



Thesis
on
The Antiseptic treatment
of scarlet fever

by
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Before referring to the treatment of scarlet fever, I should like to draw attention to certain views with reference to this disease which, if not novel, have, at any rate, little stress laid on them in most works on the subject.

Scarlet fever is the result of the entry of a specific poison into the system and in my opinion this poison usually enters by a definite point of insculcation, namely, the throat. I am inclined to believe this for the following reasons:

(1) I have never failed to detect some inflammation of the throat and swelling of the neighbouring lymphatic glands at the commencement of the febrile attack even before the appearance of the rash; and where one member of a family has been affected with the disease, I have found sore-throat and swelling of the glands in some of the others a day or two

before the onset of the febrile symptoms, I have noticed too that the throat affection often begins insidiously and causes little discomfort at first so that ^{it} is often far advanced before complained of by the patient.

Squire (Quain's Dict: of Medicine 1886 Vol II p. 1388) says:

"The longest clear interval from a single definite exposure ^{to sickness} has been 4 1/2 days. In most of the instances where 4 to 5 days have intervened 2 or 3 of these days have not been without sore-throat or other sign of invasion"

and again p. 1389:

"Infection is generally received by the throat & lungs, & seldom by a wound or abrasion of the skin & never by the unwounded skin; at first it multiplies at the point of reception, hence probably the day or two of sore-throat; and is delayed but

little in the lymphatics before
entering the blood"

and again p. 1390

"Sore-throat is always present;
during the day or two before
the seizure and almost from the
time of receiving the infection,
some traces of this are observable."

(2) The frequency with which
sore-throat occurs in persons
who have had scarlet fever, when
exposed to infection seems to me
to point to the throat as the
usual point of inoculation;
but in this case owing to the
protection afforded by the first
attack, the throat is unable to
infect the system.

Dr. J. Lewis Smith (Pepper's System of
Practical Medicine 1885 Vol. I. p. 505)
regards these affections of the throat
as "local in their nature, instead
of being local manifestations of
the constitutional disease."

Bristowe (Medicine 1884 p. 162)

regards these sore-throats as abortive attacks of scarlet fever. Squire (Quain's Dict: of Medicine Vol. II. p 1388) says:

"Every case of sore-throat occurring in an infected house is capable of conveying scarlet-fever, whether the subject of it be protected or not."

I recently attended a man of 38 for a sore-throat and a day or two after the children of the house were attacked by scarlet fever - probably an example of infection being conveyed in this way.

This sore-throat would correspond to the chancroid produced by inoculation of a syphilitic with secretion from an inflamed true chancere mentioned by Hutchinson in the Lettsomian lectures of 1886.

In exceptional cases, doubtless, the poison enters by some other route

Thus Squire (Ib: p. 1389) says:

"Infection is most rapid when carried direct to the lungs, as when inhaled through a tracheotomy tube, no particles being detained on the pharynx."

Perhaps the poison enters the lungs direct in those suppressed cases which prove so rapidly fatal; and it probably often enters by a different route in those attacked after surgical operations & in puerperal women. but for the reasons above stated, I think the throat is the usual point of inoculation.

After inoculation, the poison multiplies in the throat which acts as a reservoir of it to the system. Ulceration of the throat often occurs and the extent of the ulceration is usually a measure of the severity of the attack.

The ulcerated throat of scarlet fever

seems more liable than other ulcerated throats to give rise to septicaemia: I have little doubt that those cases where extensive ulceration is followed by such symptoms as depression, restlessness or delirium, weak & rapid pulse, dry tongue perhaps covered with sordes, cold perspirations &c are really attacks of septicaemia on the top of the specific disorder.

Perhaps abraded surfaces to which the scarlatinal poison has access have an unusual liability to septic poisoning.

Playfair (Midwifery) 1884 Vol. II pp. 342-3 / produces evidence that the contagium of scarlet fever may produce in puerperal women either scarlet fever or septicaemia & also mentions Sir J. Paget & Sir Spencer Wells as favouring the idea that surgical pyaemia may be produced by

the scarlet-fever poison.
In the recent transactions of the
obstetrical Soc.^y of London re-
ported in the *Lancet* of 24th March
& *British Medical Journal* 14th April
opinion was divided on this
subject.

