

Comparison of efficacy of detection of trisomy 21, depending on the PAPP-A test

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Objective

To compare the performance of Trisomy 21 screening at 11-14 weeks of pregnancy, based on biochemical tests certified by the FMF (Delfia Express) and non-certified by the FMF (DPC - PRISCA).

Methods

Between September 2006 and March 2008, 2267 singleton pregnancies were examined at 11-14 weeks of gestation. The CRL, fetal NT and FHR were measured. NT measurements were carried out in accordance with the principles of FMF and the FMF-certified physicians had pass an annual audit of the ultrasound. In every pregnant patient, blood samples were tested for concentrations of free beta hCG and PAPP-A, using two analyzers (Delfia - Perkin Elmer and the Immulite 2000 - DPC). Analysis of the test substances were made on the same day. The resulting sera were stored at - 18°C. Results concentrations were then converted to MoMs and were used to calculate the risk for trisomy 21 by using appropriate software (Astraia for Delfia and Prisca for Immulite). For both groups (Delfia and Immulite) a cut off of 1/300 for T21 was adopted. All patients with a risk of trisomy 21 more than 1/300 were offered amniocentesis. If invasive testing was declined, the phenotype was assessed after birth and in some of the cases with phenotype characteristics of Down syndrome neonatal karyotyping was investigated. Between the results of the risk and the methods Delfia DPC also estimated intraclass correlations and conducted Bland-Altman analysis. For risk scales BC and BC NT methods Delfia and DPC, ROC analysis was also conducted.

Results

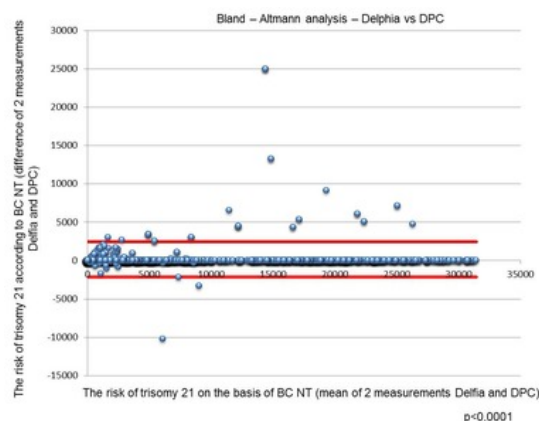
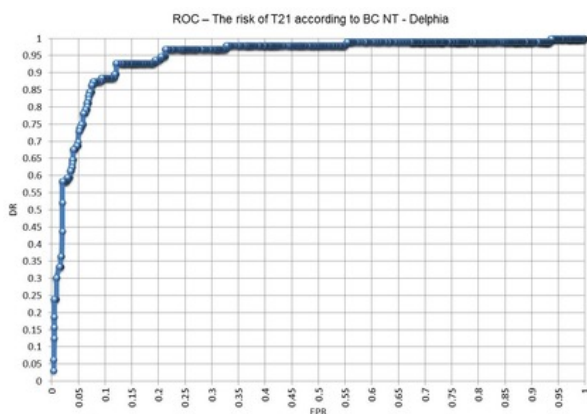
The ultrasound examination was combined with one of the two biochemical assays: DPC or Delfia. According to the different assays two test groups were formed. The Bland-Altman test was used to assess the interclass correlation analysis and to compare the methods for assessing the risk of trisomy 21 based on maternal age, maternal serum PAPP-A test and measurement of fetal NT. Our results showed significant ($p < 0.0001$) intraclass correlations between the results of both methods (Delfia and DPC). In cases of high risk for T21, BC correlation is high and amounts to 0.895. In the case of risk T21 BC NT intraclass correlation is even higher, at 0.9905. If the results of risk T21 BC coefficient of variation is about 40%, the risk of T21 BC NT is lower and amounts to 13.29%. In order to evaluate the clinical efficacy of both tests (DPC and Delfia together with maternal age, and measurement of fetal NT), in terms of detection of trisomy 21, the ROC analysis was performed. The results of risk scores for both NT T21 BC Delfia method and DPC are highly significant ($p < 0.0001$). However, the difference between the methods is statistically significant ($Z=2.4728$, $p = 0.0134$). Delfia group presented with detection rate (DR) of 81% and false positive rate (FPR) of 5%, whereas the DPC had DR 71% and FPR 5%.

Conclusion

Trisomy 21 screening using certified test by FMF for PAPP-A analysis is more effective, compared to the use of the non-certified test. The concentrations of the b-hCG in both methods showed the greatest differences. By using the non-certified by the FMF test there is high percentage of false positives resulting in higher number of invasive procedures.

Comparisson of ROC analysis

| | AUC | SE (AUC) | -95% CI | +95% CI | Z | p value |
|------------------------|--------|----------|---------|---------|--------|---------|
| RyzykoT21 BC NT Delfia | 0.0557 | 0.0123 | 0.0315 | 0.0798 | -14.75 | <0.0001 |
| RyzykoT21 BC NT DPC | 0.0648 | 0.0131 | 0.0390 | 0.0905 | -11.45 | <0.0001 |



ROC - The risk of T21 according to BC NT - DPC

