

## **SUBSTANCE ABUSE IN PREGNANCY**

**Aidan Foy**  
Director, Alcohol and Drug Services,  
Newcastle Mater Misericordiae Hospital

### **Introduction**

Substances used in pregnancy can interfere with the success of the pregnancy by affecting all three of the biological systems involved, namely the mother, the fetus and the placenta.

#### *Mother*

Drugs can interfere with the mother's well-being by:

- Direct interference with her health.
- Disturbance of her emotional status.
- Interference with her social stability and financial security.
- Producing malnutrition.

#### *Fetus*

Damage to the fetus can occur

- By direct toxicity.
- By producing fetal or neonatal withdrawal states.

#### *Placenta*

Placental/Drug interactions are important because:

- Drugs cross the placenta producing a new set of pharmacokinetics.
- Drugs interfere with placental function.
- The placenta has a detoxification function.

### **Tobacco**

The risks of tobacco smoking in pregnancy are as follows:

- Spontaneous abortion where the risk ratio appears to be increased to approximately 1.8.
- Low birth weight. Smoking mothers have roughly twice as many babies weighing less than 2500gms.
- Perinatal mortality is increased by approximately 35%.

These damaging effects of tobacco appear to be due to three substances, nicotine, carbon monoxide and cyanide which have a number of actions damaging to the fetus. Nicotine seems to be the most important substance as it has been shown by a number of electron microscopic studies that it reduces the vascularisation of the placenta and causes thickening of the basement membrane of placental vessels with marked narrowing of arterioles. Studies of fetal breathing movements have also shown that nicotine reduces the proportion of time in which fetal breathing movements occur which is regarded as a sign of fetal wellbeing. Carbon monoxide binds to fetal haemoglobin in an irreversible way and reduces the capacity of the fetal red blood cells for oxygen transport. Cyanide exerts its effects mostly by depleting the placenta of Vitamin B12 which is a co-factor for detoxification of a variety of substances.

### **Alcohol and the Fetal Alcohol Syndrome**

The fetal alcohol syndrome is a specific syndrome which is said to occur in women who drink more than 90gms of alcohol daily. However, in animal studies it has been shown that the severity of effects is not determined purely by the mean daily alcohol consumption but also by the peak blood alcohol level reached and by the area under the curve in a graph of blood alcohol levels against time. If applied to humans, this means that binge drinking is particularly hazardous in pregnancy. Since it is difficult to quantitate drinking in a binge pattern, damage to the fetus is likely to be unpredictable.

The fetal alcohol syndrome itself has three cardinal features namely: growth retardation, central nervous system damage and facial abnormalities. In addition to these it is known that babies born to heavily drinking women have various fetal growth problems and approximately twice as many congenital abnormalities as other babies.

An important factor to remember about the fetal alcohol syndrome is that it occurs because the fetal brain is exposed to alcohol at the time when it is most sensitive. This is during the proliferation, differentiation and migration phase of brain development which occurs in the third trimester in humans. Many women believe that alcohol, like most teratogens, does most of its damage in the first trimester of pregnancy and it is important to dispel this misinformation.

The maturing fetal brain is, in fact, exquisitely sensitive to alcohol at or about the time of delivery. A recent study of alcohol consumption during breastfeeding showed a measurable deficiency in psychomotor development in the babies of women drinking only 20 g per day. Whilst the abnormalities found were quite minor, and by themselves of no clinical significance, this study underlines the fact that there is no dose of alcohol at which the fetal brain can be shown to be unaffected.

As the foregoing discussion indicates, there is no safe level of alcohol consumption in pregnancy. Therefore the only useful advice that women can be given is to drink no alcohol whatsoever. However, women who are drinking during their pregnancy should be told that there is a good chance that the fetus will escape harm if they can stop drinking prior to the third trimester.

It is important that women are not given an inappropriate sense of guilt about this. Women drinking 90 g daily or more or engaging in binges should, of course, be told that they risk producing FAS in their babies. Women drinking lesser amounts, particularly those at the lower end of the scale, should simply be told that the fetal brain is highly sensitive to alcohol and, if they wish to maximise the chance of having a successful outcome to the pregnancy, they should not drink alcohol at all.

## **Use of Illegal Drugs in Pregnancy**

In the 1990's the majority of women who use illegal drugs in pregnancy will be multiple drug users. These women are not only using a variety of harmful substances but they are also living lives apart from the mainstream of society and are subject to malnutrition, poor hygiene, episodes of violence and other such consequences of their illegal lifestyle. In addition, being part of an alienated sub-culture they tend not to make use of the medical resources which are taken for granted by the rest of the population and they typically have inadequate or no antenatal care.

Therefore, it is not surprising that, as a group, they suffer a variety of medical and surgical complications in their pregnancy. These are mostly infectious in nature and include hepatitis, septicaemia or sexually transmitted diseases.

