

Clinical pathology selected abstracts

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Trauma resuscitation considerations: gender as a biological variable

April 2019—Sex dimorphisms in coagulation are well established, with females manifesting a more hypercoagulable profile, but the relationship between sex dimorphism in coagulation and trauma outcomes has not been investigated. Trauma-induced hemorrhage remains a leading cause of early post-injury death. While several studies have reported decreased morbidity and mortality among females following trauma, other studies found increased mortality or no gender-related differences. None of these studies have accounted for the whole blood hemostatic state. The authors conducted this study to determine the differences between males and females following trauma and to examine how differences in gender-specific coagulation affect clinical outcomes, specifically massive transfusion and death. The authors hypothesized that severely injured females are more hypercoagulable and, therefore, have lower rates of massive transfusion and mortality. They prospectively examined the hemostatic profiles, using thrombelastography (TEG), and clinical outcomes from all trauma activation patients from two level one trauma centers, with gender as an experimental variable. The authors compared coagulation profiles between genders and examined their association with massive transfusion and mortality. Of the 464 patients, 23 percent were female. By TEG, the female patients had a more hypercoagulable profile, with a higher angle (clot propagation) and maximum amplitude (clot strength). In addition, the females were less likely than the males to present with hyperfibrinolysis or prolonged activating clotting time. Furthermore, female gender was a survival benefit in the setting of depressed clot strength, and hyperfibrinolysis was associated with a higher case-fatality rate in males. The authors concluded that severely injured females have a more hypercoagulable profile than males and this protects against mortality in the setting of trauma-induced coagulopathy. They noted that this may challenge the clinical bias of a unified transfusion strategy and suggest that females require less blood product transfusion and are less likely to require antifibrinolytics. This study further highlights the need to investigate gender as a biological variable in trauma populations.

Coleman JR, Moore EE, Samuels JM, et al. Trauma resuscitation considerations: sex matters. *J Am Coll Surg*. 2019. doi:10.1016/j.jamcollsurg.2019.01.009.

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Vitamin D toxicity: a 16-year retrospective study at an academic medical center

Interest in vitamin D supplementation has increased, in part, because of studies that link the vitamin to improved immunity, cardiovascular health, and prevention of cancer and osteoporosis. Supplementation may be recommended by physicians or patient driven. Most patients' test results for 25-hydroxyvitamin D [25(OH)D] show normal or deficient levels, but the incidence of 25(OH)D toxicity has risen. Vitamin D toxicity has been reported in multiple age groups, and toxic levels correlate poorly with symptoms. Among the causes of vitamin D toxicity is ingesting megadoses, such as 50,000 IU, of vitamin D supplements and incorrect dosing of supplements in children. The authors performed a retrospective review of elevated 25(OH)D levels during a 16-year period at the University of Iowa Hospitals and Clinics to describe the causes of hypervitaminosis D and determine the extent to which vitamin D levels correlate with serum calcium levels and clinical symptoms. All serum/plasma 25(OH)D levels derived from clinical testing were retrieved from the electronic medical record. Elevated 25(OH)D was defined as levels higher than 80 ng/mL, although toxicity was considered unlikely unless levels exceeded 120 ng/mL. During the study period, there were 127,932 measurements of 25(OH)D performed on 73,779 unique patients. The authors also identified 1,068 samples from 780 unique patients with 25(OH)D levels greater than 80 ng/mL, which comprised 0.8 percent of total 25(OH)D measurements and 1.1 percent of all patients tested. Eighty-nine (0.12

percent) patients had results that exceeded 120 ng/mL, and four of them showed symptoms of vitamin D toxicity at the time of blood draw. The toxicity in three of the patients resulted from misdosing of liquid formulations. Statistical analysis showed a weak correlation between vitamin D concentrations and total serum/plasma calcium concentrations. The authors concluded that vitamin D toxicity is uncommon, and elevated levels of 25(OH)D did not correlate strongly with calcium levels or clinical symptoms. The findings highlight the potential risk of misdosing vitamin D using liquid formulations.

Lee JP, Tansey M, Jetton JG, et al. Vitamin D toxicity: a 16-year retrospective study at an academic medical center. *Lab Med*. 2018;49:123-129.

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