A Clinical Lecture

ON THE

COMPLICATIONS OF SCARLET FEVER.

DELIVERED AT CHARING CROSS HOSPITAL.

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GENTLEMEN,—The cases to which I have to draw your attention to-day from the wards of the London Fever Hospital illustrate the features, and especially the complications, of scarlet fever. The disease is one, as you know, of very varying intensity—sometimes so mild that, but for the slight initial rash and the subsequent desquamation, it would almost pass unnoticed; sometimes among the severest of diseases in virtue of its own virulence, or still more of the complications to which it gives rise. It is usual to recognize three types of the disease, the mild or scarlatina benigna; a more severe type complicated with angina and glandular enlargement, scarlatina anginosa; and a third severe type, scarlatina maligna. If all cases of scarlet fever could be grouped under these three headings, prognosis would be a comparatively simple matter. But even a brief experience of scarlet fever soon brings out the fact that such a grouping is at the best but a rough one, and affords no help in the study of the individual case. The chief problem which the disease presents is to explain why a case originally of the mildest character may be subject to the severest complications, and why a severe case may run an uninterrupted course to recovery. In other words, the problem that scarlet fever presents is not the incidence of complications in a certain group of cases, but the incidence of complications in the individual case—Why in one case, with everything in its favour apparently we have the severest of complications occurring, ending perhaps, fatally; and why in another, which was very severe at the outset, the course should be of the most benign character.

First of all with regard to scarlet fever generally and its features, let me recall to you briefly what they are. Scarlet fever, as you know, is a fever which is characterized by sore throat, more or less adenitis, a specific rash, a specific desquamation, and a specific course, lasting usually for six weeks. The mode of onset is usually with sore throat, headache and vomiting, those occurring in about 85 per cent. of the cases. Sore throat is the commonest of these symptoms, headache the next. In addition to these specific symptoms, some cases present rigors and diarrhoea, a few have pain in the limbs, and a few present epistaxis.

THE RASH: DESQUAMATION.

I have here records showing the time of appearance of the rash in my last series of cases (150). The rash appears in half the cases on the second day. In 80 per cent. of the cases the rash appears on the first three days of the illness. The rash lasts about six days in over one-third of the cases, and in over half of the cases it lasts either five or six days. As regards the desquamation, during the first week the commonest place for desquamation to begin is at the root of the neck, and it usually begins there during the first week—that is to say, between the fourth and eighth days of the rash. Exceptionally it may begin in this region as late as the eighteenth day. On the fingers, in more than half the cases it appears between the ninth and twelfth days; in three-fourths of the cases it appears there between the ninth and the fourteenth, but it may appear even here as early as the fifth or as late as the twenty-second day. In the toes and feet it may appear late—that is to say, in nearly half the cases it commenced between the tenth and fifteenth day of the rash. It was exceptional for it to appear here before the tenth day. It was never observed there before the seventh day. In nearly half the cases it appears from the sixteenth to the thirty-first days—that is to say, on any of those days. Those are the features with regard to the rash and its onset.

LYMPHATIC GLANDS.

Now I want to mention the condition of the glands on admission. That is an important matter for this reason: it is in connexion with the glands that the chief complications occur. A slight degree of adenitis is present in nearly all cases, and an interesting point has been to ascertain what is the relation of this initial adenitis to the secondary adenitis which occurs as a complication. I have therefore analysed my cases to ascertain the relation of the initial clinical features to the subsequent complications of the disease.

COMPLICATIONS.

What are these complications? They are, in the first instance, adenitis, which occurs in very varying proportion. In this series it appeared in 19 per cent.* Albuminuria of two or more days' duration occurred in 21 per cent., and actual nephritis in 2.8 per cent., otorrhoea and otitis in 6.4 per cent., rhinitis and rhinorrhoea in 6.4 per cent., rheumatism in 4.3 per cent., secondary tonsillitis in 3.5 per cent. And in certain cases we get mastoiditis. I have also had as complications in my cases meningitis, optic neuritis, and ocular palsies. Those are the chief ones, ending up lastly with the severest form of all—septicaemia, to which nearly all the deaths in my cases were due. Our mortality at the London Fever Hospital for the last year has been 0.8, which compares, I believe, with an average mortality of some 3 per cent. in other Fever Hospitals.

