The Use of Average Body Weight in Dosing Unfractionated Heparin

To the Editor:

In the American College of Chest Physicians guidelines in a supplement to CHEST (February 2012), Garcia et al recommend the use of weight-based unfractionated heparin (UFH). These guidelines did not address dosing in overweight and obese patients. With the prevalence of obesity in the United States, correct application of weight-based UFH therapy is an important factor in achieving therapeutic anticoagulation. UFH does not distribute into muscle or fat tissue, giving it a small volume of distribution (Vd) of 0.07 L/kg. In addition, adipose tissue is less vascular than lean tissue, making the Vd in obese patient difficult to assess. Finally, UFH has saturable pharmacokinetics, meaning requirements are not directly proportional to body weight. Failure to achieve an adequate activated partial thromboplastin time (APTT) response, especially in obese patients, continues to be a therapeutic challenge.

Based on periodic internal analyses over the last 15 years, UFH dosing using average body weight correlated best with favorable APTT response. Average body weight was defined as ideal body weight plus actual body weight divided by two. All patients received a bolus of 50 units/kg followed by 15 units/kg/h continuous IV infusion based on average body weight. In an analysis from 2010 including 40 patients, the mean age was 67 (range, 35-95) years old, and 53% were men. Twenty-five patients (63%) had a BMI $\geq$25.0, and 19 (48%) had a BMI >30 (average, 29.8; range, 17-49). The first measured APTT was subtherapeutic in 85% of the patients and was within the target range in 57% of the patients 6 to 8 h after initiation. Of the 6 patients (15%) whose initial APTT was above the therapeutic threshold in 85% of the patients and was within the target range in 57% of the patients 6 to 8 h after initiation. Of the 6 patients (15%) whose initial APTT was subtherapeutic, they had the lowest BMI (average 27). This suggests that the low initial APTT may be secondary to pharmacodynamic variability instead of related to the patient’s weight. We anticipate that the use of actual weight, especially in obese patients, would result in higher initial APTT values, potentially exposing patients to unwarranted bleeding risks. Since this has been the practice at this institution, there are no comparisons of actual body weight to include in our report. The use of average weight in UFH dosing leads to rapid and efficient anticoagulation in the majority of our patients and has led to its use at our institution.

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DOI: 10.1378/chest.13-0569

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5. Financial/nonfinancial disclosures: The authors have reported that no potential conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article.

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