

Perioperative Medicine

Endovascular repair versus open repair of ruptured abdominal aortic aneurysms: A multicenter randomized controlled trial. *Ann Surg* 2013; 258:248–56

Ruptured abdominal aneurysm of the aorta with emergent surgical open repair is associated with a high mortality rate. The primary goal of this randomized, prospective, multicenter trial was to compare open repair versus endovascular repair on a composite of death and major complications at day 30. Of 520 eligible hemodynamically stable patients with ruptured abdominal aortic aneurysms, 116 were randomized to either open repair or endovascular repair. The primary endpoint rate was 42 and 47% for endovascular and open repair, respectively. There was no difference in mortality rate between the two groups. This trial did not show a difference in outcome between endovascular and open repair for ruptured aortic aneurysms. Limitations of this study include lack of power and a large number of patients not eligible for randomization because of anatomical reasons or absence of preoperative computed tomographic imaging.

Risk of venous thromboembolism associated with peripherally inserted central venous catheters: A systematic review and meta-analysis. *Lancet* 2013; 382:311–25

The use of peripherally inserted central venous catheters (PICCs) is frequently more common; however, PICCs are associated with an increased risk of venous thromboembolism. This meta-analysis extracted 64 eligible studies (12 with and 52 without a comparative group) including 29,503 patients who underwent insertion of a PICC. The weighted frequency of PICC-induced deep vein thrombotic events was highest in critically ill patients and patients with malignancies (fig. 1). A meta-analysis of 11 comparative

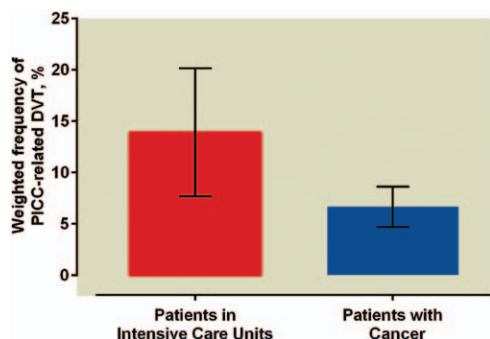


Fig. 1. Weighted frequency of peripherally inserted central venous catheter (PICC)-related deep vein thrombotic (DVT) events. Data represent mean and 95% CIs.

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studies revealed an increased risk of deep venous thrombosis (but not pulmonary embolism) associated with PICCs. The risk:benefit balance should guide the decision of whether or not to insert a PICC, especially in patients in the intensive care unit and in those with cancer.

Clopidogrel with aspirin in acute minor stroke or transient ischemic attack. *N Engl J Med* 2013; 369:11–9

The goal of this Chinese prospective, randomized, double-blind, controlled, multicenter trial was to compare the effects of clopidogrel plus aspirin with aspirin alone when given for secondary prevention of stroke in patients with acute minor stroke or high-risk transient ischemic attack. Patients (N = 5170) were enrolled within 24 of the event and randomized to clopidogrel (300 mg followed by 75 mg/day until day 90) plus aspirin (75 mg/day until day 21) or to placebo plus aspirin (75 mg/day for 90 days). The primary outcome was stroke (ischemic or hemorrhagic) at day 90. The incidence of stroke was lower in the clopidogrel plus aspirin group compared with the placebo plus aspirin (hazard ratio, 0.68; 95% CI, 0.57–0.81; $P < 0.001$; fig. 2). No significant difference was found in the occurrence of hemorrhagic strokes between groups. These results support the superiority and safety of combining clopidogrel plus aspirin over aspirin alone in the prevention of stroke in patients with acute minor stroke or high-risk transient ischemic attack.

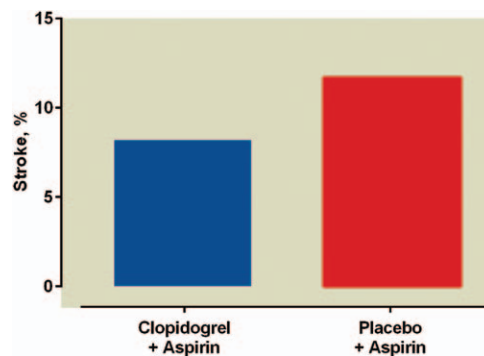


Fig. 2. Incidence of secondary stroke after preventative treatment within 24h of acute minor stroke or high-risk transient ischemic attack.

Resting-state functional magnetic resonance imaging activity and connectivity and cognitive outcome in traumatic brain injury. *JAMA Neurol* 2013; 70:845–51

This observational study compared functional magnetic resonance imaging and brain connectivity in 20 patients with severe trauma brain injury, along with 17 matched healthy controls. The main outcome and measures were signal amplitude and functional connectivity during the

resting state, tactography related to default mode network, and the association between signal amplitude and cognitive outcome. Increases in amplitude of low-frequency fluctuations in the frontal lobes were related to better cognitive performance in chronic trauma brain injury. The loss of structural connectivity induced by damage of the cingulum tract explained the compensatory increases in functional connectivity within the frontal node of the default mode network. These findings may contribute to improve clinical management and rehabilitation programs in patients with trauma brain injury.

