According to this article, age and disability should not, in and of themselves, dictate who receives care and who doesn't.

**Background:** If it wasn't well known before, Hurricane Katrina and the SARS/H5N1/H1N1 situations surely have forced this country to confront the logistics and methodologies in which health care may be altered in a mega-disaster. Since the literature is sparse on this issue, these authors wanted to describe the process where it was tackled in Massachusetts. **Review:** Throughout 2006, ethicists, lawyers, clinicians, and public health officials comprised a working group to consider the following: allocation of antiviral medications, prioritization of critical care, and state seizure of assets. Using case scenarios, community stakeholders were incorporated to discuss these and other issues. As a result of this process, both working and community groups collectively identified 4 goals and 7 principles within the concept of altered standards of care (ASC). **Goals for ACS:** (1) Protect the public as much as possible from the outbreak of disease and resultant morbidity/mortality. (2) Maximize positive patient outcomes when needs exceed resources. (3) Establish principles and guidelines to provide care in an ethical manner during times of great difficulty. (4) Establish a process for determining priorities for use of those scarce resources even before an outbreak. **Guiding Principles for Allocation of Limited Resources and ASC Protocols:** (1) Provide scarce resources to maximize the saving of lives without discrimination or regard to sex, sexual orientation, race, religion, ethnicity, disability, age, income, or insurance status. Age and/or disability must be considered with a patient's other risk factors in allocating resources. These considerations are based on the best medical information, knowledge, and judgment. (2) Permit flexibility for physician discretion and be subject to review. (3) Health care institutions are responsible to develop mutual aid plans. (4) Recognize alteration of provision of care in extreme circumstances, expanded scope of practice, use of alternative care sites, and practical standards of documentation. (5) Health care professionals are responsible for adhering to protocols to protect public health. (6) Patient care will be provided within the context and limitations required by the emergency. (7) The state and employers have a duty to prioritize the care and protection of health care providers. Now that we are in the middle of an H1N1 pandemic, hospital surge is being tested, and ED wait times are becoming more and more protracted, hopefully it will spur both administrators and practitioners to really sit down and discuss "what if" scenarios.

Additional Keywords: None

Print Tag: Refer to original journal article
Practical strategies for improving the patient handoff process exist and merit careful consideration for deployment in busy ED environments.

**Background:** It has been suggested that many treatment delays in EDs are due to "continuum of care" miscommunications associated with shift changes. Communication errors in general and poor handoffs in particular can be potentially hazardous to patients and represent a potential source of liability. The Joint Commission has advocated a standardized approach to the handoff of patient care to a successive team, but no optimal solution has been identified.

**Objective:** To provide current evidence and insight regarding the process and safety of handoffs between physicians in the ED. **Pertinent Points:** 4 phases of handoffs have been identified: (1) pre-turnover time, during which the departing team prepares for signout; (2) arrival of oncoming physician; (3) meeting, with information exchange; and (4) post-turnover, in which the receiving physician assumes care, and the departing physician focuses on unfinished tasks. Myriad factors interact during each phase and vary with patient, physician, institution, and even economic factors. Productivity-based groups may have fewer handoffs than hourly pay staff. Fatigue, inattention, language barriers, paper/whiteboard versus electronic environments, inability to recognize or emphasize "red flags," physician biases, "diagnosis momentum," and "anchoring" (over-reliance on one particular aspect of the presentation) are just a few of the many factors presented by the authors. Most handoffs are 1:1 between incoming and outgoing physicians in a chaotic ED environment with an unfavorable "signal-to-noise" ratio. Alternatives proposed to improve handoffs include modifying the number of handoff participants (single vs multidisciplinary), changing the location (central vs bedside), changing the method of exchange (written vs verbal), and using adjuncts (eg, templates, mnemonics, computers). Other strategies include reducing the number of unnecessary handoffs (eg, allow for shift overlap to facilitate continuity and disposition); limit interruptions and distractions as much as is practicable; provide a succinct overview; communicate outstanding tasks, anticipate changes, and have a clear plan; make information readily available for direct review (ie, lab and imaging results should be clearly documented); encourage questioning and discussion of assessments for all patients; and signal a clear moment in transition of care from one clinician to another.

**Conclusions:** The study of ED handoffs is in its infancy, and input is needed from many disciplines (psychology, behavioral science, communications specialists, and human factors experts). Simple solutions are elusive given the complexity of issues. An area ripe for research. As lengthy evaluations become prevalent, handoffs will increase. No data exist at present to support the superiority of ≥1 of these practices. My 2 cents: Sign out chief complaints rather than a diagnosis to keep the new team mentally flexible...and NEVER take a name off your tracking board until that patient is truly gone from the ED.

