FETAL MONITORING IN EARLY PREGNANCY

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The object of fetal montoring is to ensure optimum quality of life. To translate this concept into practical obstetrics in early pregnancy one would of necessity adopt two courses of action. The first is to detect a congenital abnormality in a given pregnancy with a view to offering therapeutic abortion. The second is to prevent the occurrence of such affected pregnancies through genetic counselling and avoidance of those environmental factors which are known to produce fetal anomalies.

The first trimester is the most critical period in the life of the developing organism as it is not only the time of very rapid cell division and organ formation, but also the organism has to migrate from the fallopian tube to reach the uterine cavity,implant itself and establish a secure and effective system of nutritional supply. It is dynamically vulnerable and highly susceptible to noxious agents.

By the end of the eight week after fertilization the primordials of all the organs have been laid down and the embryo is then called fetus. The majority will develop normally to term provided that the growth supports are adequately maintained and they will emerge into the outside world in good condition if the conduct of labour is uneventful.

Unfortunately a small percentage of these fetuses will become congenitally abnormal. The cause is then assumed to be genetic or environmental, but often it is multifactorial.

Let us consider the environmental factors first, So far only a minority of suspected factors have been proved to be teratogenic.

1. Infection – Rubella is the classical example. The earlier in pregnancy this occurs the worse is the effect i.e. mental retardation, deafness, cataract and cardiac anomalies (see Table 1). Toxoplasmosis, and cytomegalovirus are all known to affect the fetus in varying degrees.
2. Drugs – Thalidomide, cytotoxic drugs, corticosteroid etc .....
3. Irradiation
4. Maternal health – Healthy babies are born to healthy mothers. Chronic maternal diseases such as diabetes melitus are sociated witha higher incidence of congenital abnormalities.

Genetic Causes of Congenital Abnormalities:

Genetic contribution to congenital malformation can be recognized in three distinct groups of defects:–

1. Chromosomal abnormalities. This may involve the autosomes or sex chromosomes e.g.non-dysjunction or translocation mongolism.
2. Single gene defects e.g. inborn errors of metabolism.
   Genetic predisposition – This leads to increased familial incidence but not to the extent seen in (2) eg. Neural tube defects.

The role of genetic counselling is of paramount importance. This is a difficult and tricky field which requires a combination of knowledge and experience. An accurate diagnosis must first be established because an erroneous or carelessly worded statement can lead inadvertently to the elimination of the entire future pedigree of a family or in providing it with an unexpectedly defective child. The accepted indications for genetic counselling are shown in Table II. It is relevant to emphasize the fact that the prevalence of the commoner autosomal trisomies (21, 13, 15, 18) and sex chromosomes aneuploidies (47 xxy, 47 xxx etc..) rises with increasing maternal age. The incidence of mongolism in relation to maternal age is shown in Table III. Mothers above the age of 35y ears constitute only 13.5% of all pregnancies and yet they produce 50% of all mongols.

Amniocentesis :

This is an important procedure in diagnosis of congenital abnormalities. It is performed between the 14th and 16th weeks gestation. If the ultrasound service is available this will help in locating the placenta and the pool of the liquor amnii, determining the duration of the pregnancy, the number of the fetuses and may clinch the diagnosis of certain defects such as anencephaly and spina bifida.

The following investigations can be carried out on the amniotic fluid:

1. Estimation of the Alpha-feto-proteins. This helps in the diagnosis of open neural-tube defects.
2. Identification of the sex of the fetus.
3. Cytogenic studies e.g. for mongolism.
4. Biochemical studies for enzymes (e.g. Tay Sach's, Gaucher's Nieman-Pick's disease etc....)
5. Histochemical studies.

Amniocentesis carries a 1 – 2% risk of complications such as fetal death. It should therefore not be undertaken unless there is a strong indication and usually after genetic counselling.

When the diagnosis of a defective fetus is made, all the facts are explained to the parents and the decision to terminate the pregnancy is taken by them. The Obstetrician should be able to procure mid-trimester abortion but he (or she) should observe the laws of the country regarding this sensitive and emotive issue.

In future I think routine screening of all pregnant women in late first trimester by the ultra-sound and estimation of feto-proteins in the maternal blood will go along way to reduce effectively the number of congenitally abnormal babies. The prescription of drugs in pregnancy should be carefully considered. The irradiation of women in early pregnancy should also be avoided. Mass vaccination of school girls with rubella vaccine is being endorsed in some countries with great success. Lastly the science of genetic engineering is still an embryo but in the distant future it might become a practical additional instrument into our armamentarium in the fight against congnital abnormalities.

TABLE I: Rubella Infection Risk of Congenital Malforamation

Duration of Pregnancy	Risk Percentage
0– 4 weeks	33
5– 8 weeks	25
9–12 "	9
13–16 "	4
17–30 "	1

TABLE II: INDICATIONS FOR GENETIC COUNSELLING

1. A previous child had a biochemical abnormality.
2. The couple have been shown on a screening programme to be carriers of the gene of a biochemical abnormality.
3. A previous child was a mongol.
4. One parent is a carrier for an abnormality of chromosomal arrangement.
5. Mother is carrier for X-linked disorder.
6. The couple have had one child with neural tube defect.
7. Advanced maternal age.
8. Repeated spontaneous abortions.

TABLE III: Mongolism and Maternal Age

Age-goup of mothers	Incidence of Mongolism
Under 25 years	1:1600
25–29	1:1200
30–34	1: 900
35–39	1: 300
40–45	1: 100
Over 45	1: 40

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