dioxide contents, the partial pressure of carbon dioxide is **linearly related** to carbon dioxide content
- The P_{cva}CO₂/CavO₂ ratio ≈respiratory quotient (呼吸商)

Limitation

- 1、只有复苏后的比较，没有复苏过程中的结果-----是否可以指导复苏？
- 2、回顾研究
- 3、样本量35
- 4、仅针对感染性休克患者，对低容量状态患者有无预测价值？
- 5、入选患者为复苏目标达到（MAP ScvO₂），但没有尿量等其他达标状态的情况下，就不再继续进行复苏治疗。（入组后都没有再液体复苏过）
- did not calculate VO₂ or global oxygen delivery
- 观察研究，没有指定采血时间，包括乳酸