Intravenous (IV) acetaminophen:

Rectal examination:
rectal examination not often necessary,

East Lansing
Kevin M. Klauer, DO, EJD,
Assistant Clinical Professor,
Michigan State University College of Osteopathic Medicine,
East Lansing

Rectal examination: rectal examination not often necessary, except in certain circumstances (eg, to document bleeding); evidence from literature — disrupted urethra presents obvious signs (eg, pelvic fracture, blood at meatus), and rectal examination does not provide additional information; detection of spinal cord injury — 2007 study showed rectal examination has only 50% sensitivity to detect spinal cord injury; Advanced Trauma Life Support (ATLS) manual — states rectal examination not required for every patient in emergency department (ED)

Intravenous (IV) acetaminophen: approved by Food and Drug Administration (FDA) in 2010; bypasses first-pass hepatic metabolism, which substantially increases blood concentration and efficacy of drug; time to peak concentration in blood — 15 min with IV administration vs 1 hr with oral dose; maximum concentration in blood — 70% higher with IV than with oral administration; analgesic effects — comparable to opioids; contraindications — severe hepatic or active liver disease; cost for 1 g — $10 for IV vs $0.05 for oral; hospital may charge substantially more; recommended use — patients who need pain relief but have suspected opiate addiction

Epistaxis and antibiotics: 2012 prospective observational study — of 78 patients with epistaxis who received prophylactic antibiotics after nasal packing and 76 who did not, none developed infectious complications (eg, otitis media, sinusitis, toxic shock); current recommendations — advise patient to follow up with ear, nose, and throat specialist or with ED within 48 hr of nasal packing and explain reasons for conservative use of antibiotics (eg, increased resistance to antibiotics, gastrointestinal upset)

Cyanoacrylate tissue adhesive (eg, Dermabond, Surgiseal): reasonable shortcut to wound closure, but may be overused in ED (eg, lacerations on scalp, knuckles, or near eye); cosmetic results of use and suturets not equivalent; adhesive should not be used on lacerations around eye area (recent lawsuits of pediatric patients who had eye temporarily glued shut); 2012 meta-analysis of closure techniques in periorbital area — 6 times more likely to develop periostial cellulitis from cyanoacrylate tissue adhesive than from traditional sutures (1.8% vs 0.3%, respectively); speaker argues that clinicians sometimes ignore other portions of wound evaluation (eg, observation, cleaning, irritation of wound) when using adhesive

Saline hydration before IV-contrast computed tomography (CT): reduces risk for contrast-induced nephropathy; speaker recommends administering 250 mL saline before and after CT study in 2012 European Journal of Radiology: meta-analysis of 40 studies investigated procedures following CT (mean ages ranged from 44 to 74 yr, and 33 of 40 studies included patients with chronic kidney disease); results — 6.4% pooled incidence of contrast-induced nephropathy; of 20 studies that followed renal function after CT, nephropathy persisted in 1.1% of those who had developed contrast-induced nephropathy; 0.06% had dialysis or renal transplantation; significant predictors — chronic kidney disease (2.3 times), diabetes (3.1 times) more likely to have contrast-induced nephropathy

Penicillin allergy: 2012 systematic review from Journal of Emergency Medicine — analysis of 27 articles showed that <10% of patients who reported allergy to penicillin truly had one; anaphylaxis after penicillin administration ranged from 0.015% to 0.004%; cross-reactivity — 1% in patients who inaccurately reported penicillin allergy, 2.55% in patients who accurately reported penicillin allergy; R1 side chain — present in first- and second-generation cephalosporins but not third-, fourth-, or fifth-generation, so later generations of antibiotics highly unlikely to cause reactions in patients with penicillin allergy

Hydromorphone (eg, Dilauidid, Exalgo, Palladone) vs morphine: hydromorphone 5 to 10 times more potent than morphine; clinician misperception that compared to morphine, hydromorphone more effective and releases less histamine (leading to less pruritus, nausea, vomiting, hypertension); according to speaker, clinicians often fail to account for differences in potency