If these views as to the nature
of the throat affection in
scarlet-fever be correct, the
throat becomes the most
important item in all
treatment, both preventive
and curative.

As regards the other symptoms
& sequelae of scarlet fever,
I only wish here to refer to the
changes that are found in the
kidneys.

As to the etiology of the kidney
lesion, the common opinion
seems to be that it is due to the
direct influence of the scarlet

fever poison on the renal cells.
Dr. George Johnson (Diseases of
Kidney, 1852, p. 109) says:
"all the changes of structure com-
mence in the secreting cells of
the gland & are the result of an
effort made by the cells to
eliminate from the blood some
abnormal products, some
materials which do not natur-
ally enter into the composition
of the renal secretions."

It seems probable that the
kidneys always undergo more
or less morbid change and
this change, as is well shown
by D. Woodhead (Practical
Pathology, 1883, p. 196), begins
in & around the interlobular
arteries & Malpighian bodies
and may be so marked as to
cause convulsions & death follow-
ing suppression of urine in
the first week, or there may
be suppression for a day

and reestablishment of the secretion with the appearance in it of blood, albumen & hyaline casts; but most commonly the only sign of the kidney affection in the first week is temporary albuminuria with perhaps a little blood. This may pass off & the patient recover with no further sign of kidney mischief or as happens in a certain percentage of cases the albumen returns accompanied by diminution of urine, anasarca & the other signs of post-scarlatinal nephritis.

This happens during desquamation, when the nerves of the skin are unusually exposed & the patient is thus peculiarly liable to catch a chill, the kidneys being more or less likely to suffer according to the amount of the primary peri-glomerular

lesion.

Thus if the primary change have been well marked a trifling cause such as constipation or a slight exposure during desquamation, might cause a return of the symptoms of nephritis.

In Diphtheria we get a primary effect on the kidneys, perhaps causing the appearance of blood, albumen & hyaline or granular casts in the urine, but, there being no desquamation during convalescence, these conditions of the urine are rarely of long duration & scarcely ever usher in dropsy, uraemia or permanent lesion of the kidneys.

Thus in the causation of post-scarlatinal nephritis we have two factors to consider viz: (1) the greater or less amount

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of periglomerular lesion produced in the first week or rather during the febrile attack by the direct effect of the poison & (2) the state of the skin during desquamation

If we can by any means lessen the amount of the primary kidney lesion & we at the same time exercise great caution in protecting the surface of the body from chills during desquamation, we greatly lessen the chance of the superovertion of post-scarlatinal nephritis.

There being no further points, to which I wish to refer, as to the nature of scarlet fever, I will now turn to the treatment.

Treatment

The treatment of scarlet fever by internal antiseptics has not found much favour with the profession from the improbability of being able to give large enough quantities of the drugs without producing toxic symptoms.

Thus Bruntton (Pharmacology 1885 p. 85) says: "The use of antiseptics internally is limited by the resistance of the organism itself"

I append some favourable notices of this treatment.

J Lewis Smith (Pepper's System of Medicine 1885. Vol I. p. 337) says:

"From observations made by myself in nearly twenty families in which scarlet fever was prevailing, I am convinced that Boracic acid deserves trial as a preventive and antidote of scarlet fever as well as diphtheria."

He also mentions (ib) a syrup

of Phenie (Carbolic) acid prepared by Declat as being employed by several of the New York physicians, but "without sufficient statistics as yet to determine its efficacy".

In the Lancet of Jan. 22nd, 1869. Dr. Keith of Normandy mentions 600 cases of zymotic diseases, principally scarlet fever and measles, treated by Carbolic acid with only 5 deaths.

In the Lancet of Oct. 8th, 1887 Mr. A. Wigglesworth of Liverpool writes that he has treated 300 cases of scarlet fever by Carbolic acid with no deaths & only 3 cases of albuminuria & one of glandular suppuration.