Additional Keywords: None

Print Tag: Refer to original journal article
Abdominal Pain, Pelvic Mass--Think Ovarian Torsion

Cannot Exclude Torsion—A 15-Year Review.
Oltmann SC, Fischer A, et al.:
J Pediatr Surg 2009; 44 (): 1212-1217

In girls with abdominal pain and a pelvic mass of ≥5 cm, early diagnostic laparoscopy should be considered because ultrasound is not reliable in the diagnosis or exclusion of ovarian torsion.

Background: Adnexal (eg, ovarian or oviduct) torsion is a diagnosis often missed at clinical presentation with resultant delayed operative intervention and ovarian loss.

Objective: To review experiences of a single institution over a 15-year period with ovarian torsion in pediatric patients.

Design/Methods: Records were reviewed of all female patients aged ≤19 years with ovarian torsion confirmed at operation from 1993 to 2008 at Dallas Children's Hospital. Charts were reviewed for clinical information, radiology, operative, and pathology reports.

Results: 97 patients with ovarian torsion were identified. Mean age was 9.2 years (range, 2 days to 17 years), and 16% were aged 1 year presented in pain. Both ultrasound and CT were used in 25 patients. Nine patients were taken to the operating room without imaging because a physical examination indicated possible acute appendicitis. Of ultrasounds read preoperatively by a radiologist, only half were read as "torsion" or "cannot exclude torsion." When size of any adnexal mass on ultrasound and subsequent operative findings were compared, the authors determined that presence of a mass ≥5 cm in patients for >1 year had an 83% sensitivity for detection of torsion. At operation, 70% had a salpingo-oophorectomy, 19% had an oophorectomy, and 11% had an ovarian-salvaging cystectomy. When infants were excluded, the salvage rate increased to 14%. Time to the operating room of 1 year presented in pain. Both ultrasound and CT were used in 25 patients. Nine patients were taken to the operating room without imaging because a physical examination indicated possible acute appendicitis. Of ultrasounds read preoperatively by a radiologist, only half were read as "torsion" or "cannot exclude torsion." When size of any adnexal mass on ultrasound and subsequent operative findings were compared, the authors determined that presence of a mass ≥5 cm in patients for >1 year had an 83% sensitivity for detection of torsion. At operation, 70% had a salpingo-oophorectomy, 19% had an oophorectomy, and 11% had an ovarian-salvaging cystectomy. When infants were excluded, the salvage rate increased to 14%. Time to the operating room of

Conclusions: Sonographic evaluation cannot reliably exclude ovarian torsion. Earlier and more liberal use of diagnostic laparoscopy should be done, especially if a pelvic mass of ≥5 cm is detected by ultrasound. The authors note that, while ultrasound can be helpful, it can be misleading or result in delays in diagnosis. Blood flow on color Doppler ultrasound does not exclude ovarian torsion. Especially if a larger mass is detected, diagnosis requires a high degree of suspicion and potentially more aggressive diagnostic surgical intervention. We would not accept a testicular salvage rate of only 1 in 7. As this is the ovarian salvage rate in young girls in this study, we should seek to do better.

Additional Keywords: None

Print Tag: Refer to original journal article
Background: Anywhere from 1 in 1000 to 1 in 7500 pediatric hospital admissions are due to urolithiasis.

Objective: To identify factors that might be helpful in predicting urolithiasis in the pediatric population with unenhanced CT (UCT).

Design: Retrospective analysis.

Participants: Of 339 eligible patients, there were 110 cases of urolithiasis diagnosed by UCT (95 patients).

Methods: All patients aged ≤21 years who presented to 1 children's hospital and who underwent UCT of the abdomen were included in the study. Data were obtained to assess demographic, clinical, diagnostic, therapeutic, and disposition information.

Results: Mean age of the study population (ie, those with urolithiasis) was 14.4 years. Females accounted for 66% of this population. In this study population, 15% had an initial urinalysis that was negative for blood. Location of stones were as follows: ureteral (51.8%), renal (23.6%), and bladder (3.6%). Location of pain in the study group was right abdomen/flank pain in 43 patients (39.1%), left abdomen/flank pain in 38 (34.5%), and bilateral abdomen/flank pain in 7 (6.4%). In children who were not diagnosed with urolithiasis, 23 cases (10%) had an alternative significant diagnosis identified by CT, such as 11 ovarian cysts, 3 cases of appendicitis, and 1 torsed ovary. Predictors of urolithiasis included (1) history of urolithiasis, (2) history of nausea and vomiting, (3) presence of flank pain on exam, and (4) >2 red blood cells per high-power field on urinalysis. A history of fever and dysuria and presence of costovertebral angle tenderness were inversely associated with urolithiasis on UCT.