2013 study in Academic Emergency Medicine: 325 patients (age 21-64 yr) randomized to 2 mg hydromorphone or control (usual care, 6 mg morphine); 77.4% of patients who received hydromorphone declined additional dose after 30 min (vs 65.8% who received morphine) and had lower pain scores; 74% of patients who received hydromorphone and <60% of patients who received morphine had ≥50% reduction in pain; side effects — hydromorphone associated with more pruritus, nausea, and vomiting than morphine; clinical significance — speaker argues that study not effective equivalency trial, and results reflect greater potency of hydromorphone (control group received 7 equivalent units of morphine, whereas hydromorphone group received 14 equivalent units)

Significance of aVR lead in acute coronary syndrome: 2012 American Journal of Emergency Medicine — occlusion in left main coronary artery significant concern in conditions of ST depression that may benefit from emergency reperfusion; diffuse ST depression with ST elevation in aVR lead (as small

Educational Objectives
The goal of this program is to improve patient care in the emergency department (ED). After listening to and assimilating this program, the clinician will be better able to:

1. Identify misconceptions regarding the necessity of common procedures in the ED.
2. Analyze the relative risks and benefits of performing common procedures in the ED.
3. Assess the necessity of various procedures and treatments using prediction rules.
4. Use likelihood ratios to assess the effectiveness of prediction rules in the ED.
5. Determine whether prediction rules can identify a subset of patients who benefit from more aggressive treatment.

Faculty Disclosures
In adherence to ACCME Standards for Commercial Support, Audio Digest requires all faculty and members of the planning committee to disclose relevant financial relationships within the past 12 months that might create any personal conflicts of interest. Any identified conflicts were resolved to ensure that this educational activity promotes quality in health care and not a proprietary business or commercial interest. For this program, members of the faculty and planning committee reported nothing to disclose.
as 1 mm) may predict occlusion; study of ST elevation in aVr lead — of 400 patients with typical chest pain who presented to critical care unit and received percutaneous coronary intervention, 31% had ≥1 mm ST elevation in aVr lead; of patients with proximal disease, 40.7% of men and 43.8% of women had ST elevation in aVr lead; 62.7% sensitivity to predict proximal disease; clinical significance — speaker states ST elevation in aVr lead not effective for screening for proximal artery disease, but measurement does not cost additional time or money to obtain and may indicate need for further intervention

Wellens syndrome: classic electrocardiographic (ECG) presentations — biphasic or deeply inverted T waves in leads V2 and V3; less subtle than ST elevation in aVr lead; may be present even in the absence of other signs of severe coronary disease or acute coronary syndrome (eg, Q waves, ST segment elevation, loss of R wave progression); type 1 (ie, type A, ≥76% of cases) — characterized by T waves in V2 and V3 that are deeply inverted, symmetrical; type 2 — biphasic T wave in V2 and V3; both types — indicate proximal left anterior descending artery or proximal left main coronary artery disease

Novel approach to urine collection in young children: urine can be obtained by stimulation of detrusor muscle, which produces reflex contraction; procedure — stimulate 25 min after feeding; clean genital area with soap and water; dry with gauze; may be obtained by stimulation of detrusor muscle, which produces reflex contraction; 1592 patients, compared predictive value of 3 rules from study to Ottawa rule (lumbar puncture required if age >45 yr, vomiting, diastolic blood pressure >100 mm Hg; age >45 yr, vomiting, diastolic blood pressure >100 mm Hg, neck pain or stiffness, age 45 to 55 yr; according to speaker, ≥76% for Canadian head rule, <60% for San Francisco rule — “abnormal” ECG subjective; variability in rules based on who interpreted ECG; San Francisco rule being revised to increase objectivity of ECG measurement and improve clinical validity

Abdominal CT
Prediction rule on necessity of abdominal CT: Holmes et al investigated 12,000 children (median age 11.1 yr), and ≥66% had intraabdominal injury; negative decision rule — CT not required to identify injury if patient has no evidence of abdominal wall trauma or seat belt sign, Glasgow Coma Scale (GCS) ≥13, no abdominal tenderness, no evidence of thoracic wall trauma, no complaints of abdominal pain, no decreased breath sounds, no vomiting; negative LR <0.1; clinical significance — may reduce use of CT in patients scanned solely because of mechanism of injury or presence of distracting injury; CT summit at University of California, Davis — involved trauma surgery, radiology, and emergency medicine; concluded that patient with low-coded trauma (based on mechanism) and negative decision rule did not need CT before admission to ED; if patient to be discharged, CT could be obtained based on clinical suspicion of physician; in higher-level trauma with negative decision rule, option to not perform CT should be considered; implications for practice — CT unnecessary based on mechanism alone

