Prenatal Risk Assessment by Use of the Quad Screen

Lawrence M. Killingsworth, Ph.D., DABCC, Chief Science & Technical Officer and Carmen Wiley, Ph.D., DABCC, FACB

CLINICAL APPLICATION
Prenatal risk assessment with the Quad Screen identifies those individuals who are at sufficient risk to warrant further counseling and diagnostic testing for Down Syndrome, neural tube defects or Trisomy 18.

CLINICAL BACKGROUND
The first use of a biochemical marker for prenatal risk screening was in the early 1970s. Clinical researchers found that maternal serum α-fetoprotein (AFP) levels were elevated in cases of open neural tube defects. The AFP test detects about 75% of pregnancies with these conditions. The AFP test is now widely used in obstetric practice to screen for open neural tube defects.

Today this test is often used if a woman has opted to have first trimester screening for Down syndrome and trisomy 18. First trimester screening does not address the risk for neural tube defects. Therefore, the AFP test is used to detect open neural tube defects (i.e. spinal defects) in a low risk population, in the second trimester (between 14 to 22 weeks).

QUAD SCREEN WITH DIMERIC INHIBIN A
Researchers discovered that a combination of tests could be used to increase the detection rate for Down syndrome, while decreasing the number of false-positive tests. They also found that the combination of tests could be used in the detection of Trisomy 18. Human chorionic gonadotrophin (hCG), unconjugated estriol (uE3), and dimeric inhibin A (DIA) were added to AFP, to make what is commonly known as the Quad Screen. The Quad Screen combines results from these four tests and has been a standard screening procedure for many years.

The results of these four tests are combined with maternal age, weight, race, and diabetic status to calculate patient-specific risk factors for neural tube defects, Down syndrome, and Trisomy 18.

Quad Screen testing is done during the second trimester of pregnancy. The optimum gestational age for testing is 16 weeks. Correct determination of gestational age is critical in calculating accurate risk factors. The Quad Screen detects about 75% of neural tube defects, about 80% of Down syndrome cases and about 60% of Trisomy 18 cases. About 3% of women with normal pregnancies will test positive for Down syndrome with the Quad Screen. The Quad Screen increases Down syndrome detection rate by 15% over the outdated Triple Screen, while reducing the false-positive rate by about 40%.

CLINICAL MANAGEMENT
It is important to underscore the fact that a positive test on either screen indicates only that further testing should be done. Most women who initially screen positive will be found to be carrying normal babies when amniocentesis and definitive diagnostic chromosome analysis are done.

Quick Facts

- Open neural tube defects, such as spina bifida and anencephaly, occur in about 1 in every 2500 births. (75% detection rate)
- Trisomy 21 / Down Syndrome, results in mental retardation and some physical defects involving the heart and digestive system. The overall incidence of Down syndrome is about 1 in every 700 births, with lower incidence in younger women and higher incidence in older women. (80% detection rate)
- Trisomy 18, caused by an extra chromosome 18, results in severe mental and physical defects. It is generally a lethal condition. It occurs in about 1 in every 5000 births. (60% detection rate)

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**SELECTED REFERENCES**


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