FACTORS DETERMINING THE SEVERITY OF COMPLICATIONS.

As I have said, there is no disease about which we have more facts than scarlet fever. The percentages of the complications and all the other facts relating to it can be expressed in figures drawn from thousands of cases. But none of these really throw light on the incidence and severity of the complications in the individual case. I have, therefore, in the last two or three years given considerable study to this matter, that is to say, the factors which determine the severity of complications in individual cases.

To facilitate this study I have devised a graphic chart showing the whole of the features of every case on the front page. I have found it a great source of satisfaction in studying my cases, because every fact is plainly set forth, and can be related to every other, and I do not require to look at the back of the sheet in order to get further information about the history or the course of the disease, or the food the patient is getting. This chart is not only useful in scarlet fever, but you will find it an admirable chart for private cases generally. These are just the notes which I think you want to have before you to guide your treatment.

Let me describe a case of scarlet fever that illustrates the severity of these complications: A child, aged 6, was admitted with a mild attack of scarlet fever, with moderate rash, mild throat affection, and mild adenitis. The only other feature noticed was a slight nasal discharge. The course of the case was mild up to the seventh day. Then the temperature rose corresponding to the onset of slight adenitis. On the twenty-second day there was slight rheumatism in the wrists. On the twenty-fifth there was a marked attack of tonsillitis and pharyngitis and increased rhinorrhoea, considerable fever up to 103° F., and lasting seven or eight days. On the twenty-eighth day congestion at the bases of the lungs. On the thirtieth there was nephritis and haematuria, with a large quantity of albumen in the urine. This albuminuria actually lasted from the thirtieth to the eightieth day, although the temperature during that period remained practically normal. The degree to which the patient's general health was affected by this lung illness is shown by the pulse curve. The pulse was weak and bad, ranging up to 120 instead of coming down to the normal. The temperature is usually the only feature recorded graphically, but there are other factors which can be shown graphically, and the temperature is perhaps the least important.

* I include under the term "secondary adenitis" any enlargement of glands, however slight, after the initial adenitis has begun to subside. The percentage here noted—19 per cent.—includes therefore many mild cases which would not be generally regarded as "secondary adenitis." Thus the incidence of secondary adenitis given by Dr. Caiger is 8.7, "about one-third of which—for example, about 3 per cent.—suppurate." In my cases the proportion that suppurate is less than 1 per cent.

That, then, is an illustration of severe complications following a case of scarlet fever which in its early stage was mild. I now show you another which I have had prepared, that of a boy aged 12. This, again, was a moderately severe attack of scarlet fever, with temperature coming down to the normal on the tenth day, and remaining normal to the seventeenth. Then there was a slight rise of temperature and pulse attended by adenitis. On the twenty-fifth day a still further rise took place marked by an increase in the adenitis, and then an irregular pulse for four or five days, while the temperature was normal.

The last case whose chart I show you is that of a patient under my care in the last few weeks. It is that of a woman, aged 24, who was employed in a bar, which perhaps rather affected her powers of resistance afterwards. She came in with a mild or fairly moderate degree of scarlet fever, moderate rash, slight angina, and slight adenitis. You will notice that her temperature fell to normal on the fourth day. Yet the rash did not disappear, though it was moderate, and on the twelfth day the temperature rose suddenly, attended by severe angina, increase of adenitis, vomiting, and diarrhoea. On the thirteenth day there was very severe tonsillitis, and on the seventeenth day the tonsillitis was increased and further complicated by cellulitis. The temperature at this time was 103°, at which point it continued, and on the eighteenth day the rash, which had persisted all through, became most intense again. On the twentieth day, at 6 p.m., the temperature shot up to 107.8°, and, in spite of bath treatment and cold douching and sponging, she died five hours later.

