BACKGROUND OF CONGENITAL SYPHILIS*†

BY

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The study of the medico-social aspect of disease, especially true of congenital syphilis, is relatively new in this country, as is shown by the scanty literature on the subject. This might be explained by the need in research of this nature for comprehensive clinical material and for experienced medical staff interested in the problem collaborating with trained and observant social workers.

In undertaking this research, which was begun in 1949, we were conscious that within the clinic we had valuable material and resources. We would stress particularly our advantage in having available full-time medical and social staff who knew patients individually and could allow those who wished to unburden themselves to chat for a few minutes, whilst allowing those who preferred to do so to pass through quickly. It seems that this individual contact helps in preventing default and is, at the same time, an invaluable source of information. Continuity is essential when default or research work is involved. Full social and default records have been kept for many years and these have been consulted for this survey.

Moreover, our area, Tyneside and adjacent districts in which approximately one million people live, can be claimed to be a representative one, as it varies from seaports to cities with heavy industries and to urban and rural districts with coal-mining centres.

Field of Investigation

Selection.—Of 317 families with one or more congenital syphilitic patients attending this clinic 200, which contained 254 members with congenital infections (200 original patients and 54 siblings), were selected for investigation. The 117 omitted consisted of 86 who were rejected and 31 who refused to cooperate. The rejections were due to insufficient information (61), to infirmities, such as deafness or low mentality (thirteen), or to family problems (twelve).

* Received for publication August 15, 1955.

† An abstract from the Report on a comprehensive medico-social survey of 200 congenital syphilitic patients and their families.

Mode of Referral.—The largest number of patients, 98 (49 per cent.), were referred from other hospitals, 48 (24 per cent.) were referred by their own doctors, 35 (17.5 per cent.) were discovered through the follow-up of parents attending the clinic, ten (8 per cent. of women) came from antenatal clinics, and nine (4.5 per cent.) from various other sources.

Sex Ratio.—The sex incidence of the 200 original patients was 77 males and 123 females, giving a ratio of 2:3 which also applies to all congenitally infected at present attending the clinic and, further, to those with congenital syphilis (153 males and 219 females) registering for the first time during the decade 1943–1952.

Age Groups and Sex.—The 200 patients were divided into age groups when they first attended the clinic (Table I). Altogether 25 per cent. had received some treatment in the first 5 years of life, but a further 25 per cent. did not attend until after 21 years of age.

The age groups in Tables I and II are not as given in the Ministry of Health's Annual Return; the patients

TABLE I
AGE AT WHICH THE ORIGINAL PATIENTS (200) FIRST ATTENDED CLINIC

Age Group (yrs)	Male		Female		Total	
	No.	Per Cent.	No.	Per Cent.	No.	Per Cent.
Under 5 ..	19	24.6	31	25.2	50	25.0
5–15 ..	30	39.0	35	28.4	65	32.5
16–20 ..	14	18.2	21	17.1	35	17.5
21 and over ..	14	18.2	36	29.3	50	25.0
Total ..	77	100.0	123	100.0	200	100.0

TABLE II
AGE OF THE ORIGINAL PATIENTS (200) AT TIME OF SURVEY

Age Group (yrs)	Male		Female		Total	
	No.	Per Cent.	No.	Per Cent.	No.	Per Cent.
Under 5 ..	6	7.8	12	9.8	18	9.0
5–15 ..	24	31.2	24	19.5	48	24.0
16–20 ..	12	15.6	17	13.8	29	14.5
21 and over ..	35	45.4	70	56.9	105	52.5
Total ..	77	100.0	123	100.0	200	100.0

are separated into pre-school and school age, adolescence, and adulthood.

It will be noticed that at the time of survey more than half the patients were over 21 years of age (Table II). This was of importance socially as it made it possible to follow their history over a longer period.

Results of Investigation

Medical.—Initially, 39 (19.5 per cent.) of the patients were found to have latent syphilis, later eight of them developed symptoms; infantile syphilis was noted in 28 (14 per cent.), and tardive syphilis in 172 (86 per cent.).

