Scientifically Speaking

Consensus development — amniocentesis

BARBARA J CULLITON, WALLACE K WATERFALL

British Medical Journal, 1979, **2**, 723-724

Washington DC—Amniocentesis is about to receive what amounts to the United States Government's seal of approval as a piece of medical technology that has come of age. A report to be issued next month by the National Institutes of Health (NIH) will affirm that midtrimester amniocentesis is no longer experimental; it is part of standard medical practice. The implications of that judgment, which will be part of the proceedings of an NIH Consensus Development Conference on Antenatal Diagnosis,* are far reaching. The government is taking the position that every pregnant woman who might benefit from amniocentesis should be offered it. Recent court rulings have taken the same line. At the same time, federal officials recognise the dilemma created by endorsing a technology that the United States simply is not prepared to deliver to large numbers of women. Under criteria set by an NIH panel, as many as 150 000-200 000 could be eligible for amniocentesis every year. Allowing for the fact that some women fail to seek care before the fifth month of pregnancy and that others, for personal or religious reasons, might not want amniocentesis even if it were offered, officials estimate that there might still be as many as 95 000 candidates for this antenatal diagnosis a year. If even a quarter of them were to ask for the procedure, they would overload a system that is already strained to capacity by the 15 000 midtrimester amniocenteses now performed annually.

Assessing medical technology

Somewhat reluctantly, a little over 18 months ago NIH moved into the business of "consensus development," prodded by congressional pressure to do something to validate medical technology as it enters widespread use. The conference on antenatal diagnosis held last spring is one of nearly two dozen that have been held to date at which authorities in medicine, law, ethics, and other disciplines meet to assess technology. NIH insists that it is neither setting standards nor regulating medicine, but one cannot ignore the potential effects of its statements. "Consensus building is sharply differentiated from regulation or arbitration in health care and research," an NIH official has written. Rather, "By clarifying the state of the art, laying out what is known and what is not known, the scientific community provides the base upon which others act."

The consensus conference on antenatal diagnosis dealt with three related topics: predictors of hereditary disease or congenital defects; predictors of fetal maturation; and predictors of fetal distress. In this month's column we will discuss the findings of the panel on predicting disease, and in a subsequent column will report on fetal maturity and fetal distress.

Michael M Kaback, professor of paediatrics and medicine at the University of California at Los Angeles, chaired the task force on predictors of hereditary disease or congenital defects, which based its conclusions on data from three major studies as well as on the experience and judgment of members of the consensus group. In a study sponsored in the United States by the National Institute of Child Health and Human Development, 1040 women undergoing midtrimester diagnostic amniocentesis were compared with 992 women in a control group matched for stage of gestation at entry into the study, maternal age, previous pregnancies, race, socioeconomic status, and other factors. The overall accuracy of prenatal diagnosis in that study, completed in 1974, was 99·4%. A comparable study, but one which did not match patients with appropriate controls, was conducted in Canada from January 1973 through February 1976. The Canadians monitored 1223 midtrimester amniocenteses and achieved an overall accuracy rate of 99·4%. In addition, according to the report, "The percentages of fetal losses (3·4%) and neonatal deaths (0·7%) were not significantly different in the amniocentesis group from the background provincial control data nor different from the American findings."

A third study—of 2428 women followed by researchers in the United Kingdom and completed in 1978—was also reviewed by the consensus panel. At first sight, the British data, which show a higher rate of fetal loss (2·6% compared with 1·1% in controls) and an apparent increase of certain abnormalities, raised concern. Nevertheless, when differences in the design of the studies are taken into account, differences in data among the three are minimised, leaving the conclusion that midtrimester amniocentesis is both safe and effective.

Antenatal diagnosis

Developments in tissue culture techniques, the successful cultivation of fetal cells from amniotic fluid, metabolic studies of human somatic cell systems, and the introduction of chromosome banding techniques each accomplishments of the past dozen or so years have contributed to the present state-of-the-art in antenatal diagnosis, in which it is possible now to identify some 75 metabolic disorders in utero. Chromosomal abnormalities are thoroughly detectable, and certain X-linked disorders may be approached by sex identification, although it is still not possible to tell a woman whether her male fetus does or does not carry the disease from which he is at risk.

For all that amniocentesis and subsequent cytogenetic or

*For further information, contact the Office of Public Information, National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Maryland, 20014, USA.

5026 Eskridge Terrace NW, Washington, DC, 20016, USA

BARBARA J CULLITON, AB, news editor of *Science*, the weekly journal of the American Association for the Advancement of Science

WALLACE K WATERFALL, AB, senior professional associate and director, Office of Communications, Institute of Medicine, National Academy of Sciences

chromosomal analysis can achieve, there is still much to be accomplished. For this reason, researchers and policymakers are sensitive to the dilemma they create by advocating extended use of an as-yet-imperfect technology that, at the present time, must be operated by experienced hands if present standards of safety and accuracy are to be maintained. Although there has been impressive growth in the number of centres in the United States, for instance, that can handle amniocentesis, the number of facilities is nowhere near enough. In 1970, there were 10 centres actively engaged in amniocentesis and related research. Today, there are about 125, yet their capabilities vary—as does the number of patients they can accommodate in any given year. Even the largest can handle no more than 1000 women. And problems exist with respect to the type of testing each can do. Of the 125 centres, according to the consensus report, "Perhaps a dozen are capable of performing quantitative alphafetoprotein determinations in the supernatant amniotic fluid [to detect neural tube defects]. With respect to the 75 detectable inborn metabolic errors, in most instances perhaps only one centre, or perhaps a few have developed the expertise necessary to conduct such determinations. Even for that metabolic disorder, Tay-Sachs disease, where the most widespread utilisation and technology exist today, only 10-15 US laboratories can perform the appropriate analyses with the highest level of accuracy. . . ."

