Fetal Distress

Synonym: fetal compromise; non-reassuring fetal heart rate trace

Fetal distress refers to the compromise of the fetus due to inadequate oxygen or nutrient supply. This can occur due to maternal, fetal or placental factors. At its most severe it may lead to neonatal brain injury or stillbirth. Its presence may be suspected due to various factors but all have a high false positive rate.

Pathogenesis

The main cause of antepartum fetal distress is uteroplacental insufficiency.

Factors within labour are complex but processes such as uteroplacental vascular disease, reduced uterine perfusion, intrauterine sepsis, reduced fetal reserves and cord compression can be involved alone or in combination. Gestational and antepartum factors can modify the fetal response to them.

Reduced liquor volume, maternal hypovolaemia and fetal growth restriction are known associations.

Epidemiology

The overall risk of prompt caesarean delivery needed for fetal concern was shown to be 3.1% in an unselected population[1]. The risk exceeded 20% in patients with severe pre-eclampsia, post-term or fetal growth-restricted fetuses with abnormal Doppler studies and also in women with moderate/severe asthma or severe hypothyroidism.

The vast majority of cases of cerebral palsy in otherwise normal-term infants are not associated with intrapartum hypoxia-ischaemia[2].

Risk factors

Includes women with a history of:

- Stillbirth.
- Intrauterine growth restriction (IUGR).
- Oligohydramnios or polyhydramnios.
- Multiple pregnancy.
- Rhesus sensitisation.
- Hypertension.
- Obesity.
- Smoking.
- Diabetes and other chronic diseases.
- Pre-eclampsia or pregnancy-induced hypertension.
- Decreased fetal movements.
- Recurrent antepartum haemorrhage.
- Post-term pregnancy.

Maternal age over 35 years, and particularly over 40, is an independent risk factor for uteroplacental insufficiency, fetal distress and stillbirth; the highest risk is in older women who are also nulliparous[3, 4].

Presentation[5]

See also the separate Intrapartum Fetal Monitoring article.

Fetal distress presents in varied ways and to differing degrees. It may be suspected by the following, which may also be used for further evaluation of suspected fetal distress:

- **Clinical suspicion** when decreased fetal movements are felt by the mother or there is a slowing or stopping of the growth of serial symphysis fundal height.
- **Abnormal sonographic biometric parameters** when IUGR or macrosomia is suspected.
- **Doppler ultrasound** is particularly valuable when performed up to 34 weeks of gestation:
  - Umbilical artery Doppler may detect changes that reflect increasing placental vascular resistance.
  - Fetal arterial Doppler, for example, the middle cerebral artery, may detect reduced resistance which has developed to maintain blood flow to the fetal brain when placental function is impaired.
  - Fetal venous Doppler may detect changes indicative of impaired cardiac function and fetal acidosis.
- **Cardiotocography (CTG)** shows the fetal heart rate response to fetal movement and to maternal contractions. The trace it produces may be described as reassuring, non-reassuring or abnormal:
  - **Antenatal CTG:**
    - A normal fetal heart rate accelerates with fetal movement and is described as reactive.
    - Stillbirth rates have been shown to be significantly lower after a reactive trace than after a non-reactive trace[6].
    - CTG interpretation is open to inter- and intra-observer variation but can be interpreted by computerised analysis. CTG should not be used as the only form of surveillance of a high-risk pregnancy[7].
    - A contraction stress test, carried out during induced contractions using oxytocin, has no clinical benefits, and a false positive rate as high as 50%; it may also have significant adverse effects[8]. It is not used in the UK.
  - **Intrapartum CTG:**
    - See the separate Intrapartum Fetal Monitoring article for details.
    - CTG should not be used routinely as part of the initial assessment of low-risk women in early labour[9].
    - No decision about a woman's care should be made on the basis of CTG findings alone[10].

