

# Tailor Antibiotic Dose to Weight Before Cesarean

BY SUSAN LONDON

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SAN FRANCISCO – As women grow heavier, tailoring antibiotic dose to weight or body mass index may be critical for preventing surgical site infections after cesarean deliveries, a study has shown.

In the prospective cohort study, all 29 women undergoing a cesarean were given the same standard fixed dose of cefazolin before their surgery. Concentrations of the antibiotic in adipose tissue collected at the start of the surgery were one-third lower in obese women and one-half lower in extremely obese women than those in their lean counterparts. Perhaps most importantly, some of the heavier women had tissue concentrations below those believed to be necessary for preventing antibiotic resistance.

“Based on the current findings, a considerable proportion of obese women undergoing cesarean delivery do not have adequate antimicrobial protection for the duration of the procedure, following current guidelines,” said Dr. Leo Pevzner, an ob.gyn. at the University of California, Irvine.

The National Surgical Infection Prevention Project has endorsed tailoring antibiotic dose to weight or body mass index (BMI), but data on appropriate prophylactic doses in adults are limited, he noted. Hence, recommendations still call for an intravenous dose of 1-2 g for all adults, large or small.

“Current obesity trends, along with evolutionary changes in bacterial resistance, portend a questionable utility of existing prophylaxis regimens and have the potential to drastically increase the rates of surgical site infections if no attempts are made to address antimicrobial dosing based on patients’ weight or BMI,” Dr. Pevzner commented.

The investigators enrolled in the study women with a singleton pregnancy who were scheduled for a cesarean delivery at term (greater than 37 weeks’ gestation). Any who had received antibiotics in the previous week or who had chronic hypertension or pregestational diabetes were excluded.

On the basis of their BMI, the women were classified as lean (less than 30 kg/m<sup>2</sup>), obese (30-39.9 kg/m<sup>2</sup>), or extremely obese (greater than or equal to 40 kg/m<sup>2</sup>).

All were given 2 g of cefazolin 30-60 minutes before skin incision for the

cesarean surgery. The investigators collected adipose tissue at the time of skin incision (initial) and again just before closure (final), as well as myometrial tissue after delivery and blood at the end of the procedure.

The concentration of cefazolin in all samples was assessed in a blinded manner with a microbiologic plate assay performed in triplicate, using plates seeded with *Streptococcus sanguis*. Zones of inhibition were measured in millimeters.

The study participants were 30 years old, on average. The mean BMI was 27, 34, and 45 kg/m<sup>2</sup> in the lean, obese, and extremely obese groups, respectively. The mean concentration of cefazolin in adipose tissue collected at incision was 9.4 mcg/g in lean women, Dr. Pevzner reported. In comparison, it was 6.4 mcg/g, or 32% lower, in obese women ( $P = .009$ ) and 4.4 mcg/g, or 53% lower, in extremely obese women ( $P$  less than .001).

Regression analysis showed that the higher the women’s BMI, the lower the concentration of the antibiotic in their initial adipose tissue sample ( $r = -0.67$ ,  $P$  less than .001). None of the lean women had an adipose concentration of cefazolin below 4 mcg/g, the theoretic breakpoint for preventing resistance,

according to Dr. Pevzner.

But eight women – four obese and four extremely obese – had an initial or a final adipose concentration below this breakpoint.

And three women – all extremely obese – had both initial and final adipose concentrations below this breakpoint.

The concentrations of cefazolin in the final adipose tissue, myometrial tissue, and serum also decreased with increasing BMI category, but these differences were not statistically significant, Dr. Pevzner reported.

Among the 25 women with follow-up, 2 developed surgical site infections requiring antibiotic therapy. Both were in the extremely obese group, and both had initial and final adipose cefazolin concentrations below the 4-mcg/g threshold.

The study was small, Dr. Pevzner acknowledged. “As such, there is not enough information to reach a conclusion regarding the weight or BMI above which a higher dose of antibiotics should be used,” he said.

Also, the impact of multiple gestations and maternal diseases, such as hypertension and diabetes, in this setting is unknown.

Dr. Pevzner did not report any relevant financial disclosures. ■

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