

The Top 10 Adult Emergency Medicine Articles from 2007

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A Randomized Controlled Trial of Multi-Slice Coronary Computed Tomography for Evaluation of Acute Chest Pain. Goldstein JA, Gallagher MJ, O'Neill WW, et al. *J Am Coll Cardiol* 2007;49:863-871

OBJECTIVES: This study sought to compare the safety, diagnostic efficacy, and efficiency of multi-slice computed tomography (MSCT) with standard diagnostic evaluation of low-risk acute chest pain patients.

BACKGROUND: Over 1 million patients have emergency center evaluations for acute chest pain annually, at an estimated diagnostic cost of over \$10 billion. Multi-slice computed tomography has a high negative predictive value for exclusion of coronary artery stenoses.

METHODS: We randomized patients to MSCT (n = 99) versus SOC (n = 98) protocols. The MSCT patients with minimal disease were discharged; those with stenosis >70% underwent catheterization, whereas cases with intermediate lesions or non-diagnostic scans underwent stress testing. Outcomes included: safety (freedom from major adverse events over 6 months), diagnostic efficacy (clinically correct and definitive diagnosis), as well as time and cost of care.

RESULTS: Both approaches were completely (100%) safe. The MSCT alone immediately excluded or identified coronary disease as the source of chest pain in 75% of patients, including 67 with normal coronary arteries and 8 with severe disease referred for invasive evaluation. The remaining 25% of patients required stress testing, owing to intermediate severity lesions or non-diagnostic scans. During the index visit, MSCT evaluation reduced diagnostic time compared with SOC (3.4 h vs. 15.0 h, $p < 0.001$) and lowered costs (\$1,586 vs. \$1,872, $p < 0.001$). Importantly, MSCT patients required fewer repeat evaluations for recurrent chest pain (MSCT, 2 of 99 (2.0%) patients vs. SOC, 7 of 99 (7%) patients; $p = 0.10$).

CONCLUSIONS: Multi-slice computed tomographic coronary angiography can definitively establish or exclude coronary disease as the cause of chest pain. However, inability to determine the physiological significance of intermediate severity coronary lesions and cases with inadequate image quality are present limitations.

COMMENTS:

A Clinical Decision Rule to Identify Which Chest Pain Patients Can Safely Be Removed From Cardiac Monitoring in the Emergency Department. Gatien M, Perry JJ Stiell IG, et al. *Ann Emerg Med* 2007; 50 136-143

Study objective: We determine the rate of serious arrhythmias in a cohort of monitored emergency department (ED) chest pain patients and derive a clinical decision rule that can identify which patients can safely be taken off continuous cardiac monitoring at initial physician assessment.

Methods: A secondary analysis of a prospectively collected cohort was completed in a university-affiliated tertiary care center. Consecutive patients with a primary complaint of chest pain who underwent cardiac monitoring in the ED in January to April 2000 were included. Serious arrhythmias were defined as those requiring treatment in the ED. Multivariate recursive partitioning analysis was undertaken to derive a decision rule.

Results: Nine hundred ninety-two consecutive chest pain patients were monitored in the ED during the study period, of whom 14% and 12% had myocardial infarction and unstable angina, respectively. There were 17 patients (1.7%) with serious arrhythmias detected in the ED. The following decision rule was derived: patients can be removed from cardiac monitoring if they are pain free at the initial physician assessment and have a normal or nonspecific ECG result. The rule had 100% sensitivity (95% confidence interval 80% to 100%) for serious arrhythmias. Applying this rule would have allowed physicians to immediately remove 29% of patients from cardiac monitoring.

Conclusion: Serious arrhythmias are uncommon in monitored ED chest pain patients. A simple clinical decision rule could be used to safely identify low-risk patients who can be removed from continuous monitoring if its performance is prospectively validated in an independent patient population.

COMMENTS:

Randomized, Double-Blind, Placebo-Controlled Trial of Cephalexin for Treatment of Uncomplicated Skin Abscesses in a Population at Risk for Community-Acquired Methicillin-Resistant *Staphylococcus aureus* Infection. Rajendran PM, Young D, Maurer T, et al. *Antimicrob Agents Chemother* 2007;51:4044-4048

