

At the time of our original study of chromosomes in abortuses in London, Ontario, oral contraceptives were used rarely. We checked the history of contraceptive use in a large number of the patients.

Results of special study

Early in 1966 we decided to compare our results from an unselected series of abortions with ones falling in special categories. One of the categories of particular interest to us was; spontaneous abortions from women who became pregnant within 6 months of discontinuing oral contraceptives. The results of the study of 54 abortuses in this category are summarized in Table 1 and compared with the unselected series described above.

The percentage of abnormal specimens in the unselected and post-oral-contraceptive groups was 22 and 48 respectively. However, it is not the overall difference in the percentage of abnormalities which is most striking. Much more important is the breakdown in the types of abnormalities in the two groups. The percentage of specimens with one extra chromosome or one chromosome missing is identical in the two studies. On the other hand, there is a 4½ fold increase in the incidence of triploid abortuses from women who lost pregnancies which were conceived within 6 months of ceasing oral contraceptives. The number of cases with 92 chromosomes and those with a mixture of normal and abnormal cells is too small for analysis. Comments, therefore, will be restricted to the incidence of triploidy.

The number of specimens in the group from women who were on "the pill" is about ¼ the size of the unselected group. The total of 54 may seem small. However, it is in fact very large in statistical terms. The increase in triploidy in the abortuses from women who had been on the pill is so great that there is less than one chance in 10,000 that it could have occurred by accident. We have carefully compared the women in the two categories and there is no difference in relation to their average age or their previous fertility. There appears to be no difference in the two groups except the recent history of the use of oral contraceptives in the group so selected.

DISCUSSION

It is true that the unselected and "post-oral-contraception" miscarriages were studied in two different cities. The latter study was commenced in London, Ontario but most of the specimens were collected and analysed in Hamilton, Ontario. However, the trend of abnormalities was already apparent when the study started in London and the two cities are only 80 miles apart. The types of abnormality, other than triploidy, those with 45 and with 47 chromosomes, were identical in the two groups. This supports the view that the two populations were similar.

There is no published evidence that estrogens or progestogens in oral contraceptives have any direct effect on chromosomes or on cell division. Triploidy is really an abnormality of fertilization rather than a chromosome disorder. It is due to some failure of the normal mechanism which ensures that only two germ cells unite to form the embryo.

It is reassuring that the only type of abnormality which was increased in the abortuses from women who had been on the pill, is almost always lethal before the embryo reaches 3 months of development. One must balance this increased risk of a lethal anomaly (triploidy) against another possible indirect effect of oral contraceptives. It is known that abnormalities of infants are commoner in of a lethal anomaly (triploidy) against another possible indirect effect of oral contraceptives. It is known that abnormalities of infants are commoner in children born to women over 40 years of age. With the availability of highly effective birth control agents, it seems likely that families will be terminated earlier. A reduction in the mean maternal age at birth for all children has been shown to be correlated with a decline in the incidence of Down's syndrome in Britain and Australia (2). This same result could be a byproduct of the widespread use of oral contraceptives in North America. In other words, a side effect of the use of oral contraceptives could be a reduction in the incidence of birth defects.

CONCLUSIONS

As a research scientist, interested primarily in human welfare and well-being, I have considered carefully the implications of the findings reported here. The clear increase in one type of abnormality which leads to abortion is of some importance because miscarriage can be a traumatic experience for some women.