INTERIM REPORT

CONGENITAL ABNORMALITIES—IN RETROSPECT

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Twenty years have now passed since Sir Norman Gregg (1941) first drew attention to the connection between rubella in the pregnant woman and the production of congenital abnormalities. In his own practice in Sydney in the early part of 1941 he found that thirteen babies had been born with lenticular opacities which differed in detail from any previously described congenital cataract. On enquiry amongst his colleagues in Australia, he found a total of 78 patients with this defect, and of these 44 had an associated defect of the heart which was of the acyanotic type and frequently was due to patent ductus arteriosus. In trying to find a cause for this sequence of events Gregg realized that the early stages of the pregnancies of the mothers coincided with an epidemic of rubella which had been rife in Australia in 1940, and on further enquiry it was discovered that the vast majority of these mothers did in fact have rubella during the first trimester. In a later paper he (Gregg, 1956) discussed the abnormalities in greater detail and by this time it had been realized that deafness was another of the common results due to maternal rubella. He noted that the earlier in pregnancy the infection occurred the more likely was the eye to be affected with the risk diminishing rapidly during the third month. The heart was also vulnerable during the early months and the ear particularly during the second and third months.

Various estimations of the risk to the baby following rubella in early pregnancy have been made and for numerous reasons there have been fairly wide discrepancies, but it appears likely that if the attack occurs within the first four weeks the risk is in the region of 50 per cent and thereafter diminishes until the fourteenth week when there would appear to be little risk.

Gregg's initial paper gave great impetus to research into the environmental factors associated with congenital defects which had previously been thought in the main to be genetically determined Not only did research workers try to find other maternal infections which may cause these abnormalities but work has been done on the epidemiology of defects to try to give pointers to their aetiology. The seasonal and regional variations of some abnormalities have been investigated.

Using the reports of the Registrar General for Scotland where data concerning still-births has been available since 1939, Edwards

(1958) studied congenital malformations of the nervous system and reported that there was a marked seasonal variation in the incidence of anencephalus, the incidence being 30 per cent higher in winter than in summer. This did not apply to hydrocephaly nor to spina bifida. There were regional variations in the incidence of each of these three defects.

Record and McKeown (1953) reported a marked seasonal fluctuation in the number of girls suffering from patent ductus arteriosus, but the number of boys affected was fairly constant throughout the year. This seasonal variation was unrelated to the incidence of rubella, and they noted that rubella was not normally associated with the aetiology of patent ductus arteriosus unless the latter was complicated by other defects, e.g., cataract and deafness. Regarding the seasonal incidence of patent ductus arteriosus an analysis of 261 cases by Polani and Campbell (1960) tended to confirm the findings of Record and McKeown.

There is also evidence that there is an increased frequency of congenital dislocation of the hip in winter; Record and Edwards (1958) have suggested that this may be due to the mechanical effect of the pressure of clothing on the child.

An epidemiological study in Northamptonshire by Pleydell (1960) showed that the incidence of anencephaly in the urban districts was twice that in the rural districts, and he suggested that the association between this defect and social class, season, density of population, and the grouping of births, was best explained on the basis of an infectious agent.

In a survey sponsored by the Research Committee of the Council of the College of General Practitioners, over 1,300 members and associates replied giving details, including the dates and places of birth, of almost 10,000 children born or still-born with congenital defects. This information is now being coded for analysis and should allow us to study the seasonal variations of all the common congenital abnormalities.

The cause of seasonal variation in any single congenital abnormality could be multifactorial, but one environmental factor which must be considered in view of the knowledge concerning rubella is the health of the mother, particularly in early pregnancy as it is probable that teratogenic activity is greatest at this time.

Many surveys have been conducted but so far, apart from rubella and possibly toxoplasmosis, there is no definite evidence that any infectious agent can be incriminated at any rate sufficiently to give rise to concern although influenza, measles, and poliomyelitis have each been suspected. One feature which has hampered this

research is the fact that most of the surveys have been retrospective. It is notoriously difficult for a mother after the birth of the child to remember in detail illnesses, most of which may be minor, during the early months of her pregnancy and if she has given birth to a malformed infant there is a particularly large element of bias.

Bradford Hill *et al.* (1958) conducted a prospective enquiry using an ingenious method involving National Insurance certificates and maternity claim forms. They concluded that there was no evidence that mumps, measles, or chicken pox are connected with the production of congenital abnormalities.

In another prospective study McDonald (1958) noted that although there were no infants with major defects born to any of the few women in her series who had had a specific infectious disease, there had been a statistically significant excess of acute febrile illnesses, mostly involving the upper respiratory tract, in mothers of infants with major defects.

Collectively, general practitioners appear to be ideally suited for this type of research. The family doctor usually sees his patient early in pregnancy at a time when her memory for recent events, including minor illness, is clear. He may even have a note of some febrile illness which the patient had in the first weeks of pregnancy before she realized that she was pregnant. He knows whether she aborts and, if not, he can follow the course of her pregnancy. After the birth, he usually has an opportunity to examine the baby and can observe it during its first few years when some defects, not obvious shortly after birth, first reveal themselves. If enough general practitioners participate in the Survey of Febrile Illness in Pregnancy evidence could be produced on a more-than-adequate scale. For this reason steps will shortly be taken to try to increase the number of returns being made by members and associates of the College to the Director of the Epidemic Observation Unit.

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