- **Biophysical profile (BPP)** is time-consuming and rarely abnormal in the presence of normal umbilical arterial Doppler. It consists of a combination of CTG, fetal behaviour (including movement, tone and breathing) and amniotic fluid volume. This produces a BPP score to predict the degree of any compromise to the fetus. Available evidence does not support its routine use in high-risk pregnancies but observational data suggest it has good negative predictive value for fetal compromise[9].
- **Amniotic fluid volume**, both oligohydramnios and polyhydramnios, has been shown to be associated with poor fetal outcomes. However, oligohydramnios is itself associated with intrauterine growth restriction and urogenital malformations, which were not controlled for in the studies, demonstrating an association with poor outcomes. Polyhydramnios, when clinically apparent, is related to poor neonatal outcomes but mild, idiopathic polyhydramnios, detected only on ultrasound, is not associated with adverse outcomes.
- **Fetal scalp blood sampling** during labour, to measure lactate (in preference to pH if available), may be indicated for an abnormal intrapartum CTG[10]. See the separate Intrapartum Fetal Monitoring article for details.

A composite risk score, based on fetal Doppler flow resistance indices, has shown promise in identifying those fetuses antenatally who develop fetal distress intrapartum[11].

**Management**

There have been no recent trials of operative versus conservative management of suspected fetal distress[12].

- Signs of antenatal fetal distress require monitoring with a view to induction of labour or planned caesarean section.
- Immediate delivery of a preterm fetus with suspected fetal distress may reduce the risk of intrapartum hypoxia but increases the risks associated with prematurity. Benefit may be gained by deferring delivery, especially if there is uncertainty; however, evidence is lacking to guide this decision[13].
- Continuing fetal distress during labour may indicate the need for delivery to be expedited. Speed of delivery should take into account the severity of fetal heart rate and blood sampling abnormalities and relevant maternal factors. The urgency of caesarean section should be documented using the following standardised scheme in order to aid clear communication between healthcare professionals about the urgency of a caesarean section[14].
  - Class 1: immediate threat to the life of the woman or fetus. Perform this as soon as possible after decision. 30 minutes is an appropriate audit standard.
  - Class 2: maternal or fetal compromise which is not immediately life-threatening. In most situations, within 75 minutes of making the decision[14]. However, this is not achieved in a substantial proportion of cases, although it is uncertain how significant this is clinically[15].
    - There is some evidence that very short ‘decision-to-incision’ time (<20 minutes) may be inversely proportional to neonatal outcomes, ie lower umbilical pH and Apgar scores[16].
- Amnioinfusion has been shown to be beneficial in suspected umbilical cord compression (particularly when there is oligohydramnios), with a reduced risk of caesarean section[17].
  - In this process, sodium chloride or Ringer’s lactate is infused transcervically or, if the membranes are still intact, via a needle inserted under ultrasound guidance through the uterine wall.
  - The potential adverse effects include umbilical cord prolapse, uterine scar rupture and amniotic fluid embolism.
  - The current evidence on the safety and efficacy of this procedure means it is not recommended in the UK for intrauterine fetal resuscitation[10]; it is only undertaken under special arrangements that include audit and research[18].
- Term or post-mature fetuses may produce meconium-stained liquor. Meconium can be detrimental to the fetal lungs by producing a chemical pneumonitis if inhaled:
  - Significant meconium is defined as dark green or black amniotic fluid that is thick or tenacious, or any meconium-stained amniotic fluid containing lumps of meconium[10].
    - If significant meconium is present, fetal blood sampling and advanced neonatal life support may be required at delivery.
    - If there has been non-significant meconium, the baby should be observed at one and two hours.
- Amnioinfusion has been used to reduce the risk of meconium aspiration by diluting the meconium present; however, it is unclear whether this is beneficial and it is not used in routine practice[19].
Further reading & references


4. RCOG Statement on later maternal age; Royal College of Obstetricians and Gynaecologists, 15 June 2009.
6. Redund Fetal Movements; Royal College of Obstetricians and Gynaecologists (February 2011)
7. The Investigation and Management of the Small-for-Gestational-Age Fetus; Royal College of Obstetricians and Gynaecologists Green-top guideline (Mar 2013)
10. Intrapartum care for healthy women and babies; NICE Guideline (Dec 2014, updated Feb 2017)
18. Therapeutic amnioinfusion for oligohydramnios during pregnancy (excluding labour); NICE Interventional Procedure Guidance, November 2006

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