PRIMARY AND SECONDARY INFECTION.

That is a case which, speaking generally, actually makes one wonder what happened. She was a fairly healthy person, who had a mild attack, and yet the disease became very severe and ended fatally. It is the typical sort of case with which we have to deal in this disease, illustrating the two great factors. We are dealing with two classes of infection: (1) the original infection of the scarlet fever; and (2) the occurrence of complications, mostly septic; and the problem which scarlet fever presents is which of these factors is operating in any one case. We cannot eliminate the original infection—the patient has acquired that; but the question arises as to whether we can subordinate or control the septic factor and the septic complications, and it is that problem in which I have tried to interest myself in these series of cases, with results which I will now briefly indicate.

RELATION OF INITIAL SYMPTOMS TO COMPLICATIONS.

First of all, with regard to the relation of the initial features to these complications. The initial features I refer to are, first, the rash, secondly the angina, and thirdly the fever.

1. *Rash*.—The first fact which comes out is this, with regard to the rash, that the degree of the rash has some little influence on the height of the initial fever, and slightly more on the duration of the pyrexia, but it is not related to the subsequent severity of the case. One often thinks: here is a case with a severe rash, so it must be a bad case; here is another one with only a moderate rash, and that evidently is a mild case. But that theory does not work out in practice. A case with a severe rash may pursue a mild course. On the other hand, a moderate rash may appear in a case which later may become complicated by all these other conditions. On the whole, however, a severe rash is more likely to be followed by complications than a mild rash. This is best seen in the case of adenitis.

TABLE I.

Degree of Rash.	No. of Cases.	No. with Complications.	Percentage.
Slight	34	12	35
Medium	49	14	28
Marked	39	19	49

TABLE II.

Rash.	No. of Cases.	No. with Adenitis.	Percentage.
Slight	34	5	14
Medium	49	7	14
Marked	39	13	33

2. *Initial Angina*.—The next point is the relation of initial angina to the subsequent occurrence of complications—secondary angina, especially adenitis. There is some relation between the severity of the initial angina and the tendency to the occurrence of secondary adenitis, but this is not so close or so general as to account for the occurrence of this secondary adenitis. In no less than 81 per cent. of cases in which this occurred the initial angina was only slight or moderate. The liability to secondary adenitis increased, however, in proportion to the severity of the primary.

3. *Fever*.—There is no actual definite relation between the height of the temperature in the first instance and the occurrence of complications.

The subsequent incidence of complications is thus not sufficiently accounted for by the character of the initial features; other causes to which these complications (in the individual case) can be ascribed have to be sought for, and are not easily found. According to Dr. Caiger, "there is no connexion between this adenitis and either cold, damp, diet, or habits. Probably some widespread causative influence, some atmospheric or soil condition, are responsible, and about one-third of the cases suppurate."

RELATION OF ORAL SEPSIS TO COMPLICATIONS.

I have therefore studied the relation of other features to the septic complications. The difficulty about scarlet fever is to determine how far the complications are scarlatinal, and how far they are septic. The two infections are closely intermixed, and they are apparently of the same character, that is streptococcal, so that it is extremely difficult to separate them. I have, therefore, in my series of cases made observations about the presence of septic lesions in connexion with scarlet fever cases on admission. The particular sepsis is that connected with the mouth, and the result has been very interesting. I have taken note of the presence and degree of "oral sepsis" in all cases admitted, the presence of foul sores around the teeth, foul gingivitis, and I have watched the relation of this condition to the subsequent occurrence of complications. So far as I can gather, this line of investigation has not hitherto been followed, and that is the more remarkable as the conditions of such sepsis are sometimes of a very severe kind. The result cannot be shortly expressed statistically, because of the prevalence of this condition, but one result comes out clearly: that the severity of scarlet fever, that is to say of the septic complications of it, is greatly influenced by the degree of oral sepsis in the patient before he is admitted. This is not surprising, considering that the actual lesion in scarlet fever is in the throat, and the simple addition to this of a staphylococcal infection may be a very serious matter. Thus of cases without oral sepsis only 35 per cent. had complications of moderate or severe degree; whereas of cases with oral sepsis 66 per cent. showed such complications. The result is that oral sepsis affects both the number and still more the severity of the complications met with.