Conclusions: UCT can have an important role in diagnosing urolithiasis in children, especially when up to 15% may not have hematuria initially. The first take-home message is that urolithiasis is not an adult disease. The second message is that not all cases of urolithiasis are associated with hematuria. Nevertheless, we must still reconcile use of UCT in kids to make a diagnosis with long-term consequences later in life.
Despite evidence for safety and efficacy, medical expulsive therapy is profoundly under-prescribed for management of renal colic.

**Background:** Although the efficacy of adjunctive use of an alpha-adrenergic blocker or a calcium-channel blocker in upper tract nephrolithiasis has been established by 11 randomized controlled trials published between 2000 and 2006, the adoption of medical expulsive therapy (MET) by the broader medical community has been unexplored.

**Objective:** To analyze data from the National Hospital Ambulatory Medical Care Survey during the period corresponding to publication of MET efficacy and safety trials.

**Methods:** ED visits for stones were identified using a sampling technique. Use of MET was established by evidence of a prescription for a calcium-channel or alpha-adrenergic blocker at the time of the ED visit. Patients with a concurrent diagnosis of hypertension or benign prostatic hyperplasia were excluded. Estimates of the prevalence of MET use were computed using these data, and were correlated with the year-to-year and cumulative publication of study literature. Logistic regression was used to extrapolate sampled data and to examine linear and non-linear time trends in the prescription of MET.

**Results:** Use of MET increased throughout the study period. The odds of being treated with MET more than doubled with each successive year (odds ratio, 2.15; 95% CI, 1.31 to 3.5; \( P \))

**Conclusions:** The sluggish dissemination of MET into broader medical community indicates a block in the translation of clinical science into practice and raises a quality-of-care concern. I'll throw a small stone at this glass house: sampled data have limitations. Some patients treated in the ED may not require MET or may not be appropriate for it. But even given the difficulties of working with sampled survey data, the authors' point is well taken, and the numbers add memorable drama. The total of 260,000 undertreated patients per year works out to about 1.6 million over the full study period. MET safely and reliably reduces the need for surgery; its provision improves quality of care, promotes health, and has substantial economic implications. Urologists are well versed and in broad agreement with MET, but they see only a minority of acute stone patients, so somewhere in the emergency chain of care there is a failure of information dissemination. Pass the word.

**Additional Keywords:** None

**Print Tag:** Refer to original journal article
Think Twice Before Giving Prophylactic AEDs in ICH

Prophylactic Antiepileptic Drug Use Is Associated With Poor Outcome Following ICH.
Messé SR, Sansing LH, et al.:
Neurocrit Care 2009; 11 (August): 38-44

In this study, early use of prophylactic antiepileptic drugs after acute nontraumatic intracerebral hemorrhage (ICH) was associated with poor outcome, independent of other factors known to influence outcome in ICH.

Background: Prophylactic antiepileptic drug (pAED) use in intracerebral hemorrhage (ICH) is variable; there is no consensus concerning the proper approach.

Objective: To ascertain whether administration of pAEDs affects outcome in nontraumatic ICH.

Design: CHANT (Cerebral Hemorrhage and NXY-059 Trial) was a randomized trial comparing a neuroprotective (NXY-059) with placebo in patients with ICH. The current study addressed CHANT patients given placebo.

Participants: CHANT-enrolled patients within 6 hours following nontraumatic ICH. Key exclusion criteria included significant extra-axial hemorrhage (subdural, epidural, subarachnoid), hemorrhage secondary to tumor or encephalitis, planned surgery on the ICH, alcohol/drug abuse, and unconsciousness or a clinical impression that the patient was unlikely to survive the first 72 hours.

Methods: Insertion of intracranial pressure monitors and external ventricular drains, osmotic agents, and glucocorticoid use were allowed. Patients already taking AEDs were excluded. All treatments, other than study drug, were left to local investigators. Usual clinical, demographic, and outcome data were collected, including occurrence of seizures following enrollment and drugs administered. Benzodiazepines were not considered to be AEDs. The primary outcome measure was the modified Rankin scale, with scores of 6 and 5 (death and severe disability, respectively) considered poor outcomes and higher scores considered good. Data were analyzed using multivariate analysis, looking for an effect of pAED use on outcome. Further analyses were performed to examine confounding factors. Details of the statistical analysis are well explained in the paper.

