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# Fetal blood sampling in retreat

*A casualty of advances in molecular genetics, cytogenetics, and Doppler imaging*

The fetus acquired the status of patient in the 1980s. The development of ultrasonographically guided needling techniques to gain access to the fetal circulation meant that the fetus, instead of simply being imaged, could be investigated and in some cases treated. Antenatal fetal blood sampling proved a major advance in both the prenatal diagnosis of genetic disease and the assessment of fetal wellbeing. Paradoxically, the information provided by fetal blood sampling validated non-invasive methods of fetal evaluation, and these, together with advances in molecular and cytogenetic techniques, have greatly reduced the indications for blood sampling.

Fetal blood sampling was developed for the prenatal diagnosis of hereditary disease—initially the haemoglobinopathies and then the haemophilias, thrombasthenias, metabolic disorders, and immunodeficiencies. Most of these are now amenable to diagnosis by DNA analysis, which is done in the first trimester after the simpler chorion villus sampling has been performed.[1] Amniocentesis is now also possible in early pregnancy, with amplification with the polymerase chain reaction overcoming the former problems associated with a low yield of cells and thus of DNA. Fetal blood analysis is needed only in rare cases in which DNA studies are not informative or after later referrals of families that have not been studied.

Karyotyping has been the most common indication. Fetal blood sampling is technically difficult before 17 weeks and so was used to investigate structural abnormalities found on routine ultrasound scanning at 18-20 weeks, and growth retardation. Obtaining the result took only a few days, compared with up to five weeks after amniocentesis, making fetal blood sampling the preferred technique for "rapid karyotyping." Interestingly, amniocentesis remained popular for this indication in the United States, where different laboratory practices meant less delay in obtaining the result. Recent improvements in efficiency and cell culture and harvesting techniques have now also expedited results in Britain, with several laboratories achieving mean reporting times of under two weeks.[2] As amniocentesis is safer and quicker (albeit with a slower result) patients increasingly prefer it to fetal blood sampling when offered the choice. Furthermore, differences in reporting times should decrease with the likely application of fluorescent in situ hybridisation with chromosome specific probes to uncultured amniotic cells.[3]

Although fetal blood sampling has been used to measure blood gases in growth retarded fetuses,[4,5] a single measurement of pH and carbon dioxide and oxygen concentrations does not predict which fetuses will survive, the values in such fetuses being similar to those in fetuses dying in the perinatal period.[4] These studies have, however, taught us much about how the results of more simply performed biophysical tests relate to fetal condition. Appreciable fetal acidaemia and hypoxaemia are found only when the umbilical artery Doppler waveform and the fetal heart rate pattern are abnormal.[4,5] There seems little role for fetal blood sampling for measurement of blood gases in the majority of growth retarded fetuses in which end diastolic frequencies are present and the heart rate pattern is normal. One group reported a significant correlation between fetal pH and subsequent neurodevelopmental outcome, although most pH values in that study were still within normal limits.[6] Acidaemia is the result of chronic and complex changes in the fetoplacental unit, and using a low pH as an indicator for delivery is likely to have little effect on preventing handicap.

The first large series of fetal blood sampling came from France, where it was part of a national toxoplasmosis screening strategy to investigate seroconversion in pregnancy.[7] Specific IgM was positive in only 20% and culture gave positive results in only 60% of blood samples from infected fetuses.[8] Although sampling was done for toxoplasmosis in Britain, this indication has largely lapsed with the British recommendation that screening for toxoplasmosis should not be offered routinely to pregnant women.[9] Molecular techniques can now identify micro-organisms in amniotic fluid,[10] and their use warrants clinical evaluation in toxoplasmosis and other congenital infections.

