Cytogenetic Testing following recurrent miscarriage Patient Information leaflet

What is cytogenetic testing?

Cytogenetics is a test to check the chromosomes (structure containing the genetic material i.e., DNA) to detect changes or abnormalities that could lead to genetic disorders, birth defects, or certain cancers. It involves analysing cells, usually from blood, bone marrow, or other tissues, to check for missing, extra, or rearranged chromosomes. This test helps doctors diagnose conditions like Down syndrome, certain types of leukaemia, and other genetic diseases, and can also guide treatment decisions.

What is cytogenetic testing with respect to miscarriage?

Cytogenetic testing in miscarriage involves examining the chromosomes of fetal tissue to identify genetic abnormalities that may be causing repeated pregnancy losses. This testing looks for chromosomal changes, such as translocations or deletions, which could prevent a pregnancy from developing normally and could cause miscarriage. Identifying these abnormalities can help to guide future treatment options, provide insight into the cause of the miscarriages, and assess the risk of recurrence in future pregnancies.

When is Cytogenetic Testing offered?

1. After 3 (recurrent) Miscarriages:
    - Cytogenetic analysis is offered on the third and subsequent miscarriage(s) to test the products of conception (fetal tissue) to detect any chromosomal abnormalities.
2. After late Miscarriage(s) > 12 weeks:
    - Testing may also be considered after a late miscarriage (after 12 weeks of pregnancy), particularly if the fetal tissue is available, to identify potential chromosomal causes.

What are the advantages of cytogenetic testing?

1**. Identifying Genetic Causes**: Cytogenetic testing can help identify chromosomal abnormalities in the fetal tissue that may be responsible for recurrent miscarriages. Knowing the cause can provide closure and understanding to affected couples. Cytogenetic analysis of the pregnancy tissue have shown to provide a diagnosis in over 90% of couples.

2. **Guiding Future Pregnancies**: Detecting a chromosomal abnormality allows healthcare providers to offer appropriate genetic counselling to couples, which can help them understand their risk of recurrence and make informed decisions regarding future pregnancies.

3. **Tailored Treatment Options**: For couples found to have chromosomal abnormalities, specific management strategies, such as using donor eggs or sperm or considering preimplantation genetic testing (PGT) during assisted reproductive techniques, can be recommended.

4. **Informed Decision-Making**: The information from cytogenetic testing helps patients make informed decisions about further investigations, treatment options, and family planning based on their individual risk factors.

What are the risks associated with it?

1. Emotional and Psychological Impact: the potential emotional and psychological impact of the results, which can cause anxiety or distress, particularly if a genetic abnormality is detected.

2.Limited Predictive Value: In some cases, cytogenetic testing may reveal chromosomal abnormalities whose significance is unclear, which may not provide definitive answers regarding future pregnancies.

How is it done?

1. **Testing Fetal Tissue**

- Collection of Tissue**:** After a miscarriage, tissue from the pregnancy (often referred to as "products of conception") is either naturally expelled and collected or may be obtained during a surgical procedure, such as dilation and curettage (D&C).
- Chromosome Analysis: The fetal tissue is sent to a laboratory, where cells are cultured, and chromosomes are analysed to detect abnormalities.

2. **Parental Chromosome Testing**

- Blood Sample Collection: If the fetal tissue shows an abnormality or if there is a history of recurrent miscarriage without a known cause, blood samples from both parents may be collected for chromosomal analysis of the parents.
- Karyotyping: The blood samples are used to analyse the karyotype, which is a picture of a person’s chromosomes. This test checks for structural rearrangements, such as balanced translocations/deletions, that could increase the risk of miscarriage.

When do you get the results?

- The sample will go to the University Hospital of Wales for processing which may take up to several weeks.
- We deliver the results via face-to-face appointment because some of the results may contain sensitive information which is not suitable to discuss over the phone.

What are the Possible results to expect?

- Normal chromosomal karyotype
- Unable to analyse due to maternal cell contamination

  Sometimes the test cannot be completed because the sample contains too many cells from the mother instead of the baby. This happens when there is more maternal tissue than fetal tissue in the sample. In about 22% of cases, the cells do not grow as needed for testing, and in about 20% of cases, there is too much contamination from the mother's cells.

  Cell Culture Failure Rate (22%): About 1 in 5 samples may not grow the cells required for the test properly.

  Contamination Rate (20%): Around 1 in 5 samples may have too many maternal cells, which makes testing difficult or impossible.

- Abnormal results like: translocation (it is when parts of two chromosomes swap places), deletions (is when a piece of a chromosome is missing), mutations, down's syndrome trisomy 21, Patau syndrome trisomy 13, Edwards syndrome trisomy 18 etc.

References:

https://www.rcog.org.uk/guidance/browse-all-guidance/green-top-guidelines/recurrent-miscarriage-green-top-guideline-no-17

This document is available in Welsh/
Mae'r ddogfen hon ar gael yn Gymraeg