Magnesium in pregnancy

Evidence for dietary supplementation is unconvincing

Nutritional deficiencies are common in pregnancy, but many pregnant women are taking unnecessary supplements of vitamins and minerals because they fail to understand the normal physiological and biochemical variations of pregnancy. Thus after decades of study we are still unsure whether well nourished women need to take haematinics during pregnancy. Recently more attention has been paid to the importance of zinc[1] and magnesium[2-4] in pregnancy, and we must examine carefully claims of benefit from supplementing the diet of pregnant women with these minerals.

Reproductive problems are well known to arise in animals because of deficiencies in trace elements, but such problems are less well described in humans—except in relation to inborn and other errors of metabolism. In the early 1980s zinc became the fashionable trace element, and zinc supplementation during pregnancy has had its advocates. This philosophy has, however, been strongly criticised from first principles and from a review of published work,[1] and there is little place for zinc supplementation.

Although magnesium is not a trace element (being the fourth commonest cation in the human body), it acts in similar ways to many of the trace elements, and over 300 enzymatic reactions are claimed to be dependent on it.[5] Sheldon *et al* studied magnesium concentrations during human pregnancy and showed the pattern commonly seen for other substances—a steady fall in plasma concentrations during pregnancy and a rapid return to prepregnancy concentrations after delivery.[4]

In a retrospective study magnesium supplementation was associated with a reduced frequency of fetal growth retardation and pre-eclampsia.[2] These findings were not confirmed in a prospective double blind study of 568 women.[3] The prospective study did, however, show significant reductions in the need for hospital admission for antepartum haemorrhage (4/278 with supplementation, 17/290 with placebo), threatened preterm labour (12/278 *v* 26/290), and incompetent cervix (8/278 *v* 17/290). The surprisingly high incidence (at least by British standards) of cervical incompetence in both groups was not explained, neither was it explained how magnesium might reduce the incidence. Although neonatal admission to intensive care was significantly higher in the group given placebo, none of the specific indications for admission was significantly higher. A significant reduction in preterm delivery was found only after the code was broken and those who did not comply had been excluded. These disparate clinical observations clearly need to be reconciled.

There is no convincing evidence of magnesium deficiency occurring in humans except in pathological states,[6] and in the studies undertaken during pregnancy magnesium concentrations were not measured. When magnesium intake is low renal conservation is very effective—with daily urine loss of about 0·5 mmol (12 mg). This amount of magnesium is contained, for example, in about 15 g cereal, 45 g meat, or 70 g vegetables.[7] Modest supplementation probably does no harm, but intoxication with magnesium may occur when it is given therapeutically in managing eclampsia. Not only is the mother affected but also the baby may show hypotonia and reduced activity. The routine supplementation of the diet of pregnant women with magnesium is thus not to be recommended.

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Women and HIV

They need information to make informed choices on pregnancy and childbirth

In Western society women make up only a small proportion of those infected with HIV and an even smaller proportion of those with AIDS. In the United Kingdom by the end of October 1988 some 50 women had been reported as having AIDS, less than 3% of the total. Of these, 13 had received contaminated blood products, 10 were intravenous drug users, and 27 had probably been infected through sexual intercourse with men in recognised risk groups.[1,2] Because there are so few women infected with HIV they have found it difficult to organise groups for mutual support or effective lobbying. The pattern is, however, changing. Increasing numbers of women are becoming infected with HIV because of its spread among intravenous drug users and their sexual partners, many of whom are women.

Most women are uninfected but many now seek counselling. Of course drug users should not share needles, but they can be reassured that most are unlikely to become infected with HIV sexually. Nevertheless, they should avoid intercourse with a partner who might have been at risk until an informed choice can be made. An uninfected woman who has a well grounded fear that a male partner has HIV infection must consider carefully whether to have penetrative intercourse; she should at least abstain from anal intercourse and always use condoms.

