

a retrospective cohort of consecutive persons with serious blunt head injury using a structured data collection instrument from 1999 through 2003. Patients aged 18 to 65 years, transported directly from the scene of injury, evaluated in the emergency department (ED) of a Level I trauma center, and retrospectively identified as having a "serious" head injury (Abbreviated Injury Scale [AIS] score ≥ 3) were included in the analysis. Resource-based "high therapeutic intensity" (HTI) measures warranting specialized trauma care were identified a priori (all within 72 hours after ED arrival), including neurosurgical intervention, exploratory laparotomy, intensive care (ventilator support >48 hours, transfusion ≥ 6 units of packed RBC, vasopressor support), or death. We used classification and regression tree analysis to derive a preliminary decision rule using 19 covariates (patient demographics, comorbid disease, vital signs, laboratory values, and radiographic findings) and cross-validation techniques to estimate rule sensitivity and specificity. Binomial 95% confidence intervals (CIs) are provided for the derivation sample.

Results: Five hundred four consecutive trauma patients were identified as having a serious head injury, of whom 258 patients (51%) required at least 1 of the HTI measures. Five variables (emergency medical services [EMS] Glasgow Coma Scale [GCS] score, ED GCS, serum bicarbonate level, EMS respiratory rate, and ED respiratory rate) had a sensitivity of 93% and specificity of 42% for identifying patients requiring 1 of the HTI measures (derivation sample: sensitivity 95% [95% CI 92% to 98%] and specificity 52% [95% CI 46% to 58%]).

Conclusion: This preliminary decision rule identified most patients with TBI in the derivation sample requiring urgent tertiary trauma care resources and was much more specific than using a standard injury-based criterion for transfer (eg, head AIS score ≥ 3). The generalizability of this rule for head-injured patients presenting to nontrauma hospitals will need to be evaluated.

44 Barotrauma During Hyperbaric Therapy: Can We Predict Patients Who Are Predisposed Based on Diagnosis?

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Study objectives: Hyperbaric oxygen therapy (HBOT) has been used for many years for multiple disease processes. One of the most frequently encountered adverse effects of this treatment is otic barotrauma resulting from atmospheric pressure changes. We determine whether patients with specific disease processes are at increased risk for barotrauma during HBOT.

Methods: Historical and clinical data were obtained from January 2000 to December 2003 by a computerized tracking system. The hyperbaric facility is based at a suburban hospital with an emergency medicine residency program. HBOTs are on an emergency and nonemergency basis. Statistical analysis based on treatment indication was performed. Requirement of myringotomy tubes (tubes) was considered "significant" otic barotrauma. Excluded were 13 patients who received tubes before HBOT. Statistical tests used were 95% confidence intervals (CIs) and Fisher exact test as indicated.

Results: Two hundred sixty-five patients were screened, 62% were male patients, and median age was 59 years (data available from 95% of patients); 252 patients met inclusion criteria. Forty-one (16%) patients overall (95% CI 2% to 30%) required tube placement. Tubes were not required in patients with air embolism, CO poisoning, gas gangrene, decompression sickness, or arterial insufficiency. Five percent of patients with necrotizing soft tissue infection ($P=.33$), 11% of patients with failed/threatened graft ($P=.28$), 17% of patients with chronic refractory osteomyelitis ($P=.80$), 22% of patients with problem wounds ($P=.4$), 22% of patients with soft tissue radionecrosis or osteoradionecrosis ($P=.07$), and 50% of patients with crush injury ($P=.03$) required tubes. With subset analysis based on radionecrosis or osteoradionecrosis affecting head and neck (57 patients), 28% of patients required tubes ($P=.013$). Eighteen percent (22/120) of patients treated at 2.0 atmospheres absolute (ATA) compared with 14% (19/132; $P=.49$) of patients in the greater than 2.0 ATA group required tubes.

Conclusion: A moderate number of patients overall required tubes. Those patients with head and neck radiation and crush injury were at a significantly increased risk for otic barotrauma. No correlation about depth of treatment was demonstrated.