Malnutrition, thrombophlebitis and other complications of needle use as well as a variety of psychiatric symptoms also occur. The pregnancies of drug abusing women tend to be complicated by premature labour, intrauterine growth retardation and a variety of other complications such as pre-eclampsia, chorioamnionitis and an increased incidence of fetal death in utero.

The common illegal drugs will be briefly looked at in turn.

### ***Heroin***

There is now a reasonable amount of experience in dealing with pregnant intravenous heroin users. Studies in the late 1970's compared intravenous heroin users who had either no antenatal care, or antenatal care and methadone maintenance, with non-drug using mothers who had no antenatal care, and a group of normal mothers who had good antenatal care. The outcome of these studies indicates that most of the obstetric complications occurring in intravenous heroin users relate more to the level of antenatal care than it does to the use of narcotic drugs.

The results for the group of women maintained on methadone who had adequate antenatal care were comparable, though not as good as those for women who did not have a drug problem. In particular, the methadone using group did have babies who were a little more likely to be growth retarded and have poor motor, auditory and visual orientation. Also methadone led to a more significant fetal abstinence syndrome than was seen in babies of heroin using mothers. In spite of this, however, the advantages of methadone in pregnancy are clear and since the fetal abstinence syndrome is predictable it can be anticipated, planned for and treated promptly.

Current recommendations for the management of pregnant heroin users are therefore as follows:

#### *On presentation*

A full assessment of drug use should be made and the patient stabilised on as low a dose of methadone as possible. This may need to be done in hospital. If multiple drugs are used admission is essential and the patient should be detoxified from all drugs except methadone at the outset.

#### *Maintenance*

As the pregnancy continues the woman should be monitored regularly for drug use. If crises arise because of persisting drug abuse or for any other reason, a policy of ready hospital admission should be followed. If possible, the dose of methadone should be reduced slowly at a rate of less than 5 mgs a

fortnight to less than 20 mgs daily. At this level the risk of a major fetal abstinence syndrome is fairly small.

### *Delivery*

The baby should be delivered in a unit where there are facilities for neonatal resuscitation and treatment of narcotic withdrawal.

### *Stimulant Use*

The most common stimulants used in Australia are amphetamines. These were used legally in the past to control weight gain in pregnancy. The limited prospective studies of women who have used amphetamines for this reason have shown a slightly increased rate of prematurity and perinatal mortality. There have also been some suggestions that congenital abnormalities, particularly biliary atresia, are increased in these babies. If the drugs are used after 28 weeks, lower birth weights and neonatal drowsiness have been reported. The impairment in fetal growth is very similar to that seen with cocaine. There is anecdotal evidence which links amphetamine use with acute presentation with abruptio placenta.

### *Cocaine*

Cocaine, which is currently a drug causing great concern in the United States, seems to be more dangerous than amphetamines in pregnancy. It is associated with abortion, preterm birth and a variety of acute vascular effects in the fetus. There is said to be a 30% preterm delivery rate in chronic cocaine users, often in association with abruptio placenta. Also a significant disturbance of the newborn's behavioural state and an increased risk of sudden infant death syndrome has been described. It is now also recognised that impairment of fetal growth is a significant consequence of cocaine use in pregnancy.

### *Cannabis*

Very little can be said about cannabis in pregnancy although some of its effects are likely to be very similar to those of tobacco. A prospective study of 1600 pregnant cannabis users showed that they had overall lower birth weights and there was five times the incidence of neural tube defects. A second large prospective study has now confirmed impaired fetal growth.

In the present state of knowledge, therefore, women should be advised against cannabis use in pregnancy.

### *Sedatives*

Sedative drugs are now used so commonly they should be considered as a possible risk factor in pregnancy. A recent NH&MRC report has suggested that, although the evidence for teratogenicity is controversial, benzodiazepines do cross the placenta and cause CNS depression in the neonate. Similarly, benzodiazepines are excreted in breast milk.

## **Prevention and Rehabilitation**

The most important factor in the prevention of obstetric complications of drug use is an awareness that a woman is using harmful substances in the first place. Most women in our society drink alcohol and between 3% to 5% of adult women drink consistently at a hazardous level. Australian studies have

indicated that 1% of women presenting to the antenatal service at a large teaching hospital will be users of illegal drugs. In addition, approximately 30% of women smoke cigarettes. It is essential that an adequate drug history be taken at the first antenatal visit and the importance of avoiding drug use during pregnancy emphasised.

If it is clear that a woman has a serious problem of alcohol or illegal drug use then the opportunity should be taken to engage in active rehabilitation during her pregnancy. Pregnancy is a significant event in a woman's life and there is always the possibility that she will therefore choose to address her drinking or drug using problem realistically.

At an early stage it is wise to involve the services of a specialist alcohol and drug team for an assessment of the problem. Early referral increases the probability that such a team will gain the patient's trust and thereby encourage her to make the decision to cease her substance abuse.

### References

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