Results: 295 patients participated, mean age was 67.5 years, 65% were male, and mean ICH volume was about 23 mL. Five patients had clinical seizures following enrollment, all on day 2 or 3, and none were on pAEDs. All patients with clinical seizures had cortical or subcortical hemorrhage. In total, 23 patients received a pAED (ie, no seizures were present before treatment with the AED was begun). Nearly all patients received phenytoin, and 4 received valproate. pAED use was more frequent at U.S. sites. None of the patients receiving pAEDs had seizures out to 90 days. At the end of extensive multivariate analysis, pAED use remained strongly associated with poor outcome (odds ratio, 6.8), as did age, hematoma volume, presence of intraventricular hemorrhage, lower Glasgow coma score, and prior warfarin use.

Conclusions: In this cohort, early use of pAED after acute nontraumatic ICH was associated with poor outcome, independent of other factors known to influence outcome in ICH. While this retrospective cohort review suffers from all the drawbacks associated with that type of research and, in particular, very few patients received pAEDs, the data certainly justify continuing skepticism regarding blanket/automatic use of pAEDs in nontraumatic ICH patients. It also provides useful insights into the incidence of clinical seizures in the hours and days following nontraumatic ICH – these were rare, occurring in
The expanding literature suggests that serum procalcitonin levels are predictive of bacterial respiratory tract infection.

**Background:** The most common indication for antibiotics is a lower respiratory tract infection (LRTI), even though most are viral in etiology. Bacterial infections can be catastrophic if untreated, but clinical signs, symptoms, and lab values are not helpful in determining a bacterial etiology. Procalcitonin (PCT) is elevated in bacteremic respiratory tract infections, and higher levels coupled with slow rates of normalization have been shown to correlate with the severity of underlying systemic illness and the virulence of the infecting bacterium. In previous studies, a PCT algorithm reduced antibiotic use in patients with LRTIs.

**Objective:** To evaluate a PCT algorithm versus standard guideline-compliant care, and to determine whether the algorithm reduces antibiotic exposure without increasing the risk for serious adverse outcomes.

**Design:** Multicenter, open-label, noninferiority, randomized controlled trial.

**Participants:** ED patients with a severe LRTI presenting to tertiary care centers.

**Methods:** Patients were randomized to antibiotics based on a PCT algorithm with predefined cutoff ranges for initiating or stopping antibiotics (PCT group) or were treated according to standard guidelines (control group). The primary outcome was noninferiority of PCT-guided care, based on a composite adverse outcome of death, ICU admission, disease-specific complications, or recurrent infection requiring antibiotic treatment within 30 days. Other outcome measures included antibiotic exposure and adverse effects from antibiotics.

**Results:** 1359 patients were enrolled. The rate of overall adverse outcomes was similar in the PCT and control groups (15.4% vs 18.9%). Mean duration of antibiotics exposure in the PCT group was more than one third shorter in all patients (5.7 vs 8.7 days; relative change, –34.8%; 95% CI, –40.3% to –28.7%) and in the subgroups of patients with community-acquired pneumonia (n=925; 7.2 vs 10.7 days; –32.4%), exacerbation of chronic obstructive pulmonary disease (COPD; n=228; 2.5 vs 5.1 days; –50.4%), and acute bronchitis (n=151; 1.0 vs 2.8 days; –65.0%). Antibiotic-associated adverse effects were less frequent among patients in the PCT group (19.8% [n=133] vs 28.1% [n=193]; difference, –8.2%).

**Conclusions:** A strategy of PCT guidance compared with standard guidelines for LRTIs resulted in similar rates of adverse outcomes but lower rates of antibiotic exposure and antibiotic-associated adverse effects. Community-acquired pneumonia is easy regarding antibiotic use, just look for the infiltrate. What intrigues me is a marker that can suggest a bacterial etiology for a COPD exacerbation or for acute bronchitis. And then it gives you the ability to fine-tune the duration of antibiotic exposure. Assuming future studies confirm optimal cutoff points for starting and stopping, there could be enormous potential economic and public health benefits. We are slowly climbing out of our stone age of empiric 7- to 10-day antibiotic courses and wasteful, dangerous shotgunning.

