

large thrombus burden. Indeed, a recent study comparing clinical and procedural characteristics among hospitals, mostly regarding elective percutaneous coronary intervention, invariably reported a contrast volume of more than 200 ml.⁵

Finally, the difference in the primary end point and the other clinical end points between the two *N*-acetylcysteine groups was significant when analyzed by the Mantel–Haenszel chi-square test for trend, suggesting a dose-dependent protective effect of *N*-acetylcysteine.

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Iodine Nutrition — More Is Better

TO THE EDITOR: The editorial by Utiger (June 29 issue)¹ summarizes the effects of iodine deficiency. However, his recommendation of an iodine intake of 300 to 400 μg per day far exceeds the following recommendations of the Institute of Medicine: 150 μg per day for nonpregnant adults, 220 μg per day for pregnant women, and 290 μg per day during lactation.² Teng et al.³ found that an iodine intake of approximately 320 to 840 μg per day resulted in an increased incidence of subclinical hypothyroidism and thyroid autoimmunity. These risks may be clinically important — children of women with subclinical gestational hypothyroidism may have neurocognitive delays.⁴ Utiger suggests that iodine intake in the United States is marginal on the basis of the prevalence of spot urinary iodine values under 50 μg per liter among pregnant women.⁵ However, iodine deficiency may not be diagnosed from analysis of spot urine samples in individuals because of day-to-day variability. Median spot urinary iodine values accurately reflect the iodine nutrition of populations, and the median value of 168 μg per liter for the United States⁵ is consistent with iodine sufficiency according to World Health Organization (WHO) criteria. We believe

that the evidence supports the current guidelines for dietary iodine intake and that overall iodine intake in the United States remains sufficient.

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TO THE EDITOR: We fully agree with the title of Utiger's editorial, "Iodine Nutrition — More Is Better," but wish to comment on how much more is better during pregnancy and lactation.

In January 2005, the WHO held a technical

consultation on this point, and one of us was an invited speaker. The recommendation that emerged was for pregnant and lactating women to have 250 instead of 200 μg of iodine daily,¹ almost double the intake for the adult population. This results in urinary concentrations of 150 to 250 μg of iodine per liter. Even in areas with marginal iodine intake, the United States and Spain included (Fig. 1 of the editorial), it is highly unlikely that pregnant and lactating women receive enough iodine² for normal fetal neurodevelopment,³ unless daily supplements (i.e., 200 μg of iodine) are prescribed from the onset of pregnancy (or before). Such supplements taken during pregnancy and lactation would overcome changes of iodine intake through food and iodinated salt that frequently occur after conception. Supplementation is being implemented in Spain, where Yoduk tablets containing 200 μg of iodine (262 μg of potassium iodide) are made available to pregnant and lactating women through the National Health System.

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THE EDITORIALIST REPLIES: My recommendation that daily iodine intake should be 300 to 400 μg does exceed the recommendations of the Institute of Medicine by a factor of two for men and non-pregnant women, and less for pregnant and lactating women, but it does not far exceed them, as stated by Drs. Pearce and Hollowell. My recommendation was based on my concern about the increase by a factor of seven (from 1 to 7 percent) in the frequency of moderate iodine deficiency among pregnant women and also the increase by a factor of four (from 3 to 12 percent) in the fre-

quency of moderate iodine deficiency in the total population, coincident with the decline of more than 50% in urinary iodine excretion in the United States from 1971–1974 to 1988–1994 (and from 1971–1974 to 2001–2002).¹ Raising the iodine intake to 300 to 400 μg daily should reduce the frequency of low values to the 1971–1974 levels.

Drs. Morreale de Escobar and Escobar del Rey endorse the need for increased iodine intake in pregnant women, and point out another way to achieve this. All prenatal vitamin preparations should contain iodine, and all pregnant women should take them. My preference, however, is to increase iodine intake for everyone.

As noted by Drs. Pearce and Hollowell, day-to-day urinary iodine excretion varies within subjects.² However, low values cannot be dismissed as an exceptional finding; they are biologically important. For example, pregnant women with urinary iodine values of less than 50 μg per liter had larger thyroid glands and higher serum thyrotropin and thyroglobulin concentrations, indicative of compensatory thyroid stimulation, than did pregnant women who were given a supplement of 100 μg of iodine daily.³ Similarly, at birth, their infants had larger thyroid glands and higher serum thyroglobulin concentrations than did the infants of mothers who received the supplement. Although higher iodine intakes may be associated with very small increases in the prevalence and incidence of subclinical hypothyroidism and autoimmune thyroiditis,⁴ it is more important to ensure that everyone, especially pregnant women, has an adequate iodine intake.

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