Hæmaturia following Scarlet Fever

By Gordon Carnachan
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Hamaturia following Scarlet Fever.

In the experience of most medical men there are many diseases which cause infinite trouble and watchfulness not only in their primary form but also in their sequelæ and terminations. Especially so, may Scarlet Fever and Hamaturia following that disease be considered as.

From an experience of upwards of twelve years in a large and extensive practice, I may be allowed to write with some little authority on this subject. More particularly as I believe, that if the means of treatment I point out were generally adopted, this termination (often overlooked by the medical attendant or not noticed in time) would be avoided, and much anxiety and distress to all parties concerned cleared out of the way altogether.

This sequelæ of Scarlet fever is of no uncommon occurence, it is always associated with more or less of General dropsy, with a pasty, spanæmic appearance of the surface of the body.

In the great majority of cases, it is a morbid condition, perfectly manageable, quickly yielding to judicious treatment, and only in exceptional cases either leading to, or associated with, permanent and organic mischief of the kidneys.

A question of much pathological interest arises out of the study of these cases - namely, whether the congested or impeded state of the circulation in the kidneys is mainly dependent on arrested cutaneous function during the desquamation of the cuticle; or is it evidence of the imperfect elimination of the

febrile poison during the eruptive stage, and therefore a sequel to the completion thereof through these emunctories – the kidneys.

From whichever point of view we study these symptoms, the condition of the kidneys is that of inflammatory congestion, and the impeded renal function demands the same remedial measures.

Of the many cases of hæmaturia and dropsy after scarlet fever that come under treatment, some have had the exanthematous fever most favorably, and its characteristic stages have been well marked, but during convalescence have been incautiously exposed, and the proper precautions, with respect to clothing &c at that period, have been neglected.
In these cases there is some show of probability that arrested cutaneous function may suffice to explain the sequela of dropsy and bloody urine. But, in the vast majority of cases this secondary condition must be accepted as evidence of the imperfect elimination of the febrile poison during the antecedent exanthematous stage, arising either from the greater intensity of the poison, or the incompleteness of the processes by which it is released from, or decomposed in the system.

The amount and duration of the hæmaturia, as a secondary affection after scarlet fever, is very variable. In some cases the renal hæmorrhage is abundant, and gives to the urine, for some consecutive days, a marked blood-red appearance, in others, the presence of blood

is scarcely recognised, except by a certain dusky appearance, as if a certain small quantity of soot had been mixed with the urine.

Notwithstanding, whether the hæmorrhage be small or great, there is always at the commencement of this supplemental stage symptoms of more or less febrile disturbance, clearly showing the inflammatory nature of this secondary process.

Anasarca of more or less degree of the whole surface of the body, sometimes with, more frequently without, serous accumulations in the abdominal cavity accompanies, or frequently precedes, the hæmaturia, while the pale, pasty (patient) spanæmic appearana of the, is also very decided and most expressive of this disease.

Such are the chief characteristics of the hæmaturia, or secondary renal affection, following Scarlet fever, and the following case will illustrate in a marked manner these preliminary remarks.

James Wallace, aged 12 years, was seen by me on the 12th Octr 1870.- I was informed by his mother, that at the beginning of the month he had well marked symptoms of Scarlet fever. the eruptive stage was passed favourably, and he was running about the house apparently well until a few days since, when his face and eyelids were noticed to be swollen in the morning, and upon my seeing him I noted the following symptom

"The whole surface of the body is anasarcous, most evident in the face, hands, wrists, feet and ankles, than of the trunk: the abdomen is distended, dull on percussion at the flanks, and affords evidence of fluid by succussion.
The temperature of the skin is higher than natural, pulse small and frequent, tongue pale and furred, while the chest sounds are normal. The urine upon examination is of a dark blood-red colour, highly albuminous.
The patient complains of thirst, loss of appetite, with aching pains in the limbs and across the loins."
Was cupped to 6 ℥ over the loins, ordered to take half a drachm of Pulv Jacobi Compd, a vapour bath night and morning, and Chlorine mixture every 6 hours, to be well covered up in bed with flannel and blankets.

Two days after, the swelling in the abdomen was much fallen and the general anasarca of the surface diminished. There was less heat of the skin, pulse fuller and slower, no thirst, tongue cleaning and the desire for food greater.
The urine was still scanty however and tinged with blood, brisk purging with the purgative was continued night and morning, and at the end of 8 days a manifest improvement was visible. The urine began to improve in appearance and increase in quantity, though the hæmaturia continued in a slight degree.