Critical Care Medicine

A trial of intraoperative low-tidal-volume ventilation in abdominal surgery. *N Engl J Med* 2013; 369:428–37

Lung-protective ventilation with the use of low tidal volumes and positive end-expiratory pressure is commonly used to reduce mortality in critically ill patients. However, it is not clear whether it is beneficial in anesthetized patients undergoing major surgery. The Intraoperative Protective Ventilation multicenter, double-blind, parallel-group trial was conducted to compare lung-protective ventilation with nonprotective mechanical ventilation strategies in patients undergoing major abdominal surgery. Adults (N = 400) at intermediate to high risk of pulmonary complications after major abdominal surgery were randomized to either nonprotective mechanical ventilation or a strategy of lung-protective ventilation. The primary outcome was a composite of major pulmonary and extrapulmonary complications occurring within the first 7 days after surgery. The results showed the primary outcome occurred in 21 of 200 patients (10.5%) assigned to lung-protective ventilation, as compared with 55 of 200 (27.5%) assigned to nonprotective ventilation (fig. 3). Furthermore, during the 7-day postoperative period, 10 patients (5.0%) assigned to lung-protective ventilation required noninvasive ventilation or intubation for acute respiratory failure, as compared with 34 (17.0%) assigned to nonprotective ventilation. Finally, the length of the hospital stay was shorter among patients receiving lung-protective

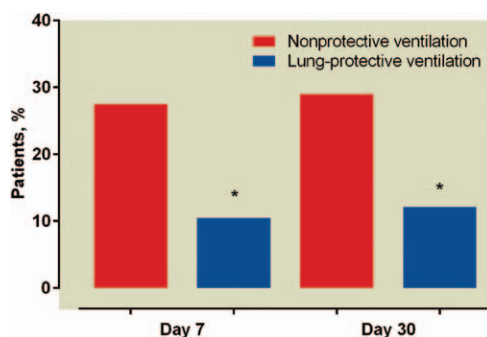


Fig. 3. Primary composite outcome. * $P \leq 0.001$.

ventilation than among those receiving nonprotective ventilation. This trial has several important strengths that include a multifaceted strategy of lung-protective ventilation that combined low tidal volumes, recruitment maneuvers to open collapsed alveoli, and moderate levels of positive end-expiratory pressure to prevent further collapse. Other strengths of the current trial include the methods used to minimize bias (blinded and centralized randomization, complete follow-up, and intention-to-treat analyses) and the pragmatic nature of the trial protocol, with routine practice being maintained. In summary, if confirmed by the results of a subsequent multicenter trial, the use of a lung-protective ventilation strategy in intermediate-risk and high-risk patients undergoing major abdominal surgery may become an important approach to improve clinical outcomes and reduce healthcare utilization.

(This article was suggested and commented by Jean-François Pittet.)

Early antibiotic discontinuation in patients with clinically suspected ventilator-associated pneumonia and negative quantitative bronchoscopy cultures. *Crit Care Med* 2013; 41:1656–63

Ventilator-associated pneumonia (VAP), one of the leading causes of morbidity and mortality in hospitalized patients, occurs up to 27% of patients. In addition, VAP causes a significant increase in the length of stay in the intensive care unit which adds to the cost of hospitalization of these patients. Clinical signs of VAP are often treated with broad-spectrum antibiotics after performing bronchoalveolar lavage or mini-bronchoalveolar lavage for quantitative bacteriological cultures. This retrospective, observational cohort study compared antibiotic utilization and mortality in empirically treated, culture-negative ($<10^4$ colony forming units/ml) patients with VAP after early *versus* late antibiotic discontinuation. Early discontinuation patients (n = 40) were defined as those who had all antibiotic therapy stopped within 1 day of final negative culture report, whereas late discontinuation patients (n = 49) had antibiotics stopped later than 1 day. Mortality rate was similar between groups (25.0 *vs.* 30.6% in early and late discontinuation patients, respectively). There were also fewer superinfections (22.5 *vs.* 42.9%), respiratory superinfections (10.0 *vs.* 28.6%), and multidrug-resistant superinfections (7.5 *vs.* 35.7%) in early discontinuation compared with late discontinuation patients. The results indicate that in this severely ill population with clinically suspected VAP and negative quantitative bronchoalveolar lavage cultures, early discontinuation of antibiotics did not affect mortality and was associated with a lower frequency of multidrug-resistant superinfections. The results of this new study provide additional support to the concept originally described by Kollef *et al.* (*Chest* 2005; 128:2706–13) that

the discontinuation of antibiotics in patients with negative lung bacteriological cultures is safe in the presence of clinical signs of VAP.