Of the various clinical manifestations, ocular lesions were the commonest and occurred in 105 (61 per cent.) of those patients with tardive syphilis. Interstitial keratitis was found in 96 (55.8 per cent.), the average age at onset being between 17 and 18 years and the relapse rate 14 per cent. It is interesting to note that two patients had Charcot joints, a third was found to have Von Gies joints (both knees), and another showed evidence of cardiovascular syphilis. Stigmata were found in 69 (40 per cent.) patients, of whom fifty had dental abnormalities; Hutchinsonian teeth were the most common, and occurred in 49 patients.

Nine patients (4.5 per cent.) presented a negative or doubtful serological result on initial attendance. Cerebrospinal fluid was "positive" in sixteen patients, of whom five had latent syphilis; a finding which illustrates the need for routine cerebrospinal fluid investigations.

Social.—The incidence of illegitimacy of all children in the 200 families (46 out of 831) was 5.5 per cent. and was comparable with the rate for England and Wales in 1952 (4.8 per cent.); for Tyneside it was 4.1 per cent., from which it would seem that our rate was noticeably higher. On the other hand, in 1946 the rate for England and Wales was 6.7 per cent., whilst in 1936 it was 4.1 per cent. Spence, Walton, Miller, and Court (1954), investigating a thousand families in Newcastle-upon-Tyne, found the incidence of illegitimacy to be 5.87 per cent., a slightly higher figure than ours. Within the families, the burden of illegitimacy has fallen upon the children with congenital syphilis; 24 (9.4 per cent.) of the 254 were illegitimate whereas only 22 (3.8 per cent.) of the 577 non-infected members of those families were illegitimate, so that the rate for the congenital syphilitic children was more than double that of their non-infected brothers and sisters.

The following facts were noted, but their significance could not be assessed because no comparable statistics for the community could be found.

Poverty.—Thirty-four families (17 per cent.) were impoverished during the childhood of our patients, that is to say, the parents, through a low income or poor management or both, were unable to feed or clothe their children adequately. While 34 were poorly clothed, only 29 were also poorly nourished. It would appear that, in time of difficulty, clothing is sacrificed before nourishment for the children.

General Health.—Seventy (39 per cent.) children were absent from school for long periods, chiefly because of ill-health, and in 32 (46 per cent.) this absence was directly caused by various manifestations of congenital syphilis.

Employment.—Of the 125 (47 male, 78 female) patients over school age, 43 women were engaged in home duties. The majority of the remaining 82 patients, despite handicaps (mainly physical), were able to earn their livelihood. Seven were in subsidized employment of various kinds, and eight were medically unfit for work. Poor employment history was associated with bad home conditions or with the deprivation of parental care rather than with health factors in 29 (35 per cent.).

Marital Status.—Of the 72 marriages made by our patients, five had terminated in separation or divorce. Fully half of the married patients had no separate homes of their own, but this factor was not closely associated with unhappiness in marriage.

The marital status of the parents fluctuated; at the time of the survey there were seventeen broken homes, fifteen due to separation and two to divorce. Few of the separations were legal and few women received maintenance from their husbands. In four instances the separation was from a stepfather, our patient having been born of an illicit union.

Housing.—We took as a standard of overcrowding the presence of more than two persons per room, excluding scullery and bathroom. By this standard our incidence of 9 per cent. (17 families) compared favourably with that in a survey conducted in our area by Spence and others (1954), whose figure was 19.5 per cent., and was only slightly worse than that of Oxford (7.2 per cent.). It was impossible to say whether overcrowding had any bearing upon congenital syphilis as we had no information about housing conditions at the time when our patients were born.

Conduct.—There was no evidence of over-indulgence in drink or of any promiscuous behaviour among our patients. It is possible that this abstemiousness is due in part, at least, to the negative attitude to life of many congenitally syphilitic patients.

At least fourteen (7 per cent.) of the mothers were promiscuous, but there was insufficient information to draw any conclusions about the fathers, of whom twenty were unknown. It was found that sixteen (14 per cent.) of the mothers and 33 (45 per cent.) of the fathers were heavy drinkers.

Child Care.—One in four of our patients was unhappy in childhood; as might be expected, they came from bad homes or were deprived of parental care. Ten per

cent. suffered from neglect, by the mother or the father or both; eight mothers (4.8 per cent.) and two fathers (1.4 per cent.) had actually been prosecuted for neglect.