He begins with a dose of 3 minims of Carbolic Acid liquefied by the addition of 10 p.c. of water for children from 2 to 6 years old & gives it every 2 hours night & day for the first 3

days, longer if necessary, but if
 the patient be doing well,
 every 3 hours until the 4th or 5th
 day, then every 4 hours until
 all danger is past & finally 3
 times a day until perfectly
 convalescent. In older patients
 his dose is 4 minimis & in
 adults even 5 or 6. He does not
 interfere with the ulcerated
 tonsils, which he finds invar-
 iably affected, but looks upon
 the extent of the ulceration as
 an indication of the severity
 of the attack & regulates the
 dose of the acid accordingly.
 He regards the smoky or black
 tint of the urine as a test
 that the dose is sufficient &
 says that he has never known
 any harm ensue from these
 doses of Carbolic acid, but
 recommends that, if possible, the
 patients should be seen at
 least twice a day to either

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increase or lessen the dose.
He also writes that he has
used it as a prophylactic
with the happiest results in
doses of 1 minim three times
a day, intercourse with the
sick not being prohibited.
I have had the opportunity
of trying the Carbolic Acid
treatment in an epidemic
that occurred in Birkenhead
last winter (1887-8) and
obtained very good results.
I have ascertained that during
the last 6 months of 1887
659 cases of scarlet fever were
reported in the borough &
that 67 deaths occurred during
the same period from that
disease; and that during
the first 3 months of 1888,
178 cases were reported with
20 deaths.

These figures give a mortality
of 10.6 per cent for the whole

epidemic.

In the dispensary department of the Borough Hospital I have had during these 9 months 205 cases of scarlet fever under my treatment.

I tried the Carbolic Acid treatment in every case that came under my treatment during two periods. The first period included October & part of November 1887 & the second January, February & March 1888.

The number of cases treated in these two periods was 74 & as the type of the disease maintained its severity throughout the epidemic, as evidenced by the mortality, I think I may fairly contrast the results so obtained with those obtained by other methods of treatment.

The remaining 131 cases were

treated in the usual way, internally with such drugs as Liquor Ammoniae acetatis, Chlorate of Potash &c, & with such throat applications as Glycerine of Boracic Acid.

Out of these 131 cases there were 15 deaths & 20 cases of post-scarlatinal nephritis, 4 of the 15 deaths being due to this latter cause.

Out of the 44 cases treated by Carbolic Acid there were 2 deaths & 5 cases of post-scarlatinal nephritis.

The one fatal case was the result of nephritis causing death in the 7th week & was I have little doubt brought about by neglect of the precautions enjoined during convalescence. The other was a child of 3 years old, which after taking the Carbolic Acid for a day or two, was seized with

diarrhoea accompanied by great pain. Thinking this was due to the drug, I discontinued its use; a day or two afterwards suppuration took place in the glands of the neck, followed by extensive sloughing which finally gave rise to fatal haemorrhage from the deep vessels of the neck. Thus this case could not be said to have really undergone the treatment & as it was the only one in which diarrhoea & griping occurred during the administration of the drug, it may have been one of those exceptional cases of scarlet fever in which diarrhoea is a prominent symptom. This was likewise the only case of glandular suppuration out of the 74. There was also almost an entire absence of aural & nasal complications.

The comparison of these figures then, shows not only a decrease of mortality but also a decrease in the frequency of the super-vention of post-scarlatinal nephritis with the Carbolic acid treatment.

By converting these figures to percentages we find that the 44 cases treated by Carbolic Acid give a mortality of 2.7 per cent, as compared with a mortality of 11.7 per cent for the remaining cases treated by me & of 11.1 per cent for all the remaining cases treated in the borough;

also that the percentage of my cases affected by post-scarlatinal nephritis after the Carbolic Acid treatment was 6.7 as compared with 15.2 after other methods of treatment.

The large total of 25 cases of

post-scarlatinal nephritis was doubtless due to the wretched housing & nursing of many of the patients & the impossibility of having proper precautions observed during desquamation.

As to the Method of Administration I usually prescribe 2 grains of the Carbolic Acid with Glycerine & Tincture of Orange in an ounce of water every 2 hours night & day. I have very seldom found it necessary to increase this dose, most of my patients having been children from 2 to 6 or 7 years old. The frequency of the dose may be gradually diminished as improvement takes place but is not to be discontinued till the ulceration of the throat is quite healed. There is very rarely any trouble in getting

children to take it.

For adults & those old enough to gargle, I prescribe a gargle of 5 grains to the ounce of Carbolic in water with a little glycerine added & order it to be used at least every 2 hours night & day at first, the frequency to be gradually diminished as improvement takes place. Along with this gargle I often give a mixture containing small doses of Quinine & Perchloride of Iron.