Empirical use of beta-lactam antibiotics, the preferred agents for treating uncomplicated skin and soft tissue infections, may no longer be appropriate for these infections because of the increasing prevalence of community strains of methicillin-resistant *Staphylococcus aureus* (MRSA). Retrospective studies, however, suggest that outcomes are good even when beta-lactams are used. We conducted a randomized, double-blind trial of 166 outpatient subjects comparing placebo to cephalexin at 500 mg orally four times for 7 days after incision and drainage of skin and soft tissue abscesses. The primary outcome was clinical cure or failure 7 days after incision and drainage. *S. aureus* was isolated from 70.4% of abscess cultures. Of the isolates tested 87.8% were MRSA, 93% of which were positive for Panton-Valentine leucocidin genes. Clinical cure rates were 90.5% (95% confidence interval, 0.82 to 0.96) in the 84 placebo recipients and 84.1% (95% confidence interval, 0.74 to 0.91) in the 82 cephalexin recipients (difference in the two proportions, 0.0006; 95% confidence interval, -0.0461 to 0.0472; $P = 0.25$). The 90.5% cure rate observed in the placebo arm and 84.1% cure rate observed in the cephalexin arm provide strong evidence that antibiotics may be unnecessary after surgical drainage of uncomplicated skin and soft tissue abscesses caused by community strains of MRSA.

COMMENTS:

Misdiagnosis of Community-Acquired Pneumonia and Inappropriate Administration of Antibiotics: Side effects of the 4-h antibiotic administration rule. Kanwar M, Brar N, Khatib R, Fakh M. *Chest* 2007;131:1865-1869

Background: The 2003 Infectious Diseases Society of America guidelines for community-acquired pneumonia (CAP) recommend the initiation of antibiotic therapy within 4 h of hospitalization. This quality indicator has been linked to the incentive compensation of third-party payers to hospitals. We evaluated the impact of this recommendation on the diagnosis of CAP and the utilization of antibiotics.

Methods: All patients with a hospital admission diagnosis of CAP before publication of the guidelines (January to June 2003) and after publication of the guidelines (January-June 2005) were included. We collected data on clinical signs and symptoms on presentation, chest radiograph findings, blood cultures prior to therapy with antibiotics, time to antibiotic administration, pneumonia severity index (PSI) score, confusion, urea, respiratory rate, BP, and age ≥ 65 years (CURB-65), and mortality.

Results: A total of 518 patients were included in the study. More patients in 2005 had a hospital admission diagnosis of CAP without radiographic abnormalities compared to 2003 (2005, 91 patients [28.5%]; 2003, 41 patients [20.6%]; $p = 0.04$), and more patients received antibiotics within 4 h of triage (2005, 210 patients [65.8%]; 2003, 107 patients [53.8%]; $p = 0.007$). Blood cultures prior to antibiotic administration increased (2005, 220 patients [69.6%]; 2003, 93 patients [46.7%]; $p < 0.001$). However, the final diagnosis of CAP dropped to 58.9% in 2005 from 75.9% in 2003 ($p < 0.001$). The mean (\pm SD) antibiotic utilization per patient increased to 1.66 ± 0.54 in 2005 compared to 1.39 ± 0.58 in 2003 ($p < 0.001$). There were no significant differences in PSI or CURB-65 scores, or mortality.

Conclusions: Linking antibiotic administration within 4 h of hospital admission (as a quality indicator) to financial compensation may result in an inaccurate diagnosis of CAP, inappropriate utilization of antibiotics, and thus less than optimal care.

COMMENTS:

Antibiotics and Topical Nasal Steroid for Treatment of Acute Maxillary Sinusitis Williamson IA, Rumsby K, Bengte S, et al. *JAMA* 2007;298:2487-2496.

Context Acute sinusitis is a common clinical problem that usually results in a prescription for antibiotics but the role of antibiotics is debated. Anti-inflammatory drugs such as topical steroids may be beneficial but are underresearched.

Objective To determine the effectiveness of amoxicillin and topical budesonide in acute maxillary sinusitis.

Design, Setting, and Patients A double-blind, randomized, placebo-controlled factorial trial of 240 adults (aged ≥ 16 years) with acute nonrecurrent sinusitis (had ≥ 2 diagnostic criteria: purulent rhinorrhea with unilateral predominance, local pain with unilateral predominance, purulent rhinorrhea bilateral, presence of pus in the nasal cavity) at 58 family practices (74 family physicians) between November 2001 and November 2005. Patients were randomized to 1 of 4 treatment groups: antibiotic and nasal steroid; placebo antibiotic and nasal steroid; antibiotic and placebo nasal steroid; placebo antibiotic and placebo nasal steroid.

Intervention A dose of 500 mg of amoxicillin 3 times per day for 7 days and 200 μg of budesonide in each nostril once per day for 10 days.

Main Outcome Measures Proportion clinically cured at day 10 using patient symptom diaries and the duration and severity of symptoms.

Results The proportions of patients with symptoms lasting 10 or more days were 29 of 100 (29%) for amoxicillin vs 36 of 107 (33.6%) for no amoxicillin (adjusted odds ratio, 0.99; 95% confidence interval, 0.57-1.73). The proportions of patients with symptoms lasting 10 or more days were 32 of 102 (31.4%) for topical budesonide vs 33 of 105 (31.4%) for no budesonide (adjusted odds ratio, 0.93; 95% confidence interval, 0.54-1.62). Secondary analysis suggested that nasal steroids were significantly more effective in patients with less severe symptoms at baseline.