Head CT
Prediction rules in adults: similar in most aspects, but vary in initial GCS upon admission and 2 hr after injury, duration of loss of consciousness or amnesia, and presence or absence of specified risk factors

Canadian CT rule: valid in patients with minor head injuries if they are high risk for neurologic intervention (GCS <15 2 hr after injury, suspected skull or basal skull fracture, vomiting, or age >65 yr) or medium risk (amnesia regarding events >30 min before impact or dangerous mechanism of injury); sensitivity of high-risk rule — relatively high (ie, identifies who needs intervention), but did not change CT-ordering practices

Joint clinical policy from Centers for Disease Control and Prevention (CDC) and American College of Emergency Physicians (ACEP): Level A recommendations (strongest) — loss of consciousness or posttraumatic amnesia plus headache, vomiting, age >60 yr, drug or alcohol intoxication, memory deficits, physical evidence of trauma above clavicle, posttraumatic seizure, GCS <15, focal neurologic deficit, and/or coagulopathy; Level B recommendations — no loss of consciousness or posttraumatic amnesia following head trauma but focal neurologic deficit, vomiting, severe headache, age >65 yr, signs of basilar skull fracture, GCS <15, coagulopathy, and/or dangerous mechanism of injury; challenge — under these guidelines, CT indicated for vast majority of patients with mild traumatic brain injury (TBI)

Alcohol intoxication: prospective study of 283 patients (median alcohol 195 mmol/L, 225 patients had GCS of 15); sensitivity of rules to identify relevant injuries — 70% for Canadian head rule, 83% for NEXUS II, 100% for New Orleans; speaker indicates rules do not perform well enough to use in intoxicated patients

Children: study from UC Davis; age <2 yr — CT not required if mental status normal, no (or frontal) scalp hematoma, loss of bradycardia, hemoglobin ≤9 g/dL, chest pain, oxygen saturation ≤94%, presence of fecal occult blood; to speaker, BNP not useful because measurement not often obtained from patients in ED

Likelihood ratio: no study has shown any syncope rule to have likelihood ratio >10 or <0.1; reason for ineffectiveness of San Francisco rule — “abnormal” ECG subjective; variability in rules based on who interpreted ECG; San Francisco rule being revised to increase objectivity of ECG measurement and improve clinical validity

Improving Clinical Care

Deborah D. Diercks, MD, MSc, Professor and Vice Chair of Research, University of California, Davis, School of Medicine, Sacramento

Subarachnoid Hemorrhage
Prediction rules from 2010 British Medical Journal (BMJ): rule 1 — age ≥40 yr, neck pain or stiffness, witnessed loss of consciousness, onset with exertion; rule 2 — arrives by ambulance, age ≥45 yr, vomiting, diastolic blood pressure >100 mm Hg; rule 3 — arrives by ambulance, systolic blood pressure >160 mm Hg, neck pain or stiffness, age 45 to 55 yr; according to speaker, clinical link between arrival by ambulance and subarachnoid hemorrhage questionable because many patients arrive at ED by ambulance; sensitivity — 100% for all 3 rules; specificity — low

2013 study in Journal of American Medical Association: in 1592 patients, compared predictive value of 3 rules from BMJ study to Ottawa rule (lumbar puncture required if age ≥40, neck pain, witnessed loss of consciousness, pain onset during exertion, thunderclap headache, or limited neck flexion); likelihood ratio (LR) for negative results — rule 3 from BMJ and Ottawa rule meet criteria for identifying patients who do not need lumbar puncture; LR for positive results — none of BMJ rules or Ottawa rule predicts patients who need lumbar puncture; clinical significance — LR for negative results may aid clinician in deciding who does not need lumbar puncture

