Fetal Doppler ultrasonography and cordocentesis

To the Editors:

We were pleased Ferrazzi et al. found significant correlations between umbilical arterial Doppler ultrasonographic studies and blood gas and acid-base measurements in six umbilical venous and three "presumed" umbilical arterial cordocentesis samples (Ferrazzi E, Pardi G, Bauscaglia M, et al. The correlation of biochemical monitoring versus umbilical flow velocity measurements of the human fetus. AM J OBSTET GYNECOL 1988;159:1081-7). However, we regret that despite their criticism of our 1986 study (which established that significant correlations exist between fetal blood velocity studies and blood gas and acid-base results before labor or delivery by analyzing 29 umbilical venous cordocentesis samples) they did not quote the reference.[1]

The analysis of their results is inaccurate because they did not adjust for the changes in blood gas and acid-base parameters with gestational age that we reported from studies of transabdominal cord samples from 200 normal pregnancies,[2] despite our warning in the American literature.[3] This was the reason why we presented our data in the "derived format" that they describe as "unfortunate" but is in fact necessary.

We were also concerned that of the 10 cordocentesis samples taken, one was excluded because of a low hemoglobin concentration and three others (thought to be umbilical venous blood at the procedure) were retrospectively reclassified as umbilical arterial on the basis of the laboratory results. It is possible to be confident of the source and purity of cordocentesis samples with appropriate technique[4] and it is necessary for the use of this procedure to guide obstetric management.[5]

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Reply

To the Editors:

We thank Dr. Soothill for his letter pointing out the erroneous reference we quoted to his work. In fact, the article we referenced to their work does present the actual lactate concentrations and respiratory gas values. The correct reference as he points out, should be the article in *Lancet*,[1] which is the one in which "adjusted" values were used. Certainly, Soothill and colleagues have been active in the field in attempting to evaluate the role of cordocentesis in the management of high-risk pregnancies, and we have followed their work with interest and commend them for their contributions.

We do have a disagreement in that we believe that there is no need for "adjusting" values. At an early stage in the assessment of a new procedure such as cordocentesis (percutaneous umbilical blood sampling) it is imperative that different groups of investigators are able to compare their data. We should like to point out that the fact that physiologic measurements change during development is not a new observation and has been addressed in perinatal physiology innumerable times; it does not require adjustment of values. It is appropriate to present regression analyses of the change of physiologic data against time, but the actual measurements should be presented so that comparisons of the data obtained at different centers are possible.

Along those lines we should point out that we have published a series of studies on the midgestation fetal lamb that have pointed out the higher oxygen saturations found in the fetal circulation in midgestation as compared with term. These higher values are found despite a higher fetal oxygen consumption at midgestation as compared with term.[3, 4]

As to our results being "inaccurate because they did not adjust" values, we point out that the design of our study included data in a narrow gestational age window, that is, only from 30 to 35 weeks' gestation, and during that short gestational age period there are no variations of fetal blood gases demonstrable against time. Given the work in the fetal lamb, we were well aware that physiologic data change over the period from midgestation until term. But if the gestational age window of a study is kept narrow, the concern about adjusting values is irrelevant.

Three blood samples that did not have a typical venous bubbling effect were indeed excluded from our analysis, and the biochemical parameters of these samples fell well within the arterial values observed on the same fetuses at the time of cesarean section. It should be noted that no overlapping data were found between the arterial and venous values. With regard to oxygen content, this continues to be our experience in >600 cordocenteses, and again, umbilical arterial values are similar to those at the time of cesarean section.

We understand that from a clinical point of view the clear discrimination of the sampling site is obviously of utmost importance. The clinical evaluation of fetal blood gases cannot be endangered by uncertain venous or arterial sampling sites. We cannot argue with investigators who state unequivocally that there is no error rate with a procedure in their hands. However, in our experience in 100 cordocenteses in the third trimester, of which 30 were in growth-retarded fetuses, we have

found that in some cases it is difficult to visualize the direction of bubbling even when recorded on tape. It is in these limited circumstances that we believe sonographic bubbling effect can be an insufficient proof of the sampling site and thus contribute to the difficulties in the interpretation of physiologic data.

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Mathematic form corrected

To the Editors:

I read with interest and appreciation the excellent article by Dr. R. E. Sabbagha et al. (Sabbagha RE, Minogue J, Tamura RK, Hungerford SA. Estimation of birth weight by use of ultrasonographic formulas targeted to large-, appropriate-, and small-for-gestational-age fetuses. Am J Obstet Gynecol 1989;160:854-2) for its potential clinical usefulness.

I would like to point out that expressions presented in Table I of the article are printed in mathematically incorrect form. These are the formulas as printed in the article and with appropriate corrections:

EFW(LGA) gm =
$5426.9 - (94.98 \times SUM) + (0.54262 \times (SUM)^2$
Correct: =
$5426.9 - (94.98 \times SUM) + (0.54262 \times SUM^2)$

EFW(AGA) gm =
$-55.3 - (16.35 \times SUM) + (0.25838 \times SUM)^2$
Correct: =
$-55.3 - (16.35 \times SUM) + (0.25838 \times SUM^2)$

EFW(SGA) gm =
$1849.4 - (47.13 \times SUM) + (0.37721 \times (SUM)^2$
Correct: =
$1849.4 - (47.13 \times SUM) + (0.37721 \times SUM^2)$

where *EFW* = estimated fetal weight; *LGA* = fetuses with abdominal circumferences ≥90th percentile; *AGA* = fetuses with abdominal circumferences >5% and <90%; *SGA* = fetuses with abdominal circumferences ≤5th percentile, for dates; *SUM* = gestational age (wk) + 2 × Abdominal circumference (cm) + Head circumference (cm) + Femur length (cm).

When applied in the computer program in the correct form and with rounding, they yield values shown in Table IV of the article.

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Reply

To the Editors:

We agree with Dr. Habekovic that it is correct to express our formulas in the mathematical form he presented. Importantly, the tabulated estimates of fetal weight for the large-, appropriate-, and small-for-gestational-age fetuses are accurately computed in Table IV.

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Case of retroperitoneal mucinous cystadenoma omitted

To the Editors:

I read your article (Pennell TC, Gudson JP Jr. Retroperitoneal mucinous cystadenoma. Am J Obstet Gynecol 1989;160:1229-31) with interest. In this article you stated that 12 cases of retroperitoneal mucinous cystadenoma or mucinous cystadenocarcinoma have been reported in the literature. You also add an additional case. I would like to correct you on this in that you left out one case.[1] In this article a retroperitoneal mass in a 36-year-old patient who had the diagnosis of both normal ovarian tissue and a mucinous cystadenoma is discussed.

The authors also speak of three plausible theories advanced recently for the formation of mucinous cystadenomas. I would like to ask them the embryology of this and remind them of the embryology of the ovaries in the determination of the formation of these possible ovarian masses retroperitoneally. Would they please speak to the embryology of these masses?

The last question I would like to ask the authors is