Conclusion Neither an antibiotic nor a topical steroid alone or in combination was effective as a treatment for acute sinusitis in the primary care setting.

COMMENTS:

Antibiotic Use for Emergency Department Patients with Upper Respiratory Tract Infections: Prescribing Practices, Patient Expectations and Patient Satisfaction. Ong S, Nakase J, Moran G, et al. *Ann Emerg Med* 2007;50:213-220

Study objective Physicians often prescribe antibiotics to patients even when there is no clear indication for their use. Previous studies examining antibiotic use in acute bronchitis and upper respiratory infections have been conducted in primary care settings. We evaluate the factors that physicians in the emergency department (ED) consider when prescribing antibiotics (eg, patient expectations) and the factors associated with patient satisfaction.

Methods: Ten academic EDs enrolled adults and children presenting with symptoms consistent with upper respiratory infection. Enrolled patients were interviewed before their physician encounter and were reinterviewed before discharge and 2 weeks later. Physicians were interviewed about factors that influenced their management decisions, including their perceptions of patients' expectations. Patients with a single diagnosis of uncomplicated acute bronchitis or upper respiratory infection were included for analysis.

Results: Of 272 patients enrolled, 68% of bronchitis patients and 9% of upper respiratory infection patients received antibiotics. Physicians were more likely to prescribe antibiotics when they believed that patients expected them (odds ratio [OR] 5.3; 95% confidence interval [CI] 2.9 to 9.6), although they were able to correctly identify only 27% of the patients who expected antibiotics. Satisfaction with the ED visit was reported by 87% of patients who received antibiotics and 89% of those not receiving antibiotics. Satisfaction with the visit was reported by 92% of patients who believed they had a better understanding of their illness but only by 72% of those who thought they had no better understanding (OR 4.4; 95% CI 2.0 to 8.4).

Conclusion: Physicians in our academic EDs prescribed antibiotics to 68% of acute bronchitis patients and to fewer than 10% of upper respiratory infection patients. Physicians were more likely to prescribe antibiotics to patients who they believed expected them, although they correctly identified only about 1 in 4 of those patients. Patient satisfaction was not related to receipt of antibiotics but was related to the belief they had a better understanding of their illness.

COMMENTS:

Early Treatment with Prednisolone or Acyclovir in Bell's Palsy. Sullivan FM, Swan IRC, Donnan PT et al. *N Engl J Med* 2007;357:1598-1607.

Background Corticosteroids and antiviral agents are widely used to treat the early stages of idiopathic facial paralysis (i.e., Bell's palsy), but their effectiveness is uncertain.

Methods We conducted a double-blind, placebo-controlled, randomized, factorial trial involving patients with Bell's palsy who were recruited within 72 hours after the onset of symptoms. Patients were randomly assigned to receive 10 days of treatment with prednisolone, acyclovir, both agents, or placebo. The primary outcome was recovery of facial function, as rated on the House–Brackmann scale. Secondary outcomes included quality of life, appearance, and pain.

Results Final outcomes were assessed for 496 of 551 patients who underwent randomization. At 3 months, the proportions of patients who had recovered facial function were 83.0% in the prednisolone group as compared with 63.6% among patients who did not receive prednisolone ($P < 0.001$) and 71.2% in the acyclovir group as compared with 75.7% among patients who did not receive acyclovir (adjusted $P = 0.50$). After 9 months, these proportions were 94.4% for prednisolone and 81.6% for no prednisolone ($P < 0.001$) and 85.4% for acyclovir and 90.8% for no acyclovir (adjusted $P = 0.10$). For patients treated with both drugs, the proportions were 79.7% at 3 months ($P < 0.001$) and 92.7% at 9 months ($P < 0.001$). There were no clinically significant differences between the treatment groups in secondary outcomes. There were no serious adverse events in any group.

Conclusions In patients with Bell's palsy, early treatment with prednisolone significantly improves the chances of complete recovery at 3 and 9 months. There is no evidence of a benefit of acyclovir given alone or an additional benefit of acyclovir in combination with prednisolone.

COMMENTS:

Comparison of Oral Prednisolone/Paracetamol and Oral Indomethacin/Paracetamol Combination Therapy in the Treatment of Acute Goutlike Arthritis: A Double-Blind, Randomized, Controlled Trial. Man CY, Cheung ITF, Cameron PA, Rainer TH. *Ann Emerg Med* 2007;49:490:670-677

Study objective: We compare the analgesic efficacy and adverse effects of oral prednisolone/acetaminophen and oral indomethacin/acetaminophen combination therapy in the treatment of acute goutlike arthritis in patients presenting to an emergency department (ED).