Thirty of the 54 infected siblings were found through the follow-up of family contacts, thus making a total of 65 (25.6 per cent.) patients with congenital syphilis who were found in this way. Almost half of the siblings had latent syphilis and none had a negative serology.

Cooperation of Patients.—Of 176 patients who had completed treatment, 84 (47.7 per cent.) did so in the prescribed period. As might be expected, the longer the course of treatment, the greater the default rate. Of the patients who were under 21 years of age and who were either chronic or complete defaulters, 47 (30 per cent.) reflected their parents' lack of cooperation. On reaching adulthood, the prospect of cooperation improved significantly. Fifty of the patients who had defaulted returned after a lapse of years, those with fresh symptoms cooperating better than those who returned for other reasons. When the complete record of attendance during both treatment and surveillance was reviewed, the cooperation of one-third of the patients was excellent, and of another third satisfactory.

Search for a Pattern

Five attempts were made to search for a possible medico-social pattern. The first attempt was based upon the social class of the family. The classification used was that which was made for the 1951 Census (General Register Office, 1951), the family being classed according to the occupation of the breadwinner. The second attempt was based on a comparison between the original patients who had been deprived of parental care and the remainder as a control. From the medical standpoint, the following investigations were carried out:

- (1) *On Original Patient:*
 - (a) Age at initial attendance;
 - (b) Incidence of clinical or latent congenital syphilis.
- (2) *On Families:*
 - (a) Multiplicity of congenital syphilis;
 - (b) Total infected persons in family.

In neither of these attempts was any significant difference noted in any of the medical investigations.

The social investigations according to class revealed the handicap of congenital syphilis when the patients were compared with their non-infected siblings. For example, a greater proportion of the congenital syphilitics who were employed were engaged in less-skilled work than their fathers and a much higher percentage were in the lower social

classes, whereas the non-infected were not only in the higher social classes, but also a larger percentage had risen into more skilled occupations than their fathers.

The patients deprived of parental care showed a definitely inferior social pattern. This was especially noticeable in illegitimacy, unhappiness in childhood, forced marriage, and occupational habits. They appeared to suffer chiefly in their adjustment to life, in that they tended to be unhappy and unable to form good relationships with others.

In the subsequent attempts both medical and social backgrounds were investigated, the medical from the points of view of syphilis and general health, and the social according to the history of the patient and the parents. The adverse factors were summed up and the patients were placed into the following categories:

- O = nil adverse,
- A = severely adverse,
- B = moderately adverse.

From the above summation, the patients were grouped as follows:

- (1) No adverse factors at all (O), four (2 per cent.) patients;
- (2) At least one factor moderately adverse (B), 39 (19.5 per cent.) patients;
- (3) At least two factors moderately adverse (BB), 48 (24 per cent.) patients;
- (4) At least one factor severely and one moderately adverse (AB) 77 (38.5 per cent.) patients;
- (5) At least two factors severely adverse (AA), 32 (16 per cent.) patients.

Only fourteen patients (four with OOOO, nine with BBBB, and one with AAAA) had identical coding throughout all four sections.

Because of markedly adverse social factors in their personal history, 34 patients were placed in Category A, but their medical history did not show correspondingly unfavourable results when they were compared with the remainder of the 200 patients.

Twenty-seven patients were selected because of their severe functional handicaps, which were caused either by congenital syphilis or by other diseases, and their social background was compared with that of the remaining 173 patients. Among them a correlation was noted between their medical and their social history, as was seen in poor nourishment and interrupted schooling in childhood, and in unemployment and marriage problems in adulthood. It is probable that these adverse findings would have been revealed in the consideration of any patients with severe functional handicaps, but there were

other social problems which seemed specially related to congenital syphilis, shown by the higher incidence of illegitimacy and the notably smaller proportion who came from good homes.

Recommendations for the Prevention of Congenital Syphilis

The burden of congenital syphilis falls upon the patient, upon his family, and also upon society. The present survey was undertaken not merely to gain information but also in the hope of finding a means of eliminating this disease, and we venture to put forward the following suggestions which occurred to us in the course of reviewing the results of the investigation.