Among the most noticeable effects of the drug when given internally, I have observed a rapid lowering of the pulse & an unusual tendency to sleep. The pupils were often considerably dilated. The colour of the urine varied from smoky to greenish, often becoming black after standing. The average

temperature was decidedly lower than among the cases treated by other methods, the throat symptoms less pronounced; nasal or aural complications absent or slight, in fact, the disease itself seemed to run a milder course.

Of the use of the drug as a prophylactic I have not as yet made an extensive enough trial to determine its value.

Mode of Action

The nature of the scarlet fever poison is as yet undiscovered, though several microbes have been described in connection with it, such as the *Monas scarlatinosa* of Klebs & the *Plex lindens* of Eklund, consequently it is impossible to speak absolutely as to what effect

on its propagation in the blood, Carbolic Acid taken internally might have.

Lauder Brunton (Pharmacology 1885 p 47) says:

"A solution of Carbolic Acid 1 in 1250 and 1 in 850 sufficed to prevent the growth of anthrax bacilli; while a strength of 1 in 500 was required to prevent the growth of others"

In a child of 65 lbs weight with 5 lbs of blood 28 grains of Carbolic Acid will be required to produce a 1 in 1250 solution in the blood, so that the virus would have to have a resisting power about $\frac{1}{14}$ of that of the anthrax bacillus in order to have its growth prevented by 2 grain doses of Carbolic Acid, seeing that the drug is so rapidly eliminated in the urine that no accumulation is possible.

I am rather inclined to think that the beneficial effect of the drug is, at any rate, chiefly due to its local action.

Firstly as a prophylactic - If it be conceded that the throat is the usual point of inoculation, it is easy to understand how swallowing an antiseptic fluid several times a day would lessen the chance of inoculation taking place, the drug of course having no effect in the exceptional cases where the system is infected by some other route.

Gargling with a solution of Carbolic acid ought to have an equally good, if not better, effect.

Secondly as a remedial agent - The Carbolic acid being taken every 2 hours keeps the

mouth constantly washed out with an antiseptic solution & thus checks the propagation of the poison in the throat, lessens the amount of it admitted into the system & by so doing induces a milder type of the disease.

By limiting the extent of the throat mischief, it tends to ward off the troublesome aurial & nasal complications which are the result of direct extension from the throat. It also promotes the healing of the ulcers & prevents septic absorption by their surfaces at a later stage.

If less of the poison be admitted into the system the amount of the primary periglomerular lesion of the kidneys will be lessened & that being so the kidneys will more quickly recover & thus there will be less

liability to the superoention of post-scarlatinal nephritis during desquamation.

The reasons why this method of treatment is superior to other methods where antiseptic applications to the throat are made use of, are, I think, the following:

- (1) The application of the antiseptic is begun early & kept up constantly & frequently; while in other methods of treatment the applications are not made use of, until the throat mischief has become more or less pronounced & seems to demand some treatment & are then probably not frequent enough.

Thus Bristowe (Medicine 1884. p. 170) says: "To relieve the soreness of the throat ice or the inhalation of steam or warm milk slowly

swallowed or astringent or antiseptic gargles are employed". Squire (Quain's Dictionary of Medicine 1886. Vol. II p. 1393) says: "The throat symptoms often claim early attention". He then goes on to recommend ice to suck & poultices externally but lays no stress on antiseptic applications, though he suggests taking chlorate of Potash into the mouth or using a spray of it.

(2) The difficulty of making efficient applications to the throat in young children; any form of swabbing would probably cause a good deal of irritation even if they could be got to submit to it often enough or if the attendants could be persuaded to do it often enough; and sprays are usually out of the question for dispensary patients.

Consequently, for young children, I think, the internal administration of the drug is advisable as being more practicable & having no superfluous internal action when carefully watched but perhaps a beneficial one.

The cases I have treated by the gargling alone have done very well but have not been many, most of my patients as I said before having been young children.

In conclusion, I do not doubt that other antiseptics used in the same way will prove equally efficacious, the essential part of the treatment apparently being that the use of the antiseptic, whether as a gargle or spray or internally, should be begun early and repeated frequently.