45 Leukotriene B₄, Acute Abdominal Familial Mediterranean Fever and Acute Abdominal Pain From Other Etiologies

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Study objectives: Familial Mediterranean fever (FMF) or familial paroxysmal

polyserositis, an autosomal recessive disease, is a frequent etiology for acute abdominal pain in febrile patients arriving at emergency departments (EDs) attending areas with a high rate of population from Mediterranean extraction. Diagnosing acute peritonitis as a peritoneal FMF attack is extremely important because its nature is benign and its treatment medical, whereas other etiologies may be life threatening and require a different medical approach and, frequently, surgical intervention. An accurate and feasible test that corroborates acute abdominal FMF may prevent unnecessary abdominal surgery. Lipoxigenase products are present in the serum and synovial fluid of FMF patients (6), and attacks may be prevented or reduced in frequency by dietary fat restriction (7-11) or by colchicine therapy (12, 13); lipocortin defect has been suggested as a potential cause of phospholipase A2 release of arachidonic acid and its subsequent cyclooxygenase- and lipoxigenase-mediated eicosanoid derivatives. Eicosanoid generation, especially prostaglandin E₂, prostacyclin, and leukotriene B₄, has a potent proinflammatory effect that could be responsible for symptoms occurring during an acute attack.

Methods: Urine samples were collected from consecutive patients arriving at the ED for right lower quadrant abdominal pain and tested for leukotriene B₄ (LTB₄). Clinical follow-up, computed tomography, and ultrasonographic examinations, as well as pathology results, were analyzed, and patients were classified into 4 groups: acute appendicitis, urinary conditions, nonspecific abdominal pain, and acute FMF.

Results: Urine samples from 17 healthy individuals and from 36 patients with right lower quadrant abdominal pain and presenting to the ED were examined for LTB₄ concentrations. Mean LTB₄ concentrations were as follows: acute FMF 328 ± 237 pg/mg chromium, nonspecific abdominal pain 297 ± 173 pg/mg chromium, acute appendicitis 261 ± 105 pg/mg chromium, urologic conditions 244 ± 64 pg/mg chromium, controls 210 ± 62 pg/mg chromium.

Conclusion: LTB₄ level is high in acute abdominal conditions, especially in acute FMF ($P<.032$). Although significant differences in urine LTB₄ levels were found between acute FMF and the control group, urine LTB₄ levels were also high in right lower quadrant abdominal pain from other etiologies, the differences being insignificant. Our findings suggest a role of the lipocortin pathway in acute FMF but suggest that urine LTB₄ is not specific enough to differentiate acute FMF from other conditions presenting with right lower quadrant abdominal pain, and especially acute appendicitis.

46 Evaluation of D-Dimer for the Exclusion of Myocardial Infarction in Conjunction With Troponin I in an Emergency Department

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Study objectives: Chest pain is a frequent symptom in the emergency department (ED) and often presents a diagnostic challenge. Some published studies have shown that hemostatic markers had a diagnostic value in patients presenting to the ED with chest pain or shortness of breath. This study, performed in our military hospital, was aimed to demonstrate that D-dimer associated with troponin (bioMérieux SA, France) could be used as an exclusion test for patients suspected of having myocardial infarction in the ED, thus enabling a reduction of the patient hospital stay and cost savings.

Methods: One hundred nineteen consecutive patients presenting with chest pain selected within the hospital ED were included in this prospective study during 6 months. T₀ corresponds to the onset of chest pain. Fresh plasma samples collected from those patients were tested with the VIDAS D-Dimer New and VIDAS Troponin assays at different times. T₁ corresponds to the time of the first sample collection at patient arrival, T₂ corresponds to T₁+6 hours. Troponin I cutoff was fixed at 0.8 $\mu\text{g/L}$ as described previously; D-dimer cutoff was fixed at 250 ng/mL. An ECG was performed for all patients. Patients were classified into 4 categories: normal, stable angina, unstable angina, and myocardial infarction.

Results: The results obtained are consolidated in the Table. For the diagnosis of myocardial infarction at T₁, troponin I alone gave a sensitivity of 46.2% and a specificity of 96.8%, whereas at T₂, the sensitivity was 96.2% and the specificity was 96.8%. At T₁, D-dimer showed a sensitivity of 88.5% and a specificity of 25.8%. When we associated both troponin I and D-dimer assays, the sensitivity was 96.2% and the specificity was 25.8%. The combination of the 2 parameters allowed us to exclude 24 patients (20% of the total population) at T₁, 1 patient remaining false negative.

Conclusion: The association of D-dimer and troponin can safely enable the exclusion of myocardial infarction in an ED population and may be incorporated into clinical decision models in EDs.