Like their male counterparts many HIV infected women abstain altogether from sexual intercourse. Those who continue and decide not to become pregnant may need two preventive measures: a condom to prevent transmission of HIV (and other organisms) and a further, more efficient, contraceptive. For preventing infection the condom is the mainstay[3]; its use, however, requires the cooperation of the male partner, who may be unreliable. Other barrier methods have not been investigated, but diaphragms may help to

prevent infection and Femshield, the new female condom, seems a promising development. All barrier methods should be used with a spermicide containing nonoxinol 9 as this chemical inactivates HIV—at least in vitro.[4]

In choosing a reliable method of contraception sterilisation seems the obvious solution. But for some this is unacceptable as the implication is that there is no hope of a cure for HIV infection. Intrauterine devices should probably be avoided because they carry an appreciable risk of pelvic infection. The usual choice is a combined contraceptive pill, but, given the irregular lifestyle of many intravenous drug users, compliance may be difficult and a long acting progestogen may be a better alternative.

The risk of an infected mother having an infected child is difficult to estimate: there are no simple markers for infection in the child, and the mother's infectivity may vary. Recent studies have suggested that between a quarter and just less than a half of babies born to infected mothers are themselves infected.[5,6] Most of these seem to be infected in utero.[7]

Thus, though the risk of pregnancy to the mother is still uncertain, the main indication for termination in an infected women is the risk to the child. Although some evidence suggests that breast feeding increases the risk of neonatal infection, this is probably small. Transmission through breast milk has been described in babies whose mothers became infected after delivery, but this may have occurred because of a short peak of infectivity just after infection.[8] In Third World countries the benefits of breast feeding outweigh the risks of HIV transmission, but in Western society we cannot be so sure.[9]

HIV infection predisposes to the development of some cancers, especially those thought to be caused by viruses. In women with HIV infection human papillomavirus infection and cervical dysplasia are frequent,[10,11] and as both of these are strongly linked with carcinoma of the cervix cervical dysplasia may be another tumour related to HIV. Women need to be aware of this hazard so that they can consider attending screening clinics.

AIDS has extended the debate on the patient's "right to know," and these issues challenge many aspects of the conventional doctor-patient relationship. As with other young people with long term illnesses, those with HIV infection usually want to know as much as possible about this and to be in control. The added dimension of pregnancy and childbirth means that a woman has an even greater need of information so that she can make informed choices.

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A century of cardiac pacing

Suggested from Aberdeen in the "BMJ" 100 years ago

Exactly 100 years ago this week John McWilliam, a professor from Aberdeen, suggested in the *BMJ* that repeated electrical stimulation might be used to maintain the heart rhythm in patients with bradycardia.[1] Some 70 years later Elmqvist and Senning first implanted a permanent pacemaker in man.[2] McWilliam's paper is a masterpiece.

John McWilliam. Reproduced by permission of Medtronic Incorporated

Mr Geoffrey Davies, inventor of one of the first permanent pacemakers (see p 349)

Stimulating the heart had been tried by various methods in McWilliam's era, and he was aware of the dangers: "The application of strong galvanic and faradic currents to the ventricles is attended with disastrous results: an immediate abolition of the normal beat, and the occurrence of a wildly incoordinated, arrhythmic contraction of the ventricular muscle (fibrillar contraction or heart-delerium), attended by a great and rapid fall in blood pressure, and, in the higher mammals (the dog at least) by speedy death." He recognised as well, however, that "in certain forms of cardiac arrest there appears to be a possibility of restoring by artificial means the rhythmic beat and tiding over a sudden and temporary danger."

McWilliam thus described a potential method of electrically stimulating the arrested heart: "We want a much more effective and speedy mode of exciting rhythmic contraction, and one that will have a direct and powerful influence in calling forth a series of beats in the depressed or inhibited heart, while at the same time free from the danger of throwing the ventricles into delerium. Such a mode of excitation seems to be available in the form of a periodic series of single induction shocks sent through the heart at approximately the normal rate of cardiac action. A single induction shock readily causes a beat in an inhibited heart, and a regular series of induction shocks (for example, sixty or seventy per minute) gives a regular series of heart beats at the same rate."

In his paper McWilliam described studies in anaesthetised cats in whom bradycardia and hypotension had been induced by direct vagal stimulation. The ventricle was paced by "a