1. *Oral Sepsis in Relation to the Severity of the Initial Angina*.—The figures bring out this result. The severity of the initial angina is affected by the presence of this previous sepsis. Thus, in 51 cases without oral sepsis, severe angina was only met with in 3 cases (6 per cent.), and it was moderate in 14 cases (28 per cent.). In 34 cases (67 per cent.) it was of mild degree. On the other hand, in 10 cases with severe oral sepsis only 2 (20 per cent.) showed mild angina. In 8 (80 per cent.) the angina was severe. Bacteriological examination showed that this increased severity was associated with the presence of staphylococcal organisms. Thus, in 14 cases without oral sepsis, staphylococci were isolated from the tonsils in 6 cases, whereas in 19 cases with oral sepsis, staphylococci were isolated in 17 cases.

2. *Oral Sepsis in Relation to the Occurrence of the Secondary Angina.*—In 60 per cent. of the cases having this oral sepsis in which complications occurred, the oral sepsis was noted to be very severe. The last case I have described to you illustrates that very well. Here is my note of it. Rash, moderate; angina, moderate; adenitis, moderate. Yet the one fact noted in connexion with that is that there was the severest degree of oral sepsis, with an abscess round one of her teeth. The subsequent course of this case was the severest angina, the severest adenitis, and the severest cellulitis. She also had vomiting, and she had diarrhoea, denoting "septic gastritis" and "septic enteritis," and afterwards hyperpyrexia occurred and death.

3. *The Relation of Oral Sepsis to the Severity of the Complications.*—This is very striking. I have here notes of 7 cases. The 7 cases in which oral sepsis was noted to be severe were nearly all severe. Two had severe adenitis, severe septic enteritis, and septic rash; the third had angina of severe degree, rheumatism very severe, albuminuria lasting thirty-four days, gangrenous stomatitis, which gave the greatest trouble, septic gastritis, enteritis, and finally pyaemic abscesses in the hip, from which streptococcus was isolated. These were all in one case which eventually recovered. The fourth case had adenitis twice; the fifth case had rheumatism and albuminuria lasting nine days; the sixth case had severe angina, and the severest form of otitis lasting six weeks. In other words, 6 out of the 7 cases in which this condition of severe tonsillitis was noticed were actually very severe cases, both as regards the degree and the variety of the complications.

Now let me note another fact in connexion with oral sepsis in relation to complications as a whole. The actual frequency of the occurrence of complications of some kind or another is but little affected by the presence or absence of oral sepsis, but the number of complications met with in cases of oral sepsis is much higher than in those without it. And still more, the severity of the complications met with is much greater. In cases of oral sepsis, 66 per cent. had complications of moderate or severest degree, whereas only 35 per cent. had such complications in cases in which there was no oral sepsis. This is well brought out by taking any one complication, such as tonsillitis, to which the figures I have given you refer. With regard to the relation of oral sepsis to albuminuria, 30 per cent. of the cases had albuminuria. In the cases without oral sepsis the average duration of the albuminuria was 5.8 days. In cases with oral sepsis the average duration was 15.1 days. In cases with oral sepsis and cellulitis the figures are equally divided. Of rhinitis we had 13 cases. No oral sepsis in 7, and those 7 cases were of mild degree. Oral sepsis was present in 6, 2 of them of mild degree, 2 of moderate degree, 2 of severest degree. Next with regard to oral sepsis and otitis. There were 12 cases. No oral sepsis in 6 cases; 5 of them were of mildest degree. Oral sepsis in 6 cases; 2 of these were of mildest degree, 1 of moderate degree, and 3 of severest degree. Oral sepsis and rheumatism we will take next—20 cases. Without oral sepsis, 10 cases, all of them of mildest degree; with oral sepsis, 10 cases, the slightest degree in 7, severe or moderate in 3.