Hot was now dry cupped over the loins, which appeared to relieve the symptoms of pain, and the urine gradually became clearer and more natural in appearance.
The dropsical symptoms by the 12th day had nearly disappeared, the abdomen was natural and free from any indication of fluid and the only vestige of the anasarca was a slight puffiness of the eyelids in the morning.
The heart was frequently examined during the progress of the case and was found free from any murmur.
By the 14th day great improvement had been effected, all traces of dropsy then having disappeared.
The appetite was good, no thirst, amount of urine natural but still slightly albuminous, there was also the pale peculiar look of the face observed in these cases, the evidence of an impoverished state of the blood which is so general in this disease, and which tells so forcibly of the morbid agencies that, from the primary exanthematous fever to the secondary febrile stage with renal haemorrhage, had been continuously deteriorating this fluid in its most important constituent of red globules, that the propriety and even necessity for the administration of chalybeate medicines was quite apparent. The patient was then ordered to take Tinct: Ferri Perchloridi in ten drop doses twice daily and to be continued for a fortnight.
Then a rapid and constant improvement took place, the

countinance and general surface of the body indicated a marked and increasing tone, the urine gradually became quite natural and in a short time was entirely free from albumen, when the case was considerd out of danger.- Such medicines are best indicated when all febrile symptoms are at an end or nearly so, so long as there is thirst, anorexia, a quick pulse and hot skin, febrifuge medicines and local depletion are clearly indicated, but with the subsidence of these, no time should be lost before the influence of ferruginous remedies are tried, and generally in these cases of renal hamorrhage and albuminous urine, the Tinct: as given in the above case will be found the most efficacious and trustworthy for this class of disorders.

The above case has well illustrated the chief features both of symptoms and treatment of the hamaturia and dropsy after Scarlet fever.- They may be summed up as follows- Anasarca of the surface, ascites, scanty urine, renal hamorrhage, albuminous urine, with symptoms of febrile disturbance.

The principles of treatment were to alleviate the local congestion and impeded function of the kidneys; to lessen the febrile excitement, the action of the skin promoted: and for a time, while the inflammatory congestion of the kidneys continued, to husband the renal function, and by active hydragogue purges to cleanse the system of the accumulated fluid which the embarrassed kidneys were inadequate to excrete.

and lastly, when these results had been favourably accomplished, to supply the functions of assimilation with a constituent all important to the impoverished blood, and which co-operating with animal food, well regulated diet and warm clothing, carried the patient through an alarming illness to a satisfactory convalescence.

I have alluded to a point of much pathological intrest arising out of the investigation of these cases of hæmaturia and renal disturbance; whether this morbid sequel simply arose from the arrest of the cutaneous function during the period of the desquamation of the cuticle, or whether it might not be traced to the imperfect elimination of the febrile poison at the exanthematous period, and referable therefore to a state of the blood imperfectly purified.

The following case bears materially on these points.

Charles Watson, aged 10. was seen by me on Oct^r 8^th 1870. (Several members of the family had been ill with Scarlet fever previous to that date, but had passed through the illness without much trouble) this patient complained the previous night of being ill, and early on the morning of the 8^th he was seized with retching, vomiting, and purging. The tongue was bright red and moist, while the papillæ were much enlarged. He vomited frequently during the day, and complained of pain in the abdomen. The pulse was small and weak and very quick (140). On the 10^th there was sore throat, the fauces and tonsils having the brilliant scarlet redness characteristic of Scarlet fever, and the tongue

had acquired the well known strawberry aspect.-
In the course of the day a bright efflorescent rash appeared on the face and throat, extending thence to the trunk, and during the following days covering the whole body and extremities. The irritable state of the stomach and bowels ceased with the appearance of the Eruption.

He was ordered a diaphoretic powder, and a warm bath night and morning on the 8th, and on the 10th Chlorine Mixture. On the 3d day of the eruption, the colour had become dusky, and there was no diminution of the sore throat, on the contrary, there was a disposition to ulceration with the formation of a dirty, tenacious viscid secretion.

The patient had obstinately refused to take the mixture as ordered - I insisted upon the mother to cleanse out the mouth and throat frequently by means of a sponge saturated with the chlorine mixture. On the 16th the eruption had entirely disappeared, and the throat presented a more favourable appearance, but there was no symptom of desquamation of the cuticle; he was then ordered a warm bath night and morning with olive oil Inunction, the patient still refusing to take the mixture, the Mother giving it to the Skin.

