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COMMENTARY

Preventing pulmonary embolism and deep vein thrombosis: a 'call to action' for vascular medicine specialists

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Amin *et al*. [1] have shown that US hospitals have failing grades for thromboprophylaxis of medical patients to prevent pulmonary embolism (PE) and deep vein thrombosis (DVT). It is a double failure. Firstly, the absolute rate of prophylaxis is low. Secondly, among those given prophylaxis, the prophylaxis orders are often inadequate with respect to proper drug, dose and duration. Especially disappointing in this large, broad-based overview is that patients were ill, with at least 6 days of hospitalization, and at high risk for venous thromboembolism (VTE). During the 2002–2005 survey period, almost 10 million patients were discharged from the 227 participating hospitals. The hospitals were diverse in type and location, with representation from all regions of the USA. Almost 200 000 patients met the stringent criteria necessary to be included in this audit.

The overall VTE thromboprophylaxis rate for inpatients should have been 100% but was only 62%, of whom only half received appropriate prophylaxis. For outpatients, among the 66% discharged from the hospital who did not receive appropriate prophylaxis, 38% received no prophylaxis, 17% received an inappropriate duration of prophylaxis, 6% received an inappropriate dose, and 5% received only mechanical prophylaxis [1]. In a separate survey of inpatients in Canada, the situation may be even more dismal. Of 4124 medical admissions, only 16% received appropriate prophylaxis [2].

Let us remind ourselves why VTE prophylaxis is important. We should not take this for granted because members of the hematology/thrombosis/angiology community embrace VTE prophylaxis with differing levels of enthusiasm and passion. Some believe that VTE prophylaxis is overblown. They remind us that no survival advantage has ever been demonstrated with VTE preventive measures. They claim that the 8-fold greater death rate from autopsy-proven PE in surgical patients not given prophylaxis [3] might not apply to medical patients. They criticize the three major pharmacological prophylaxis trials, prophylaxis in MEDical patients with ENOXaparin [4], Prevention of Recurrent Venous Thromboembolism [5] and ARixtra for Thromboembolism prevention in a Medical Indications Study [6], because they were 'driven' to statistical significance by asymptomatic rather than symptomatic VTE. They pay little attention to rigorously conducted meta-analyses [7,8]. They ignore the not often cited study by Vaitkus *et al*. [9], which showed that asymptomatic proximal DVT at 3 weeks after hospitalization is associated with a marked and highly significant increase in death rates at 90 days. Many VTE prophylaxis skeptics speak and write eloquently, thereby ensuring a lively debate at scientific meetings and in print journals.

As a community, we must respond to the challenge and conduct a megatrial of VTE prophylaxis in high-risk medical patients with the primary endpoint of mortality reduction. One group could receive mechanical prophylaxis and the other a combination of pharmacological plus mechanical prophylaxis. Such a study would be carried out in a clinical and cultural setting where VTE prophylaxis in medical patients remains an unsettled question and where equipoise exists. Until then, we must rely upon the totality of evidence, which has been reviewed and endorsed by most groups that care for hospitalized medical patients. We should campaign to augment the proportion of medical patients given prophylaxis and to ensure that the quality of prophylaxis also passes muster. For the time being, we must issue a 'call to action' for vascular medicine specialists.

Ensuring proper inpatient VTE prophylaxis will reap a high return on investment. Firstly, VTE is much easier and less expensive to prevent than to diagnose or treat [10]. Secondly, by preventing inpatient VTE, the rate of community-acquired outpatient VTE should plummet. Spencer *et al*. have shown that most outpatient VTE can be traced back to a hospitalization within the prior 90 days [11]. It is no surprise in this

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Table 1 Venous thromboembolism prevention: carrots and sticks

Carrots
Medical school: embedded within curriculum
Postgraduate education courses
Grand rounds
Joining hospital quality improvement committees
Sticks
Electronic alerts
Human alerts
Financial penalties
Loss of accreditation
Malpractice litigation

study that when use and quality of prophylaxis is examined among those stricken with outpatient VTE, the majority had no prophylaxis or inadequate prophylaxis. This study shows that we need to focus on the continuum of care to ensure adequate prophylaxis at the time of hospital discharge.

Ultimately, we have the opportunity to make PE and DVT as rare as acute rheumatic fever or tetanus. Our paradigm should conceive of VTE as an infectious disease with several different vaccines: unfractionated heparin, low molecular weight heparin, fondaparinux, graduated compression stockings, and intermittent pneumatic compression devices.

I dream of our generation's success in wide-scale prevention of VTE. A decade from now, I like to imagine getting paged by a medical house officer who says: 'Sorry to bother you. But our patient was just diagnosed with acute PE. I remember a few cases from medical school, and I've read about it on Up-to-Date®. But could you tell me, first hand, the pearls and tricks of the trade to best care for this rare disease?'

To achieve this ambitious goal of VTE prevention, several carrots and sticks must be made available (Table 1). The carrots focus on improved medical education, ranging from the student to the postgraduate level. Working on Quality Improvement committees is a mark of good citizenship within the hospital and helps colleagues embrace the concept of prophylaxis with a combination of consensus building and auditing.

The sticks range in degree of admonishment. At the mild end of the spectrum is an electronic alert to the physician responsible for a high-risk patient not receiving VTE prophylaxis. The alert is gentle and reminds the physician that prophylaxis is advised. The message is delivered privately as a computer-generated alert. This modest intervention reduced symptomatic DVT and PE by 41% at Brigham and Women's Hospital [12]. The same message can be delivered more bluntly by a quality improvement nurse, pharmacist or physician. This is a bigger stick because the human reminder is not as private as the computer alert. Peer pressure comes into play. The biggest sticks are financial or accreditation penalties levied upon the hospital or medical malpractice litigation.

As a community of specialists, we need to deliver a more unified, coordinated and stronger message: VTE prophylaxis in high-risk patients is mandatory, not optional. We cannot delay or defer action until future trials are undertaken. We must take responsibility, too, for improving the education of all student and certified health care providers who manage these vulnerable patients. Our model of immunizing against VTE faces the same challenges that immunization against infectious diseases must contend with. Philosophical and political barriers must be overcome, primarily by presenting the strong set of evidence accrued, but ultimately with fiscal or accreditation penalties if necessary. If we unite, the long-term dividend will be the joy of recounting to wide-eyed and incredulous younger professionals some tales that begin with the phrase: 'In the old days, VTE was the third most common cardiovascular disease, after heart attack and stroke'.

Disclosure of Conflict of Interests

The author states that he has no conflict of interest.

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