

maternal age and free-beta hCG the detection rate would be 57.6% (95% CI 42.3% to 72.9%) for the same 5% screen-positive rate. The highest detection rate would be achieved using both markers in combination with maternal age. At the same 5% screen-positive rate the detection rate would be 66.4% (95% CI 50.2% -82.7%). The increase seen by adding dimeric inhibin to a combination of maternal age and free-beta hCG is statistically significant (mean increase 8.8%, 95% CI 1.5% -16.1%).

The data presented in this study demonstrate that circulating dimeric inhibin levels in maternal serum of a woman carrying a child is an index of the risk of the child being affected by Down's Syndrome. Furthermore, the dimeric inhibin results may also be combined with other pregnancy specific analytes such as free beta-hCG to improve the detection rate of Down's affected pregnancies.

The stability of the regressed median of the dimeric inhibin concentrations (within the window of days of gestation examined) translates into a lower dependence upon actual age of gestation compared with other analytes such as free-beta hCG (in this study).

The use of a dimeric inhibin measurement in maternal serum combined with maternal age (in the present study) results in 10% more Down's affected pregnancies being detected at the 5% false positive level than was previously reported (van Lith, Pratt, Beekhuis and Mantingh, Prenatal Diagnosis, 12, 801-6, 1992) who utilized the alpha-specific two-site inhibin assay. The accuracy of detection rate can be improved by inclusion of other analyte results such as free beta-hCG. This improvement is enhanced by a low correlation between the free-beta hCG and dimeric inhibin values in contrast to the data reported in previous studies (Spencer, Wood and Anthony, Anal. clin. Biochem., 30, 219-20, 1993).

In conclusion, the data presented in this study have demonstrated that maternal immunoreactive dimeric inhibin concentration is indeed a useful index of the risk of a woman carrying an unborn child affected by Down's Syndrome. Further improvements in the detection rate of the Down's affected pregnancies can be made by combining the dimeric inhibin data with that of another analyte (free beta-hCG in the above example). Dimeric inhibin determinations will therefore be useful as an additional biochemical marker in Down's Syndrome screening programmes.

We claim:

1. A method for antenatal risk assessment for chromosomal abnormality in a fetus, comprising:

- A) calculating a pregnant patient's prior risk of carrying a fetus having said chromosomal abnormality,
- B) measuring said pregnant patient's blood for a concentration of dimeric inhibin,
- C) calculating a normalized value of said concentration by dividing said concentration by a median value found in

a population of women with unaffected pregnancies and same gestational age as said pregnant patient,

- D) calculating a first probability that the corrected normalized value is part of a Gaussian distribution of values found in unaffected pregnancies,
- E) calculating a second probability that the corrected normalized value is a part of a Gaussian distribution of values found in pregnancies with said chromosomal abnormality,
- F) calculating a likelihood ratio, said likelihood ratio being said first probability divided by said second probability, and
- G) modifying the prior risk by the likelihood ratio.

2. The method according to claim 1 wherein step (B) further comprises measuring said patient's blood for a concentration of a marker selected from the group consisting of intact hCG, alphafetoprotein, and unconjugated estriol.

3. The method according claim 1 wherein the chromosomal abnormality is selected from the group consisting of: Down Syndrome, Trisomy 18, Trisomy 13, and Turner Syndrome.

4. The method according to claim 2 wherein the chromosomal abnormality is selected from the group consisting of Down Syndrome, Trisomy 18, Trisomy 13, and Turner Syndrome.

5. An apparatus comprising: a means for obtaining measurements of a pregnant patient's blood concentration of dimeric inhibin and a computer programmed to carry out a method for antenatal risk assessment for chromosomal abnormality in a fetus, said method comprising the following steps:

- A) calculating a pregnant patient's prior risk of carrying a fetus having said chromosomal abnormality,
- B) receiving a measurement of said pregnant patient's blood for a concentration of dimeric inhibin,
- C) calculating a normalized value of said concentration by dividing said concentration by a median value found in a population of women with unaffected pregnancies and same gestational age as said pregnant patient,
- D) calculating a first probability that the corrected normalized value is part of a Gaussian distribution of values found in unaffected pregnancies,
- E) calculating a second probability that the corrected normalized value is a part of a Gaussian distribution of values found in pregnancies with said chromosomal abnormality,
- F) calculating a likelihood ratio, said likelihood ratio being said first probability divided by said second probability, and
- G) modifying the prior risk by the likelihood ratio.

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