Routine serological testing of both parties before marriage would prevent much unhappiness and reduce the incidence of congenital syphilis. Blood tests could be taken by the family doctor where possible, but equally well at any hospital department other than the Venereal Diseases clinic. Regional laboratories should undertake the complement-fixation and flocculation tests and, where necessary, confirmation of their reports should be sought from the Venereal Diseases Reference Laboratory which uses the treponemal immobilization test. We feel, from experience, that the interpretation of positive or doubtful findings should rest with the syphilologist.

The absolute necessity for serological testing of every woman in every pregnancy, and not merely the first, is clearly shown in the following investigation of the pregnancy history of the 200 mothers which revealed these significant and disturbing facts :

- (1) 130 (65 per cent.) women gave birth to their first syphilitic child after the first pregnancy, 39 (19.5 per cent.) at the fifth or later pregnancy ;
- (2) 46 (23 per cent.) mothers had given birth to more than one syphilitic child.

Over the past 5 years, the proportion of women undergoing antenatal serological tests in this area has varied between 54 and 46 per cent., with an annual average of 50.3 per cent. It is disquieting to note that the tendency during the last 3 years has been for the incidence to decline.

In our local laboratories during the period of this survey, 97,568 blood specimens from blood donors and pregnant women were examined. Of 460 (0.47 per cent.) found to be "positive", 250 (0.25 per cent.) were eventually found to have syphilis.

To institute a practice of routine blood-testing would require the cooperation of doctors, nurses, midwives (particularly), and patients, and they would all need to be impressed by the value of such

tests. The argument in favour of serological testing is strong, but it depends upon the provision of adequate laboratory facilities and suitable premises, preferably polyclinics or general medical out-patient departments, where these patients can be examined and, if need be, treated.

The problem of diagnosis in expectant mothers and their infected children is emphasized by the high proportion in our series who had latent syphilis (65 per cent. of the mothers examined, and 19.5 per cent. of the original patients). In the majority of expectant mothers who have syphilis, clinical manifestations are absent or, if present, atypical. Similarly, the history of apparently healthy children which many of these women give cannot be accepted without question : all members of the family must be investigated.

Another danger is that the administration of penicillin for other conditions may temporarily conceal the presence of syphilis in a patient. Having noted the anxiety and perplexity arising therefrom, we do not support the view that penicillin treatment, relatively non-toxic though it may be, should be given to the majority of expectant mothers presenting a doubtful serology. Similarly, we would record our disapproval of the administration of this drug "just to be on the safe side" to the healthy infant of a treated mother or one whose doubtful serology could not be fully investigated before term. A careful serological study, especially if it includes the treponemal immobilization test, should solve the problem, providing we remember that the maternal immobilizing antibodies may persist in the infant's blood until the fourth and even the sixth month of life (Miller, Slatkin, Brodey, Wechsler, and Hill, 1954).

Serological and radiological investigations are especially important in infantile congenital syphilis, as obvious signs of the disease may not be evident at this stage. It is, however, necessary to stress that one positive Wassermann result is insufficient basis for a diagnosis of congenital syphilis to be made in an apparently healthy child, and that the cord blood test result may also be misleading. Similarly, it has to be remembered that occasionally an initially negative or doubtful serology is compatible with the presence of syphilis.

In the absence of corroborative clinical evidence or a definite family history, a patient's infection cannot be classed as "congenital". Subsequent findings, *e.g.*, through family follow-up by the social department, may establish that the patient was actually born with the disease.

It cannot be too strongly urged that the sooner congenital syphilis is diagnosed the better. In only

14 per cent. of our patients was the disease detected in infancy. In searching for congenital syphilis it is not wise to concentrate solely on any one age group; in this series, 25 per cent. were over the age of 21 years when they first attended.

Patients come to our clinic from many sources, *e.g.*, ophthalmologists, orthopaedic surgeons, general practitioners, antenatal clinics, etc. Diagnostically speaking, it would seem that there is a need for raising the index of suspicion in the medical and dental professions. Fifty of our 200 patients had dental abnormalities, 49 of them having Hutchinsonian teeth, but none was referred by dentists. Many persons hesitate to seek dental care, but it might be expected that such abnormalities would be revealed in schoolchildren undergoing routine dental examination. Bertram (1950) and Beecher, McIntosh, and McCart (1951) found that of dental abnormalities suspected, in the course of school medical inspections, to be due to syphilis, 24.5 per cent. and 32 per cent. respectively were, in fact, due to this disease.

