Commentary on: Doppler Ultrasound Imaging of Plastic Surgery Patients for Deep Venous Thrombosis Detection: A Prospective Controlled Study

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The author of the preceding article has done a creditable job of presenting a prospective cohort study of Doppler ultrasound screening for lower extremity deep venous thrombosis (DVT) of patients undergoing cosmetic outpatient surgery procedures. Not surprisingly, no cases of postoperative DVT were noted among the postoperative patients. While we may wonder about the cost implications of universal Doppler screening before and after cosmetic surgery, the investigator demonstrates that the modality was feasible in their practice, albeit it was offered free of charge. However, more troubling are a number of other assertions by the author that gloss over important issues surrounding postoperative venous thromboembolism (VTE) risk assessment and prevention in plastic surgery patients.

Although they are rare events, VTEs do occur after outpatient operations. In an analysis of 259,231 outpatient surgeries over a 5-year period from the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database, Pannucci and colleagues calculated an overall VTE rate of 0.15%, including cases of DVT and pulmonary embolus (PE). The investigators identified multiple risk factors for VTE, including age, body mass index (BMI), and length of surgery. A weighted risk index was calculated based on these factors. Using this index, a sub-population of high-risk patients was noted to have a 30-day VTE rate of 1.18%. While we would all like to believe that postoperative VTE poses little or no risk to our outpatients, the “never seen one” rationale does not justify ignoring preoperative VTE risk assessment or, in high-risk cases, failure to consider VTE prophylaxis.

In the current article, the author asserts that “it remains impossible to accurately predict which patients will develop a postoperative deep venous thrombosis.” He goes on to dismiss the Caprini Risk Assessment Model (RAM) as lacking validity and maintains that “risk stratification is ineffective in plastic surgery patients.” Recent studies on VTE risk assessment would seem to indicate otherwise. It is true that when created in the early 1990s, the Caprini RAM was based on expert opinion and was initially applied in concert with logic and best clinical judgment. However, since that time, the Caprini model has been validated in multiple patient populations. Most recently, a 2010 validation study of a Caprini-based RAM by Bahl and colleagues retrospectively evaluated 8216 general, vascular, and urologic surgery patients from the NSQIP database. Patients were scored by the Caprini RAM criteria, and 30-day postoperative VTE events were recorded. Investigators noted that the scoring system, which assigns patients to 1 of 4 categories from low to highest risk, was predictive of VTE events: Higher Caprini scores were associated with greater risks of postoperative VTE. Patients with Caprini scores of 9 or higher were noted to have a VTE risk of 6.51%. The Caprini RAM has also been found to predict 30-day VTE risk in a series of 2106 patients undergoing otolaryngology or head and neck surgery.

Contrary to the current study author’s claims, the Caprini model has also been validated for plastic surgery patients.
In an analysis from the 2011 Venous Thromboembolism Prevention Study (VTEPS), conducted by the Plastic Surgery Foundation, the records of 3334 patients undergoing cosmetic and reconstructive procedures in 4 tertiary-care facilities were reviewed. As with the study conducted by Bahl and colleagues, patients were risk stratified using the Caprini RAM, and records were reviewed for VTE events. Both the 2005 version and an updated 2010 model were evaluated. In the plastic surgery population, the 2005 RAM was found to be the most predictive of postoperative VTE, with patients scoring 8 or higher at a 5.85% risk of DVT or PE.5

Although routine duplex screening for postoperative patients may be “safe and well tolerated,” as maintained in the current article, imaging does not provide “a rational alternative to individual risk stratification and chemoprophylaxis,” as the author insists. The 2012 CHEST guidelines on VTE prevention are an exhaustively researched, heavily referenced, and widely accepted compendium on VTE risk assessment and prophylaxis. Updated in an evidence-based fashion every 4 years, this document does not recommend screening duplex for asymptomatic patients, even if they are considered to be at high risk.6 Use of screening duplex ultrasound after surgery does nothing to prevent VTE, akin to closing the barn door after the horse has already left. The imaging study identifies DVT, when present, but provides the surgeon with no ability to mitigate risk. In contrast, preoperative risk assessment using the extensively validated 2005 Caprini RAM provides the surgeon with valuable information up front. The RAM has consistently been shown to identify a 15- to 20-fold variability in VTE risk among the overall surgical patient population and can reliably identify both very high- and very low-risk patients. Merely completing the RAM forces the surgeon to stop and consider individual VTE risk factors. This information, which is available before a patient ever enters the operating room, allows the surgeon to conceptualize and quantify VTE risk, as well as identify risk factors that can potentially be modified (such as obesity, oral contraceptive use, or a very recent operative procedure) or that require further investigation (such as patients with known family histories of VTE who have not personally been evaluated for genetic hypercoagulability). In extreme cases, surgeons may choose to defer surgery entirely in very high-risk patients.

Timely diagnosis and treatment of DVT and PE indeed are important. However, even for those individuals evaluated and managed appropriately, VTE often carries serious consequences. Patients with DVT develop post-thrombotic syndrome, characterized by chronic edema, pain, and skin ulceration, in over half of cases.7 The outlook for victims of PE is even more dismal: 10% die in the first hour and 25% survive less than 12 months.8 Among those living beyond a year post-pulmonary embolus, chronic pulmonary hypertension has been reported in 5%.9 Finally, patients with a previous history of VTE carry a heightened lifetime risk for recurrent DVT or PE. For individuals whose initial VTE was attributable to a transient risk factor (such as surgery), the risk of a recurrent VTE is approximately 3% per year for the remainder of their lives.10 Patients with a history of DVT or PE should be considered at high risk for new VTEs for all future surgeries. Clearly, even a VTE that has been diagnosed early and treated appropriately carries serious lifelong implications for the patient.

As noted by the United States Surgeon General,11 the US Joint Commission,12 and the American College of Chest Physicians,13 the key to minimizing the morbidity and mortality of VTE is prevention. While there is a growing body of evidence supporting use of chemoprophylaxis for inpatient procedures in high-risk individuals, more research is needed on risk stratification and prevention in outpatient plastic surgery populations.14 The 2012 Michigan NSQIP study is a start. However, we need new studies evaluating risk-assessment strategies and prevention protocols, particularly in plastic surgery outpatient populations. Admittedly, the risk of VTE in the outpatient setting appears to be low.15 However, given the potentially devastating consequences of these events for both patient and surgeon, it is our responsibility as providers to gather the evidence necessary to protect our patients. If we don’t do it, who will?

The author of the current study used “total intravenous anesthesia” in all the reported cases. Although this “spontaneous breathing, Avoid gas, Face up, Extremities mobile (SAFE)” technique, nor postoperative Doppler screening can be viewed as substitutes for rigorous, evidence-based VTE risk assessment and (where indicated) VTE prophylaxis. In summary, routinely scanning patients following aesthetic procedures certainly does no harm, except perhaps to the patient’s or surgeon’s pocketbooks. In fact, screening may result in the timely diagnosis of a DVT. However, advocating this approach as a sufficient safeguard against VTE misses the point. Instead of funding universal Doppler scans, perhaps our resources would be better spent on well-designed, controlled studies aimed at preventing VTE in the first place.

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REFERENCES