What indications are left? Not immune thrombocytopenia, following the recognition that the earlier risks of fetal thrombocytopenia were exaggerated, as was the chance of intracranial haemorrhage during vaginal delivery, which now seems negligible.[11] In contrast, fetal blood sampling continues to play an important part in alloimmunised pregnancies when fetal antigen status is checked, the fetal haemoglobin concentration or platelet count is assessed, and intravascular transfusions are given. Even here, fetal blood sampling is under threat from less invasive strategies, such as molecular determination of rhesus or platelet antigen status in amniotic fluid,[12] immunoglobulin treatment, [13] and, possibly, stem cell transplantation. Fetal blood sampling is also indicated

in unexplained hydrops to detect the rare fetus with anaemia secondary to parvovirus infection or fetomaternal haemorrhage.

Access to blood samples from fetuses led to a wealth of research and important contributions to the understanding of human fetal physiology, metabolism, and disease. Banks of surplus samples from clinically indicated procedures should be maintained as a valuable resource for future research, as ethics committees are unlikely to approve fetal blood sampling solely for research.

Blood sampling carries a risk of fetal loss of 1-3%,[7 14 15] with up to 25% in high risk pregnancies.[13] The development of non-invasive or less invasive procedures that provide the same information should be encouraged. The contracting role for fetal blood sampling has implications for training as the experience of the operator is the main determinant of the risk associated with the procedure. The real skill in the future, however, may not be manual but may rather lie in knowing in whom not to perform this procedure.

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# Why do adults sexually abuse children?

## *Men and society are mostly to blame, but apportioning guilt is difficult*

Of the 3800 children newly registered on child protection registers as having been sexually abused in England and Wales in the year to 31 March 1992,[1] probably about a third will have been abused by young people—mostly boys—and two thirds will have been abused by adults—95% by men and 5% by women. Most will have been abused within the family or by a trusted adult.[2] Despite the considerably increased public awareness of the deleterious effect of sexual activity with children the annual number of registrations currently is similar to that of previous years.

Why do adults continue to abuse children? Does it represent a pathological perversion of sexual interest and orientation or an incestuous family affair? Or does it represent a more general view of women and children as appropriate victims of male sexual interest and therefore appropriate objects to meet sexual needs? Although abuse by women is now being recognised, the fact that most known sexual abusers are men seems to indicate that how boys and men are socialised is somehow connected with why they sexually abuse children.

Recent studies on young male university students have shown how commonly they found children sexually arousing and the role of social inhibitions in preventing them acting on their arousal.[3] Studies of those who abuse children suggest that a substantial number had a sexualised orientation towards children in their teenage years, even as early as 12.[4]

What accounts for this early orientation and interest in children as objects of sexual desire? An important focus of interest has been whether adults who sexually abuse children were abused in their own childhood, so that their later sexual orientation was influenced.[5] Yet girls are abused four or five times more commonly than boys, and women make up only a small proportion of adults who abuse children.

How boys and girls are socialised may play some part in how they respond to a similar abusive experience.[6] Girls tend to internalise their response to abusive experiences. They believe that abuse is their fault, which is reinforced by adults who claim to misperceive their ordinary affection and early sexual interests as equivalent to adult signals. Commonly, negative self attributes develop, together with self mutilation, anorexia nervosa, and the adoption of victim roles. Boys, however, tend to externalise their experiences of abuse. Flashbacks related to traumatic experience and memories of abusive acts shape boys' sexual activities. Memories of their own abuse intermingle with developing sexuality, reinforced by the common stereotypes of "macho" male roles in the media. The combination of a reaction to powerlessness and sexualisation associated with the abuse lead to the active need to find someone to take over their own traumatised self representation, someone else who reminds them of their powerlessness and can be made to feel it instead. Revenge may be part of it, and some girls also follow this route.[7] Unsurprisingly, men and women who have had similar experiences may find each other, and adults who abuse their own children have high rates of both sexual and physical abuse in their own childhoods and focus on their own needs, so that they are emotionally unavailable to their children.[8]

Not all adults who are sexually interested in children were sexually abused as children. For example, boys commonly compensate for rejection and non-sexual physical abuse by finding emotional closeness through sexuality. This may account for their later sexual interest in children. It is argued