Additional Keywords: None

Print Tag: Refer to original journal article
Background: According to the Centers for Disease Control and Prevention, there are 6 to 12 million manifestations of pediculosis capitis each year. While permethrin is first-line therapy, there is evidence that lice in the U.S. and elsewhere are becoming increasingly resistant to it. Spinosad 0.9% creme rinse may be an efficacious alternative, and its studies have been submitted to the FDA for approval.

Objective: To compare spinosad with permethrin under "actual-use" conditions in participants' home settings.

Design: 2 phase-3, multicenter, randomized blinded studies.

Participants: 1038 children aged >6 months.

Methods: Primary participants and infected family members were stratified into the 1.0% permethrin with combing group and the 0.9% spinosad without combing group. Subjects administered the pediculicidal agent 1 to 2 times at home during a 21-day interval (frequency depending on presence of lice requiring a second treatment). Evaluations on these subjects were accomplished at baseline and on days 7, 14, and 21. The primary end point was evidence of no lice by day 14.

Results: In study 1, 84.6% of spinosad-treated patients were lice-free compared to 44.9% of permethrin-treated patients. In study 2, 86.7% of spinosad-treated patients were lice-free compared to 42.9% of permethrin-treated patients (P

Conclusions: Spinosad is significantly more effective than permethrin in treating pediculosis capitis, and it requires only 1 application in most circumstances without nit combing. Spinosad works by ultimately paralyzing the insect. Studies have shown that it is not acutely toxic to mammals and has no long-term effects such as tumors, neurotoxicity, fetotoxicity, or teratogenicity. The creme is applied to the scalp and then applied to the tips of the hair. It's left on for 10 minutes, then shampooed off. Combing is not necessary because the product is ovicidal.

Additional Keywords: None

Print Tag: Refer to original journal article
More Education, Training Necessary for Optimally Managing Adrenal Insufficiency

Adrenal Crisis in Treated Addison’s Disease: A Predictable but Under-Managed Event.

White K, Arlt W:
Eur J Endocrinol 2009; September 29 (): epub ahead of print

Patient-reported data suggest that vomiting and/or diarrhea trigger most episodes of adrenal crisis.

**Background:** Adrenal crisis is a life-threatening event that is largely preventable but often unrecognized. For patients with primary adrenal insufficiency, the contemporary medical preference for conservative hydrocortisone dosing (to minimize complications such as diabetes and osteoporosis) puts them at higher risk for adrenal crisis than was the case in the relatively recent past, when higher daily doses were commonplace.

**Objective:** To evaluate provocative factors and the extent to which adrenal crisis is underdiagnosed and poorly managed in patients with adrenal insufficiency receiving standard replacement therapy (20 mg daily).

**Methods:** Questionnaire-based survey directed to patients only, asking about their experience of adrenal crisis and demographic characteristics. No clinical data were evaluated. No medical records were reviewed. A 2003 survey was mailed to members of Addison’s support groups in 4 countries. In 2006, a shorter follow-up survey was mailed to UK patients only. Data were analyzed to identify main variables associated with an elevated risk of crisis.

**Results:** Surveys were obtained from 1102 patients. Responses indicated that 8% of diagnosed cases required hospital treatment for adrenal crisis annually. Vomiting and/or diarrhea triggered more adrenal crises than other factors and were responsible for more than half of all cases. Flu-like illness and major infections were the next most important risk factors (about 17% of cases). Surgical procedures carried out with insufficient steroid coverage caused more adrenal emergencies than accidental injuries. Concomitant diabetes and/or asthma and premature ovarian failure increased the frequency of adrenal crisis reported by patients. Up to one third of emergencies occurred away from home. Only a few patients were able to self-inject supplemental hydrocortisone.

**Conclusions:** Comprehensive patient education and training are necessary for optimal management of adrenal insufficiency, as is vigilance by physicians and awareness that everyday infections can be life-threatening for steroid-dependent patients with adrenal insufficiency. This methodology was certainly different from the conventional. Presumably, patients in these organizations are highly motivated, and it is very interesting to read their perspectives on etiologies. These patients are extremely sensitive to changes in fluid status (as they themselves report), and obviously they are far more vulnerable to infection. As we know, putting people on chronic steroids is like giving them another disease, even when what we are treating is a steroid-deficient condition. Despite the authors’ title, there is little to support the contention that the disease is "under-managed," apart from patient inability to self-inject, although I would agree that it is probably under-recognized. Some chart review and metabolic profiling would have been nice to have.

Additional Keywords: None

Print Tag: Refer to original journal article
An extensive review has shown that we still haven't demonstrated that any cerumenolytic is better than placebo.