Time will not permit me to go further, but I hope enough has been said to bring out the fact that this class of work is of interest. We cannot deal directly with the scarlatinal factor, but with the septic factor we can deal; and these figures bring out the fact that there is a definite relation, as one would expect, between the actual existence of oral sepsis in a patient with scarlet fever and the severest complications. It must be remembered that in all these cases I removed the oral sepsis immediately, and did not leave them to, as it were, soak in their oral sepsis; and yet that is what has been done hitherto. Usually no care has been taken to remove this source of infection. So these figures do not bring out the true relation. To do that it would be necessary to compare this series of cases with a parallel series in which the oral sepsis had been observed and yet nothing done for it. Of this class I have no cases; for in all cases which have come under my care the condition has been immediately treated antiseptically by swabbing out, and carefully removing the sepsis from the mouth. Despite these precautions, the existence of oral sepsis at the time of contraction of the disease has influenced the primary angina, the

subsequent occurrence of tonsillitis, of adenitis, and especially has undoubtedly influenced the severity of the complications afterwards.

The practical outcome, irrespective of mere statistical considerations as to whether oral sepsis does or does not influence scarlet fever, is that it is absolutely necessary to remove even the chance of it doing so. Therefore it is to me a very important duty, in all cases of fever coming under my care, to endeavour to eliminate this factor as far as possible. So I do not wait to find out what it is going to do, but I remove it, as I should remove any other possible source of trouble, just as I should give the patient fresh air, good food, or see that he was kept properly clean. That is the general outcome of this work, and I think you will find that in the cases which come under your care you will derive the greatest possible satisfaction yourself and you will confer the greatest possible benefit on your patients by dealing with this as you would with any other possible element of danger in connexion with the case. The *prima facie* case for dealing with it seriously in scarlet fever is, I think, greater than in any other fever with which we have to deal.

As I showed in a previous communication,¹ it is no less important in enteric fever, in which disease, according to my observations, the septic factor is an important cause of the chief intestinal complications—perforation and haemorrhage.

The sepsis associated with these two fevers and responsible for the chief complications is thus, in my experience and judgement, largely a preventable condition, and the question I now leave with you is: If preventable, why not prevented?

I drew attention to the subject at the Oxford meeting of the British Medical Association,² and this lecture is an addition to the facts then brought forward.

A Clinical Lecture ON WHITLOW AND ITS TREATMENT.

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THE subject I have chosen for this lecture may appear to be a very everyday one, but that is really the reason which led me to choose it. The subject of whitlow, as I shall deal with it to-day, is one which appeals to everybody who is in practice; every one who sees cases of all kinds will see many cases of whitlow in the course of twelve months, and if we can arrive at some understanding as to what is the best way of treating the several cases of whitlow as they appear I shall be satisfied with the results of this hour's lecture.

I do not think I can do better than start by reminding you of the customary classification of whitlow, and then I shall pass in review fairly rapidly what is considered to be the best treatment for each variety of the disease. Then I shall describe the extensions of the disease, which are very important, into the palm of the hand and so forth, and shall state, as far as it can be stated, what is the best method of treating cases which we will suppose have come before us.

THE VARIETIES OF WHITLOW AND THEIR TREATMENT.

The four varieties of whitlow are the subcuticular, subcutaneous, thecal abscess, and subperiosteal abscess. The subcuticular variety is that in which the inflammation is found underneath the cuticle, between the cuticle and the cutis vera; it is probably due to the poison having been introduced by inoculation through the cuticle. The second variety, which is perhaps the commonest, is the subcutaneous form, in which the inflammation occurs in the fibro-fatty pad, and this is the variety which one sees so often at the top of the finger. The third variety is not usually a primary one, but occurs secondarily as an extension from the last mentioned form, that is to say thecal abscess, or an inflammation which has extended

¹ Oxford Meeting, British Medical Association, BRITISH MEDICAL JOURNAL, November, 1904.

² BRITISH MEDICAL JOURNAL, November, 1904.