All of this adds up to potentially serious medical and social problems. At present, there is no indication that thousands of women are going to begin demanding amniocentesis and yet, in theory, the government and the medical profession ought to encourage them to do just that. Furthermore, in a handful of recent court cases, judges have held physicians liable for failure to offer genetic counselling to women at risk because of maternal age or family history. As these decisions filter down through the practising obstetrics community, one might anticipate a new-found enthusiasm for amniocentesis among doctors who wish to protect not only their patients but also themselves. But if increased demand materialises, no one knows how it will be met. One thing is clear, however, and that is that the research community is not anxious to meet it. "As service demands increase, the ability of genetics groups to continue meaningful research is impaired," the NIH report notes. "The very individuals expected to devise newer and better techniques for prenatal diagnosis and make strides towards intrauterine therapy are becoming totally occupied with providing service."

In the absence of a real crisis, the government, already financially strained, is not about to step in, and third-party payers are not rushing forward to pay for services in a way that would stimulate the growth of facilities in the private, as opposed to the university-based research, sector. So, for the present, we'll just have to wait and see.

No reprints of this article will be available from the authors.

Cases in which the physician should discuss amniocentesis with his patient include:

Pregnancies in women 35 years of age or more

A previous pregnancy that has resulted in the birth of a chromosomally abnormal offspring

A known chromosomal abnormality in either parent

History of Down's syndrome or other chromosomal abnormality in the family

History of multiple (three or more) spontaneous abortions in this marriage or in a previous mating of either spouse

Previous birth of a child with multiple major malformations

Women with near relatives with Duchenne muscular dystrophy, severe haemophilia, or who are at risk of being carriers of other deleterious X-linked genes

Pregnancies at increased risk for fetal neural-tube defects

Couples at risk for detectable inborn errors of metabolism (X-linked or autosomal recessive)

STRANGE ENCOUNTERS

Post mortem—film producers in the mortuary

In over 20 years in departments in which some hundreds of PMs are done every year, I have known several occasions on which facilities to film a PM have been asked for—even demanded—in connection with the preparation of a documentary or fictional programme intended for public showing. Some of these approaches were made to pathologists, some to members of the technical staff, some to doctors in other departments of the hospitals, and at least one to a hospital's administrative department.

The doctors and technicians regularly declined to be talked into concessions to the film producers. In most instances, the discussions that took place with the latter were sensible and pleasant, and refusal was accepted in good part and with understanding. Once, a minor politician peremptorily required me, through his secretary, to change my mind; the filming organisation had an office in his constituency and he had been in touch with the head of my hospital's management board, a layman with limited understanding of the importance of ethics in medical life.

After one producer had telephoned for permission to film in the PM room, and been refused, he had his assistant take more direct steps. The assistant had picked up enough information about the practices of pathologists in some hospitals to know that there are occasions when a mortuary technician may make the preliminary dissection by which the body cavities are opened. This led him to suggest to the technician in our mortuary that if filming were done on such an occasion no one else would need to know about it. He fared no better than his boss.

One young woman who wanted facilities for filming a PM said that she needed no more than to record the "opening of the body" and the removal of the brain and eyes. It seemed that her company was planning a modernised account of the man-made man theme. She asked if there was any way, perhaps electrical, of making the heart start to beat after it was exposed within the chest: if not, she added, they could always "edit in" a suitably filtered sequence of frames from a film of heart surgery. I asked how her studio had got hold of the surgical film: she was reticent, but hinted at purchase from a cleaner who swept the editing room of a hospital film unit.

The producer who came nearest to gaining his object was the one who got in touch with the administration department of a hospital. One of the administrators, without reference to the pathologists, arranged for the producer to bring his lighting and camera crews to the PM room on a morning when the senior technician would be away and a recently appointed assistant mortuary attendant in charge.

The administrator, whose only motive was to keep the hospital's name before the public, made two slips. It had not occurred to him that a newly appointed technician would put loyalty to the department in which he worked before obedience to a senior member of the administrative staff: the technician refused to allow the strangers, including the administrator, into the mortuary without the pathologists' consent. The administrator's other mistake was to be ignorant of what goes on in a PM room. He did not know that the performance of a PM is the pathologist's responsibility: he had not considered the possibility that a technician would not "do a PM." The visitors were explicitly angry and talked of broken contracts and of consulting their lawyers. They left promptly enough when a pathologist, called to the scene by the technician, made it clear that if they lingered their presence would be referred not to lawyers but to the law.—WILL MACREDIE.