**Background:** Cerumen impaction can often be benign, but it can interfere with physical exam, cause conductive hearing loss, cause discomfort, and be a contributing factor in infection.

**Objective:** To test eardrop effectiveness for treatment of symptomatic ear wax.

**Design:** Review and meta-analysis.

**Methods:** Of 86 studies retrieved, 60 were immediately considered unsuitable. Other criteria for exclusion included in vitro trials, duplicate studies, and no data addressing the primary outcome. A total of 9 trials met all inclusion criteria. Criteria for evaluation of studies included adequacy of randomization, potential for selection bias, blinding of outcome, and quality of outcome assessment. Based on these criteria, studies were graded on a scale of A, B, or C based on their quality. For a study to be A, all criteria had to be met, B indicated each criteria was at least partially met, and C indicated 1 or more criteria were not met.

**Interventions:** Cerumenolytic, placebo, or nothing. In some studies syringing was used.

**Results:** The authors point out that studies available are of modest quality due to the fact that only a small number of subjects were studied. None of the studies demonstrated a significant difference between 2 cerumenolytics, or between any cerumenolytic and a placebo such as water or saline. The strongest results were from a study demonstrating a benefit of eardrops over no treatment. The meta-analysis was limited due to differences in methodological quality and outcome measures between studies. Of studies, 2 could be combined in a meta-analysis. After this combination, only 1 significant difference was found between a cerumenolytic and placebo: triethanolamine polypeptide placed in children’s’ ears for 15 minutes proved better than saline at eliminating the need for syringing.

**Conclusions:** In their implications for practice, the authors conclude that there are no good data that can allow us to recommend any cerumenolytic over another. Saline and water are both effective and readily available. There is also weak evidence that a short 15-minute period of instillation of triethanolamine polypeptide eardrops prior to syringing may be helpful. I can't say that this article will change my practice. Now, when asked what the best method to remove cerumen is, I can say with honesty that it is unknown. Further progress in this area requires a trial comparing oil-based and water-based solvents with a placebo. This trial would have to have an appropriately large number of patients, and outcome measures should be standardized.
High-dose N-acetylcysteine lowers the odds of contracting contrast-induced nephropathy by >50%.

**Background:** There is considerable debate regarding whether N-acetylcysteine (NAC) is beneficial for prevention of contrast-induced nephropathy (CIN). Early trials and meta-analyses were notable for considerable heterogeneity of treatment effects across a range of doses.

**Objective:** To conduct a meta-analysis to evaluate the efficacy of high-dose NAC for prevention of CIN.

**Methods:** Prespecified criteria for evaluable studies included enrollment of adult subjects who received high-dose NAC, orally or IV, as a daily dose >1200 mg or as a single periprocedural dose (within 4 hours of contrast exposure) exceeding 600 mg. Prospective trials of individuals randomized to NAC versus a control group were also included, as were trials that included an explicit end point of the incidence of CIN. Trials that compared NAC with other active treatments were excluded.

**Results:** 16 high-quality comparisons of patients randomized to high-dose NAC versus controls met prespecified inclusion criteria. These trials represented a total sample size of 1677 subjects (842 assigned to high-dose NAC; 835 assigned to control). The average population age was 68 years, nearly 40% were diabetic, and the weighted mean baseline creatinine of the overall population was 1.58 mg/dL. No significant heterogeneity was detected ($P = 0.09; I^2 = 34\%$). The odds of CIN were 54% lower in patients assigned to high-dose NAC. The results of the more-conservative random-effects approach were similar, with NAC reducing the odds of CIN by 48%. There was no evidence of publication bias.

**Conclusions:** High-dose NAC decreases the incidence of CIN. Renal protection is an important goal, and this was a good, solid publication. Thus, this week, NAC is back among the good guys, provided it's high dose. While it's far from clear what this means for emergency practice, I'll tell you why I think NAC will head our way. For starters, radiologists are simply wedded to contrast. Furthermore, we see more and more patients with high-normal or modestly elevated creatinine. As lengths of stays in the ED expand, as we identify patients for admission who are likely to require serial scans as inpatients, as incentives mount for hospitals to protect patients from unintended harm, as overwhelmed radiology departments push back against rampant scanning, there will sooner or later be a perfect storm of voices demanding that we in the ED start the clock on pretreatment scenarios. Remember, this meta-analysis also included studies evaluating a single periprocedural dose. How many more years until we have a nice, fast, open-air MRI?

Additional Keywords: None

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