Methods: This is a double-blind, randomized, controlled study in a university hospital emergency department (ED) in the New Territories of Hong Kong. Patients older than 17 years and presenting between February 1, 2003, and June 30, 2004, with a clinical diagnosis of goutlike arthritis were randomized to receive either oral prednisolone/acetaminophen or oral indomethacin/acetaminophen combination therapy. Primary outcome measures were pain scores, time to resolution of symptoms and signs, and adverse effects. Secondary outcome measures were the need for additional acetaminophen and relapse rate.

Results: There were 90 patients randomized: 46 patients to the indomethacin group and 44 patients to the prednisolone group. Baseline characteristics, including pain scores, were similar in the 2 groups. Both treatment groups had a similar decrease in pain score in the ED. The mean rate of decrease in pain score with activity for indomethacin was -1.7 ± 1.6 (SD) mm per day and for prednisolone was -2.9 ± 2.0 (SD) mm per day (mean difference 1.2 mm/day; 95% confidence interval 0.4 to 2.0 mm/day; $P=.0026$). Although these differences were statistically significant, at no time was the difference in mean pain score greater than 13 mm. Therefore, it is unclear whether these differences are clinically significant. The mean total dose of acetaminophen consumed by the prednisolone group was significantly more than in the indomethacin group (mean 10.3 g, range 1 to 21 g versus mean 6.4 g, range 1 to 21 g). Twenty-nine patients in the indomethacin group and 12 patients in the prednisolone group experienced adverse effects ($P<.05$). The commonest adverse effects in the indomethacin group were nausea, indigestion, epigastric pain, dizziness, and gastrointestinal bleeding (N=5; 11%). None of the patients in the prednisolone group developed gastrointestinal bleeding. The relapse rate for both groups was similar.

Conclusion: In the treatment of acute goutlike arthritis, oral prednisolone/acetaminophen combination is as effective as oral indomethacin/acetaminophen combination in relieving pain but is associated with fewer adverse effects.

COMMENTS:

Emergency Department Crowding Is Associated With Poor Care for Patients With Severe Pain. Pines JM, Hollander JH: *Ann Emerg Med* 2008;51:1-5

Study objective: We study the impact of emergency department (ED) crowding on delays in treatment and nontreatment for patients with severe pain.

Methods: We performed a retrospective cohort study of all patients presenting with severe pain to an inner-city, teaching ED during 17 months. Poor care was defined by 3 outcomes: not receiving treatment with pain medication while in the ED, a delay (>1 hour) from triage to first pain medication, and a delay (>1 hour) from room placement to first pain medication. Three validated crowding measures were assigned to each patient at triage. Logistic regression was used to test the association between crowding and outcomes.

Results: In 13,758 patients with severe pain, the mean age was 39 years (SD 16 years), 73% were black, and 64% were female patients. Half (49%) of the patients received pain medication. Of those treated, 3,965 (59%) experienced delays in treatment from triage and 1,319 (20%) experienced delays from time of room placement. After controlling for factors associated with the ED treatment of pain (race, sex, severity, and older age), nontreatment was independently associated with waiting room number (odds ratio [OR] 1.03 for each additional waiting patient; 95% confidence interval [CI] 1.02 to 1.03) and occupancy rate (OR 1.01 for each 10% increase in occupancy; 95% CI 0.99 to 1.04). Increasing waiting room number and occupancy rate also independently predicted delays in pain medication from triage (OR 1.05 for each waiting patient, 95% CI 1.04 to 1.06; OR 1.18 for each 10% increase in occupancy; 95% CI 1.15 to 1.21) and delay in pain medication from room placement (OR 1.02 for each waiting patient, 95% CI 1.01 to 1.03; OR 1.06 for each 10% increase in occupancy, 95% CI 1.04 to 1.08).

Conclusion: ED crowding is associated with poor quality of care in patients with severe pain, with respect to total lack of treatment and delay until treatment.

COMMENTS:

Sending Low-Acuity Patients Away From the ED: Closing the Door or Stemming the Tide? Greene J. *Ann Emerg Med* 2007;49:317-319

Diverting low-acuity patients from the emergency department (ED) has become a hot-button issue for the American College of Emergency Physicians (ACEP), with some members contending it is an obvious necessity and others opining that it tears at the fabric of emergency medicine's mission.

Emergency physicians are struggling to maintain an open-door policy in the face of large numbers of patients who use the emergency department for minor ailments better treated by a primary care doctor. Some hospitals' policies to send those patients elsewhere are raising fears that this selective process will erode the specialty's mandate to care for all.