On the 18th, the eight day of the fever, slight cuticular exfoliation appeared on the arms, but no further appearance of desquamation was observable. His convalescence progressed very slowly. The appetite continued indifferent; the tongue

had become pale; the aspect of the patient had become dull, the bowels acted regularly, and the urine was abundant and natural. During this period he was placed on bark and nitric acid, and the diet improved; but there was little or no inclination for food, he was lethargic and dull, indifferent to every thing about him, with no inclination to get up. There was no cough, the respiratory sounds were natural, and with the exception of the signs of a tardy convalescence and defective appetite, there was no bad symptom of consequence.

On the 2nd of Nov., twenty two days after the first appearance of the scarlet rash, the surface of the body became generally anasarcous, there was some heat of skin and acceleration of pulse; the tongue was pale and moist; the face was edematous, as well as the trunk and extremities, but there was no ascites. He complained of aching pain across the loins, and the urine was scanty and highly charged with blood. The breathing was somewhat oppressed and short; there was frequent cough without expectoration; the respiratory sounds were very faint throughout the chest, and in the larger tubes some trifling sibilus. He was cupped to 12 ℥ from the loins, ordered Pulv Jalapii Comp: ℈ss, and a diaphoretic mixture: to be well wrapped up in flannel, and a hot air bath administered night and morning. The urine was microscopically

flammed, and fibrinous casts entangling blood discs were abundantly visible, together with free blood corpuscles.

The treatment made little impression on these symptoms for the first six days, throughout this period the Lamaturia continued and the anasarca increased, so that both upper and lower extremities became extensively edematous. The baths and pungatives were continued, and 1/2 doz leeches were twice applied over the loins, with application of hot bran poultices.

On the 15th Nov. the urine became more abundant, had lost the red, sanguineous character, and had acquired the smoky tinge observable in the milder forms of Scarletinal dropsy, urine moderately albuminous. The Microscope exhibited tubular casts; more transparent, and containing a few blood discs, with glandular epithelial cells. The Tinct. Ferri perchlor. was now given in ten drop doses. The anasarca gradually disappeared: the urine became clear and natural, and when examined on the 30th Nov. was found to be free from all appearances of desquamation products, whether of albumen or casts, the patient rapidly improved, soon lost the flabby sodden aspect of dropsy, and was then considered convalescent.

This case teaches us, that no precaution (or treatment) (unless with the exception of that to be hereafter mentioned) taken during the period immediately subsequent to the

exanthematous fever can avert the morbid sequelæ in certain instances. This child never left the room where he was confined during the whole period of the attack, the temperature was kept at an equal degree, and with the exception of his refusal to take the chlorine mixture ordered, the medical rules and prescriptions were carefully carried out. The type of the fever was that of Scarlatina anginosa. The ushering in of the fever was more than usually severe, the vomiting and purging of the days preceding the eruption being disproportionally frequent. The eruption exhibited in its course nothing irregular, it may perhaps be said to have receded too early. The sore throat was not more severe than in analogous cases. The irritable state of the stomach and bowels departed as soon as the eruption came out.
On the whole, however, it was very evident that the type of the fever was of the severest, excepting only that dreadful form, the Scarlatina maligna; and moreover, that the exanthematous period had not adequately eliminated the febrile virus.

This became apparent at the period of desquamation, which, in ordinary cases proceeds pari passu with convalescence; but a trifling exfoliation of cuticle took place, and the progress of recovery

lingered, as though some morbid material still lurked in the system; nor can we doubt that it was so, for secondary febrile symptoms manifested themselves accompanied by hæmaturia and general dropsy; congestion of the respiratory organs, expressed by cough and dyspnœa, were also among the disturbances indicative of some remotely-acting morbid influence. The hæmaturia was severe, and continued unaffected by the measures employed for the lessening of the local and internal congestions. Cupping, leeching, diaphoretics, active purging and hot-air baths were administered, but the hæmaturia continued unabated for seven or eight days, and then, apparently having accomplished the complete depuration of the system, it subsided, leaving no other morbid condition to be combatted, but the impoverished blood and the accompanying debility.