(This article was suggested and commented by Jean-François Pittet.)

Pain Medicine

Prognostic indicators of low back pain in primary care: Five-year prospective study. *J Pain* 2013; 14:873–83

Persistent low back pain remains one of the most common and vexing problems facing primary care and pain management physicians alike. This problem has immense human and economic costs. One of the key goals in improving our care of these patients lies in the identification of who is likely to recover from acute episodes of back pain *versus* who is likely to develop more chronic issues. Many investigations in the past have attempted to find prognostic factors though most of those studies have been small in scope, limited in the number of factors considered, and brief in duration. This prospective study on patients aged 18–60 yr from eight primary care practices in England enhances our understanding of this problem. A total of 488 patients were followed from the time of their presentation to a final time point of assessment 5 yr later. The assessments used to predict persistent low back pain included questionnaires examining demographic, physical, psychological, and occupational domains. Most factors found in previous studies to predict low back pain outcome were included in this approach. The authors found that baseline back pain intensity and patients' belief that back pain would persist conferred significant risk of poor outcome (relative risks 1.12 and 1.09, respectively). Many other factors found by other authors in smaller studies to be predictive of persistent low back pain did not survive the regression analysis (fig. 4). However, the identification

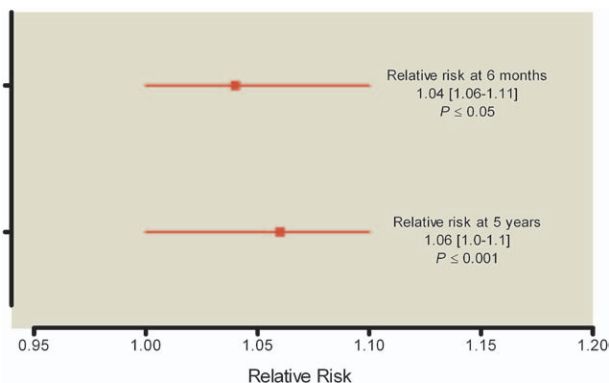


Fig. 4. Cox regression model for the relationship between Illness Perception Questionnaire-Revised and timeline acute-chronic indicators at 6-month and 5-yr follow-up.

of these two important risk factors suggest that better acute pain management and modification of patient's beliefs concerning ongoing back pain might be useful approaches to treatment.

(This article was suggested and commented by David Clark.)

Education

First-year residents outperform third-year residents after simulation-based education in critical care medicine. *Sim Healthcare* 2013; 8:67–71

A proverbial question about educational methodology is, “Does simulation make a difference, that is, do students taught with simulation learn more?” Many published studies have demonstrated enhanced performance of psychomotor skills when the students learn procedures through simulation. Less has been published to demonstrate enhanced cognitive prowess resulting from simulation education.

Recognizing the importance of this question, Singer *et al.* performed a prospective cohort study of Internal Medicine residents in a Medical Intensive Care Unit environment. A study group of first-year residents was compared with third-year residents. Both groups of residents were exposed to traditional clinical education while caring for patients and listening to didactic presentations. The first-year residents were also provided a 4-h standardized simulation-based curriculum. Three clinical simulation scenarios were the basis for the education which was furthered by extensive feedback and debriefing. Clinical knowledge of all of the residents was evaluated at the bedside at the end of the month long Medical Intensive Care Unit rotation. The first-year simulation-educated residents, who by definition experienced much less real patient care, had a better grasp of clinical concepts than the third-year residents who lacked simulation education (91.3 *vs.* 80.9% correct on clinical skill assessment; table 1). The authors note two published meta-analyses that support the results of this investigation (Cook *et al.*, *JAMA* 2011; 306:978–8 and McGaghie *et al.*, *Acad Med* 2011; 86:706–11.)

Table 1. Bedside Clinical Skills Assessment Performance

	Simulator-trained First-year Residents (n = 40)	Traditionally Trained Third-year Residents (n = 27)
Bedside assessment score, % (95% CI)	91.3 (88.2–94.3)	80.9 (76.8–85.0)

An important inference derived from this study is particularly applicable to the education of anesthesiologists who specialize in critical care medicine; simulation allows educators to develop, implement, and evaluate a standardized curriculum that can be provided to students in a low-stress, nonreal patient care setting with unfettered time for extensive feedback and debriefing resulting in more consistent and lasting learning. The authors are quick to point out a major

limitation of this and most investigations of simulation education; although this study demonstrated knowledge gain and clinical competency in students, it does not document patient outcome benefit, a deficiency of most studies of simulation education that must be addressed with future research.

*(This article was suggested and commented
by Alan J. Schwartz.)*