Since no exact threshold accurately predicts an outcome or obligates specific management, any selection of cutoffs is arbitrary, whether based on fraction of the hemithorax or actual volume. Separation into thirds or use of quartiles, as suggested by Drs Hu and Zhong, are both, to our knowledge, without precedent. We designed our cutoffs rationally, with no a priori assumptions, based on the ability of the best CT imaging features to consistently separate effusions into groups. The rule was engineered for ease of use.

It is true that a common plain radiographic classification system uses cutoffs of $<500$ mL, $500$ to $1,000$ mL, and $>1,000$ mL. We agree that this is a logical starting point for a rule based on CT imaging. However, we avoided a method based on raw volume for two major reasons. First, we found a weaker association between absolute effusion volume and the CT imaging features, as well as inconsistencies in the relationship of absolute volume to percentage volume. For example, small effusions ranged from 78 to 325 mL, moderate effusions ranged from 378 to 1,566 mL, and large effusions ranged from 472 to 3,673 mL (data not previously shown). Second, we firmly believe that the physiologic effect of a pleural effusion of any given volume depends on the patient's body habitus. It is hard to imagine that a 500-mL effusion in a small, elderly woman is as well tolerated as the same volume in a hulking male athlete. In fact, our data support this common sense conclusion, as the typical geometry of the layering effusion better reflects the volume percent rather than the raw volume. Thus, the effusion percent allows a better fit for the data and a more physiologic representation of disease severity.

Clinical medicine is replete with cutoffs in laboratory values, diagnostic criteria, treatment algorithms, and staging rules that undergo regular reevaluation. We claim no monopoly on assessment of pleural effusions, a disease process defined by gradations of increase from the physiologic amount of pleural fluid. The system we proposed yields an expedient and easily taught method for quantifying pleural effusions, thus advancing communication and reproducibility.

Jeffrey M. Levsky, MD, PhD
Bronx, NY
Matthew P. Moy, MD
Boston, MA
Linda B. Haramati, MD, FCCP
Bronx, NY

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. In the Organization to Assess Strategies for Ischemic Syndromes Investigators 2 (OASIS-2) trial, the likelihood of major bleeding was increased by 7% for every 10-s increase in the APTT.

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 ≥ 25.0, and 19 (48%) had a BMI > 30 (average, 29.8; range, 17-49). The first measured 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.

Affiliations: From the Albert Einstein College of Medicine & Montefiore Medical Center (Drs Levsky and Haramati); and Massachusetts General Hospital (Dr Moy).

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

Correspondence to: Jeffrey M. Levsky, MD, PhD, Albert Einstein College of Medicine, Montefiore Medical Center, 111 E 210 St, Bronx, NY 10467; e-mail: jlevsky@montefiore.org

© 2013 American College of Chest Physicians. Reproduction of this article is prohibited without permission from the American College of Chest Physicians. See online for more details.

DOI: 10.1378/chest.13-0569

REFERENCES


REFERENCES