Syncope
Prediction rules: to identify patients who benefit from hospital admission
San Francisco syncope rule: abnormal ECG, dyspnea, systolic blood pressure <90 mm Hg, hematocrit <30%, or history of congestive heart failure
Osservatorio Epidemiologico sulla Sincope nel Lazio (OESIL) rule: abnormal ECG, age ≥65 yr, history of cardiac disease, no prodrame
Risk stratification of syncope in the emergency department (ROSE): abnormal ECG, B-type natriuretic peptide (BNP),
Acute Coronary Syndrome (ACS)
Thrombolysis in myocardial infarction (TIMI) risk score: at speaker’s institution, used to identify patients who would benefit from aggressive therapy upon admission to ED (eg, dual antiplatelet therapy, administration of heparin)

Suggested Reading

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1. Which of the following statements is(are) true regarding intravenous vs oral acetaminophen?
   1. Intravenous acetaminophen takes longer to reach peak concentration in the blood.
   2. The analgesic effects are similar between intravenous and oral acetaminophen.
   3. The maximum blood concentration is higher with intravenous acetaminophen than with an equal dose of oral acetaminophen.
   4. Intravenous acetaminophen is not recommended for patients with a suspected opiate addiction.
   (A) 1,2 (B) 3,4 (C) 3 ** (D) 2,4

2. A recent meta-analysis showed that patients who receive cyanoacrylate tissue adhesive in the periorbital area are _______ as likely to develop peri orbital cellulitis than those who receive traditional sutures.
   (A) Equally (B) 2 times (C) 6 times ** (D) 10 times

3. Which of the following is true regarding nephropathy induced by intravenous contrast for computed tomography (CT)?
   (A) Most cases of contrast-induced nephropathy persist long-term
   (B) The majority of cases require dialysis or renal transplantation
   (C) Diabetes significantly increases the likelihood of developing contrast-induced nephropathy**
   (D) A and B

4. A recent study indicated that hydromorphone was significantly better than morphine for relieving pain. What was the primary limitation of this study that prevented accurate comparison between the two drugs?
   (A) The outcome measures used did not accurately assess pain
   (B) The units of analgesia were not equal between the drugs
   (C) The number of subjects was insufficient to accurately compare the drugs
   (D) No limitations were identified in this study

5. According to recent research, which of the following statements most accurately describes the clinical significance of a ≥1 mm ST elevation on the aVR lead of an ECG?
   (A) It can effectively screen for occlusion of the left main coronary artery
   (B) It is present in more than half of individuals with proximal artery disease
   (C) It may indicate the need for further intervention for proximal artery disease
   (D) It does not have any known clinical benefit in identifying possible coronary artery disease

   (A) High, high (B) High, low (C) Low, high (D) Low, low

7. Which of the following criteria or measurements of the San Francisco syncope rule tends to be the most subjective?
   (A) Dyspnea (B) Blood pressure (C) Abnormalities on ECG ** (D) B-type natriuretic peptide

8. Based on a study of a large population of children, which of the following best describes the recommendations for abdominal CT following injury?
   (A) The mechanism of injury is the primary predictor of whether an abdominal CT is necessary, regardless of trauma signs
   (B) Patients with high-level trauma require an abdominal CT, whereas those with low-coded trauma do not
   (C) Abdominal CT may not be necessary in patients with a negative decision rule finding regardless of mechanism of injury
   (D) All abdominal trauma injuries require CT even in the absence of trauma signs

9. According to recent research, which of the following prediction rules for when to obtain a head CT missed a small percentage (1.7%) of clinically relevant injuries (not including those in patients who were intoxicated)?
   (A) Canadian CT (B) NEXUS II (C) New Orleans ** (D) None of the rules missed relevant injuries

10. According to recent research in patients with unstable angina or non-ST segment-elevation myocardial infarction, early invasive therapy significantly reduced mortality rate in ______.
    (A) All patients (B) Patients with a high GRACE score ** (C) Patients with a low GRACE score (D) None of the patients

Answers to Audio Digest Emergency Medicine Volume 31 Issue 24: 1-D, 2-B, 3-D, 4-B, 5-D, 6-B, 7-B, 8-C, 9-C, 10-B