Evaluation of a Kit for Early Detection of Pregnancy

To the Editor:

The sensitivity, specificity, speed, and simplicity of radioreceptor assay and radioimmunoassay for detection of chorionadotropin surpass that of earlier bioassays and immunological tests for diagnosis of pregnancy. However, radioreceptor assay does not discriminate between chorionadotropin and lutropin, thus the preovulatory surge in lutropin could interfere with accurate diagnosis of early pregnancy. This drawback was overcome by the use of antiserum raised against the β-subunit of chorionadotropin, which has virtually no cross reaction with lutropin and other glycoproteins (1, 2).

The “BETA-TEC” kit (Wampole Laboratories, Cranbury, NJ 08512) is designed for detection of early pregnancy. Briefly, the steps include incubating antiserum to β-chorionadotropin with 125I-labeled chorionadotropin and the test sample for an hour, treatment with second antibody for 5 min, and precipitation of the resulting antigen–double antibody complex with polyethylene glycol. The 125I content of the precipitate is an inverse function of the β-chorionadotropin content of the unknown sample and is interpreted in terms of the presence of trophoblast tissue—and hence of the possibility of pregnancy. A reference standard, 30 milli-int. units of chorionadotropin per milliliter of plasma, is assayed with each series and the precipitated radioactivity within a 5% experimental error is considered to be the borderline between normal (not pregnant) and abnormal (pregnant or trophoblast disease). In a typical assay, 5500 counts/min are precipitated with the reference standard. Such a result (5200–5800 counts/min) is in the indeterminant range. Most samples present values of >7000 counts/min or <4000 count/min, so the difference between the indeterminant and definitive ranges is sufficient to allow confident interpretations. When a test result is indeterminant, it is recommended that the assay be repeated in three days.

Our purpose was to evaluate how well the Wampole kit achieves its intended purpose and to gain information on the sensitivity of the kit by comparing the results with the estimated stage of gestation and with the concentration of serum chorionadotropin obtained by an accurate quantitative β-subunit assay (1). Our data dealing with the initial 39 subjects at the promulgation of the study are presented in Table 1.

The qualitative data provided by the kit and the clinical findings correlate well, but some of the subjects require explanation. Patients 5 and 28 were pregnant at the time of testing but aborted shortly thereafter. Patient 9 was tested two weeks after treatment with a mixture of follitropin and lutropin (Pergonal, Serono) and chorionadotro-
tropin. As judged from the reported biological half-life of chorionic gonadotropin (3), exogenous hormone should have been cleared from the blood, but we cannot state unequivocally that all the serum chorionic gonadotropin was of placental origin. Ectopic pregnancies were suspected in patients 15, 24, 36, and 37. Positive values in these samples agreed well with the quantitative analyses and clinical findings. On the other hand, patient 31, presenting with symptoms of ectopic pregnancy, had a negative test result, which was confirmed by the quantitative result and the clinical findings. Patient 39, who had an hydatidiform mole evacuated, tested positive before and negative after chemotherapy. Several discrepancies were observed when the samples from patients 1 to 19 were analyzed by use of another commercial kit based on the same principle (Cambridge Nuclear Corp., N. Billerica, MA 01862). Test values of the samples from patients 5 and 9 were indeterminate by the Cambridge Nuclear kit, while the results with the Wampole kit were positive, in agreement with quantitative findings. Patient 10 had a negative test result with the Cambridge Nuclear kit, and the test result by the Wampole kit was indeterminate. Clinical findings, along with quantitative analysis for chorionic gonadotropin (6.4 µg/l), confirmed pregnancy.

Besides these 39 patients, another group of 294 patients was screened with the "BETA-TEC" kit only. Of these, 88 were positive and 202 were negative, in harmony with later clinical findings. Only four test results were judged to be indeterminate. One of these patients was found not to be pregnant on subsequent test and clinical diagnosis. The other three did not return for a repeat test as recommended.

We conclude that the Wampole "BETA-TEC" kit (possessing the potential of quantitation when necessary) can assist the clinician in the accurate determination and better management of early pregnancy.

References

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Detection of Neotanatal Respiratory Distress on the Basis of Fluorescence Polarization (Microviscosity) Measurements of Amniotic Fluid: A Word of Caution

To the Editor:

So far, this journal has published two articles (1, 2) on the use of fluorescence polarization values of amniotic fluid as a predictor of fetal lung maturity. In spite of these favorable reports I have pointed out some problems (3, 4) that I have encountered in evaluating the usefulness of this method. I would now like to mention two other factors that may influence the microviscosity of amniotic fluid but which are probably independent of the production of lung surfactant. In the first place, amniotic fluid contains high-density lipoproteins (5) and these proteins have their own microviscosity (6), which will be superimposed upon that of the phospholipids from the lung. Secondly, amniotic fluid contains cholesterol (7) and this will cause a decrease in the fluorescence polarization of the high-density lipoproteins (8). Thus as long as we do not know how much each component contributes to the total microviscosity of amniotic fluid, further studies on the reliability of this method of predicting respiratory distress are needed. It will also be necessary to determine whether the microviscosity measurement, which is done with an expensive apparatus, produces results of greater use to the clinician than, for instance, measurement of absorbance at 650 nm (9), which is rapid, simple, and inexpensive.

References


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Chemotherapy as a Cause of Low Serum Creatine Kinase Activity

To the Editor:

In the past six months I have noticed low serum creatine kinase (CK; EC 2.7.3.2) activity in many patients visiting the chemotherapy clinic of this hospital.

Bruns et al. (1) reported low apparent CK activity in the sera of patients with carcinoma metastatic to the liver. They attributed the low values to slow or incomplete activation of the enzyme by sulfhydryl agents rather than to other factors (2) such as drug inhibition or removal of intermediate reaction products by another enzyme. Recently, Hinderks and Frohlich (2) reported that low CK activity was invariably associated with medication with steroids, particularly prednisone.

For three months, I recorded the CK results from the clinical chemistry profile of all outpatients visiting our chemotherapy clinic. CK activity was measured with a Technicon SMAC and with Technicon reagents. The reference interval for CK is 0–80 U/L (mean = 40) for women and 0–185 U/L (mean = 75) for men.

The upper limits of both reference intervals are the 97.5th percentile of a large patient population.

I then categorized the patients (Table 1): (a) taking no medication, (b) taking prednisone as part of their combination chemotherapy, or (c) taking other chemotherapy drugs. Most of the patients were receiving several chemotherapeutic agents concurrently.

References