In attempting to eradicate congenital syphilis from the population it is obvious that the first need is the adequate treatment of all patients with early syphilis. The efficacy of antisyphilitic treatment is such that congenital syphilis could be eliminated. Modern therapy is well-nigh non-toxic, it is reliable, and its relative safety enables it to be strongly advocated. In this department, the concomitant administration of penicillin and bismuth is preferred because

(a) there is reason to believe that penicillin alone may not always be completely successful, especially in late pregnancy if the infection is virulent,

(b) the therapeutic penicillin blood level is not invariably demonstrated.

This reservation is made because of our experience in a series of twelve male patients who were submitted to the same dose of a "delayed-action" penicillin; one of them failed to give an adequate penicillin blood level even when, after suitable intervals, three other proprietary preparations were used.

To be effective, treatment can only be reckoned "adequate" if attendance is regular, and this involves cooperation on the part of the patients and their parents. We were fortunate in that the majority of our patients cooperated well, but the small number of defaulters presented a difficult problem. In early life, the child's cooperation is a reflection of that of the parents. There would be considerably less default if the parents could be made to understand the necessity for regular treatment. The shortened therapy practised in modern times has made it easier for patients to attend regularly during

the whole course. The attainment of adulthood and a more responsible attitude to life, coupled with a knowledge of the nature of the disease from which they are suffering has, in our experience, made for markedly better cooperation.

The transfer of a patient from one clinic to another does sometimes cause default, even amongst those who have previously attended well. It is felt that if an extract of the patient's case record (V.15) were sent direct to the medical officer of the new clinic, and a report on the social conditions to the almoner, the patient would be recognized on his arrival and made to feel at ease; should he fail to report, his absence would be noted and he could be written to or visited.

The adult patient who is mentally capable of understanding the truth has a right to know the nature of the disease from which he is suffering; it is belittling his intelligence to expect him to attend for years without knowing why this is necessary. There are, however, many points to be considered before a decision on what he should be told, and when, is reached. First of all there is the parental background—disharmony might be caused in an otherwise happy home if the information is given too bluntly. It is well that it should be known whether the parents are alive or dead. If either or both are living and have shown themselves cooperative, their feelings in this matter should be respected, but it may be necessary to override their wishes if they have been obstructive or neglectful. Should the parents have died before the need to tell the patient arises, the problem is somewhat simpler—clearly, it is very desirable that his respect for his parents should not be lessened, but at least the danger of his making some unwise remark at home no longer exists.

In this department, if a patient has reached the age of 21 years or is about to get married, the medical officer is given full information by the almoner about the home background and then he decides how much of the truth should be told. He will tell the patient he has syphilis, but may withhold the fact that it has been inherited and merely say that it might have been caused by accidental infection in childhood. That the disease has been contracted innocently must in every case be impressed upon the patient.

Of the 98 patients in our series who were told the truth, eighty apparently took it well, seven appeared indifferent and perhaps did not realize the implications, seven took it badly and have been worried ever since, and four were definitely embittered. From experience, it was found that patients who had not been told the truth by us were exposed to the grave danger of learning it from undesirable sources.

The results of this investigation convinced us of the need for polyclinic treatment of congenital syphilis, and this is now given in the out-patient department of this hospital. Here, mothers receive treatment with their children, women with doubtful antenatal serology are investigated, as also are the family contacts of infected patients. It is a great help to be able to direct patients to a clinic that is not associated solely with the diagnosis and treatment of venereal disease, since many of them would be ashamed to be seen entering such a place.

Our results show the urgent need for testing all members of the family of a patient suffering from congenital syphilis, and those children of a syphilitic mother born subsequent to her infection. Almost half (254) of 534 contacts examined were proved to have syphilis, and a quarter of the 254 congenital syphilitics were discovered through these routine examinations. In this sphere the family doctor can

play a most helpful part ; he, more than any other medical practitioner, can take the blood specimens without arousing suspicion.

We would place on record our thanks to the Newcastle-upon-Tyne Regional Hospital Board for financial aid which made this research work possible, and to the Printing Section, Department of Photography, King's College, Newcastle-upon-Tyne, for the printing of the complete paper.

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