Amniocentesis

The experience in a district hospital

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Summary: The aim of this audit was to evaluate the effect of the introduction of biochemical screening for Down's syndrome (triple test i.e. serum alphafetoprotein [AFP], human chorionic gonadotrophin [hCG], and unconjugated oestriol [uE3]) on amniaocentesis at Whipps Cross Hospital.

INTRODUCTION

Invasive prenatal diagnosis of fetal abnormalities has become an integral part of obstetrics and perinatal medicine, and midtrimester amniocentesis has traditionally been the most common technique used. Cytogenetic, enzymatic and DNA analysis can be done on cells obtained from the amniotic fluid. In addition, levels of alpha-fetoprotein (AFP) and acetylcholinesterase (AChE) in the amniotic fluid can be measured to diagnose neural tube defects and anterior abdominal wall defects prenatally. At Whipps Cross Hospital amniocentesis is used only for the prenatal diagnosis of chromosomal abnormalities. The main indication for amniocentesis at Whipps Cross Hospital was maternal age of 37 years or more, until 1st of March 1991 when biochemical screening for Down's syndrome was introduced.

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PATIENTS AND METHODS

The study population consisted of all women who had amniocentesis at Whipps Cross Hospital between 1st of May 1991 and 31st of April 1994. The procedure was performed at 16-18 weeks gestation under aseptic conditions, using a 20-22 gauge spinal needle. The needle was inserted following fetal and placental localisation by ultrasound. 10-20 mls of amniotic fluid were taken and sent to the cytogenetic department, Queen Elizabeth Hospital, London for karyotyping. Following the procedure the heart rate is checked by ultrasound and 250 iu of anti-D immunoglobulin is administered to Rhesus negative women. Karyotyping result is usually available in 2-3 weeks.

RESULTS

A pregnancy is SPD if the triple test gives a risk of greater than 1 in 250.

In some cases women had positive biochemical screen for Down's syndrome and were 37 years old or over. Under current policy these women would have been of-

Table 1. — *Uptake of Amniocentesis and miscarriage.*

No of deliveries	12,978
No of amniocentesis offered	815
No of patients that refused procedure	4
No of miscarriage before procedure	12
Amniocentesis performed	799
No of miscarriage after procedure	8
Rate of amniocentesis	799/12,978 = 6.16%
Uptake of amniocentesi	799/(815-12) = 99.5%
Rate of miscarriage	8/799 = 1.00%

Table 2. — *Indication for amniocentesis.*

Maternal age (37 years or more) [AGE]	336
Previous chromosomal abnormality	5
Family history of chromosomal abnormality	4
Screen positive for Down's syndrome (SPD)	448

fered amniocentesis regardless of triple test result. The 448 women classed as screen positive were those less than 37 years and therefore would not normally have been offered an amniocentesis.

DISCUSSION

Up till 1st of March 1991 when triple test was introduced at Whipps Cross Hospital, the main indication for amniocentesis was maternal age of 37 years or more at the expected date of delivery. This method of screening will only detect approximately 30% of Down's syndrome pregnancies (Wald and Kennaard, 1992 [1]) as 70% of Down's syndrome babies are born to mothers aged less than 37 years old. Wald and colleagues proposed combining the triple test with maternal age to improve the effectiveness of screening for Down's syndrome (Wald *et al.*, 1988a [2]). Using a risk cut-off of equal to or greater than 1 in 250, the detection rate was 60% with a false positive rate of five per cent. Subsequently, the detection rate was revised to 58%, or 67% if ultrasound was routinely used to estimate gestational age (Wald *et al.*, 1992a [3]).

In agreement with Wald *et al.* (1988a and 1992a [2-3]) we have found that the triple test as a screening tool increased the detection rate of Down's syndrome from 34.78% (using maternal age of 37 years or over), to 62.5%. This was associated with a false positive rate of 3.5%. This is consistent with the finding by Ogueh (1995 ([4]) studying the same patients as in this study, of an increase in detection rate from 24% to 58%, with a false positive rate of 6.2%. Sanusi *et al.* (1994 [5]) had a zero detection rate for Down's syndrome using serum AFP and total hCG as screening test. Their result many have been improved by the addition of uE3 as one of the analytes. Wald *et al.* (1992b [6]) have shown that the use of uE3 would increase the detection rate for a given false positive rate. The increase in detection rate has however ben associatd with a corresponding increase in the number of amniocentesis performed (Table 2). This increase is because women over 37 years of age are still being offered amniocentesis even if their age adjusted serum levels give a

Table 3. — *Detection rate of Down's syndrome.*

Women screened	12306
Down's syndrome	
total population	23
screened population	16
Detection rate	
screened population	10/16 = 62.5%
using maternal age	8/23 = 34.78%
False positive rate	
(screened population)	(448-16)/ /12306 = 3.5%

screen negative result. It is important not to run the two policies in parallel so as to avoid undue increase in cytogenetic workload. However it is acknowledged that women over 37 years with a screen negative results may still remain anxious and request amniocentesis. They can still have this done after appropriate counselling.

Whilst amniocentesis for fetal kariotyping is a highly specific and sensitive test for Down's syndrome, it is associated with a risk of miscarriage. This is particularly worrying to women, especially those over 37 years in whom the pregnancy may not be readily replaced. Our miscarriage rate of one percent compares favourably with those of others (Tabor *et al.*, 1986 [7]; Shulman and Elias, 1993 [8]). This is despite the fact that most of the amniocentesis was performed by doctors who have had no special training. This is in keeping with Tabor *et al.* (1986 [7]) who found no correlation between the rate of spontaneous abortion and the experience of the operator. We do not know how much of our miscarriage is due to the amniocentesis since we do not know the background rate of miscarriage in our population. It is interesting to note that all the fetuses that miscarried had normal karyotype. This possibility must be borne in mind when counselling patients for amniocentesis.

The high uptake rate of amniocentesis (99.5%) may reflect the effectiveness of our counselling. However, even for couples who would consider termination of a Down's pregnancy, the decision to have an invasive test is not easy. Ultimately the decision depends on the value which a couple places on the possible outcomes: the birth of a Down's syndrome baby, termination of pregnancy for an affected fetus or loss of a normal pregnancy (Lilford 1990 [9]; Thornton 1990 [10]).

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