

Prenatal Screening Breakthrough

By Philip Buchanan, Ph.D., F.A.C.M.G. , and Jeff Taska, MS

Larry and Brenda arrive at their obstetrician's office. They are excited because a pregnancy test they took over the weekend indicates that they are pregnant. Larry and Brenda are a little worried though because they have a family friend whose child has Down syndrome. They are wondering what the chances are of their baby having a similar condition. The couple has heard that a new type of testing has recently become available for Down syndrome but they are uncertain of whether this testing is right for them.

The genetic counselor at the OB's office imparts to the couple that maternal serum screening was first developed to detect open neural tube defects by measuring levels of AFP in the mother's blood. *Elevated* levels of AFP are associated with an abnormal opening in a baby's body, such as spina bifida, and AFP screening will detect the great majority (98%) of open spine and skull defects.

Coincidentally, *decreased* levels of AFP are associated with a baby who has Down syndrome. Unfortunately, the association between decreased AFP and Down syndrome is not nearly as strong as the association of elevated AFP with open neural tube defects. Adding other chemical markers besides AFP to the screening test has increased the detection rate but second trimester AFP triple screening is estimated to detect, at most, only 60% of pregnancies with Down syndrome. So, as the counselor explains to Larry and Brenda, while second trimester screening is quite effective for open neural tube defects, its use is somewhat limited in detecting Down syndrome because it was not originally designed to find chromosome abnormalities.

An exciting alternative to second trimester screening is a different test that can be performed earlier in pregnancy and uses different markers to screen for Down syndrome. The counselor describes how not only is this screening available in the first trimester, but also that it is more accurate than the mid-trimester AFP triple screen.

What started as an investigation into the value of measuring the "nuchal translucency" (subcutaneous accumulation of fluid in the fetal neck) has now evolved into a sophisticated and highly accurate first trimester screen for Down syndrome, Trisomy-18, Turner syndrome, and cardiac abnormalities. Performance of the screen involves sonographic measurement of the fetal nuchal translucency at 11-14 weeks' gestation, and combining this measurement with fetal crown-rump length, maternal age, and maternal serum values for freeBeta hCG, and Pregnancy Associated Plasma Protein-A (PAPP-A). ***Experience with over 250,000 patients shows an approximate 90% detection rate for Down syndrome, and a false positive rate of less than 5%.*** *In addition to these excellent statistics, it has been found that pregnancies with a Down syndrome risk within the normal range but with an increased nuchal translucency measurement have a very high rate of other chromosomal and fetal anomalies. This screening is now the standard of care in the UK and many other countries.*

After learning of the intricacies of screening, Larry and Brenda decide that learning their screening results as early as possible is the best option for them. They feel that 1st trimester screening will give them more time to consider their options should the test come back at increased risk for Down syndrome, and give them an earlier risk reduction for the pregnancy should the test result come back within the normal range. Within a week after testing the couple learns that, like most couples, their screening results are within the normal range and further testing for chromosome abnormalities is not indicated.

For those couples who opt for 2nd trimester screening in lieu of 1st trimester screening or who discover their pregnancy too late for 1st trimester screening, GeneCare offers MSAFP/freeBeta hCG 2nd trimester screening. This test has an approximate Down syndrome detection rate of 80% and the ability to detect 98% of open spine and skull defects.

Dr. Buchanan is the director of GeneCare Medical Genetics Center. The co-author, Jeff Taska, is a genetic counselor there. GeneCare provides comprehensive genetic counseling, 1st and 2nd trimester genetic screening and laboratory testing. For more information, visit their website, www.genecare.com , or call (919) 942-0021 or (800) 277-4363.