It is interesting to observe how rapid is the restoration to health, how speedily ferruginous preparations seem to enrich the blood with red corpuscles, as soon as this cleansing process of the secondary fever has become complete. The hæmaturia in these cases, when severe, would seem to threaten the organic integrity of the renal organs; but, if careful microscopic examination be made from time to time, and the characters of the casts carefully noted, these will be seen as fibrinous moulds of the larger tubes, containing blood discs and so-called epithelial cells.

as anasarca diminishes epithelium becomes more abundant, and gradually disappears as convalescence progresses; the albumen, at the same time, daily becomes less, till, at length, all vestages of it are lost, and the urine exhibits all the qualities of the healthy excretion.

It is when the desquamation of the renal epithelium does not diminish, the urine continuing albuminous for weeks after the secondary attack, the specific gravity of this fluid becoming low, the urinary constituents reduced to a minimum, the casts becoming more and more transparent and fatty, the epithelium becoming more granular with scattered or grouped fat corpuscles; it is under such circumstances as these that an unfavorable prognosis must be formed, and fears entertained that permanent granular degeneration of the kidneys has commenced which will end in death.

If further proof were necessary, to establish the doctrine that the morbid sequela of scarlet fever are to be traced to the imperfect elimination of the original virus from the system, it might be found in cases in which the morbid symptoms of this secondary stage are not limited alone to renal disturbance, but where serious complications, both of the cerebral as well as the respiratory functions, co-exist. In these cases, when cerebral symptoms become developed during the

presence of general dropsy the urine being highly albuminous, with abundant exudation of the renal epithelium, there can be no hesitation in attributing the convulsions, coma, and death, to uræmic poisoning. The symptoms are strictly analogous to one form of Cerebral disturbance frequently observed in cases of renal degeneration in adults, in whom the function of the kidneys is limited to the excretion of the water and albuminous constituents of the blood, and fails to eliminate the urea, the retention of which, acting as a poison in the blood, manifests its most virulent power by very fatal indications.

It might therefore be assumed that these symptoms are referible rather to the renal incompetency than to the febrile poison. Proximately, doubtless they are so: but it has been already shown that the incipient stage of the renal disorder,- the congestion, the hæmaturia, are not accidental conditions, but arise undeniably from the secondary effects of the original febrile virus. There can be no difficulty, then, in tracing the convulsions and fatal termination as much to the imperfect elimination of the scarlatinal poison as to the intensity with which the system was in the first instance impregnated. The following is a very instructive case to the point.

Robert Creighton, aged 10 years, was first seen by me on Nov. 11th. (had been attending the boy's father for an attack of Measles since the 8th) at the time of my visit he was

sitting by the fireside in a dull impassive state, I spoke to the mother and asked her if the boy had been ill, when she informed me that "she thought he had a rash something like scarlet fever about three weeks ago, but that he was now apparently quite well, had gone back to school, had no medical attendance previously, and on account of the father's illness he had not got much attention or care"; was allowed to be much out of doors, weather at this time being cold and wet.

On observing the boy, I noticed that his symptoms were of a serious nature. There was a considerable degree of constitutional disturbance, febrile heat of the skin, pulse rapid (100); the tongue red and inclined to become dry; the whole surface of the body was anasarcous; the face pallid, sodden, and puffy to a considerable extent under the eyelids; scrotum and prepuce distended and edematous, with slight indications of ascites. The chest was moderately resonant throughout, but there was coarse moist mucous murmurs all over the right side, and with considerable bronchial wheezing on both sides; the respirations were 26. frequent cough and slight attacks of dyspnoea; heart sounds natural. The urine was procured in quantity, smoky in appearance, specific gravity 1.014. highly albuminous. The mother stated that she noticed for some days previously, that the urine appeared as if bloody.

Hot air baths were ordered at once, the Pulv Jalapii

Compd: as a purgative, and the chlorine mixture every 6 hours. For two days after, the urine remained the same in quantity and appearance or nearly so, but became much higher in its specific gravity, 1.020. The purging with the Compound Jalap powder was established on the 16th, with great advantage to the symptoms, the skin becoming cool, and the tongue less red and moist, the patient eagerly taking the farinaceous food and beef tea prescribed.
There was also considerable diminution of the adema of the prepuce and scrotum, although the face still continued puffy.

Ten days after being seen, the urine became more copious, the smoky appearance had given place to a clear amber-coloured urine, of a specific Gravity 1.017, highly albuminous. On adding nitric acid to the heated urine, the colour became first of a bluish green, and subsequently greenish black. These pigmentary alterations in albuminous urine are of occasional occurrence in the progress of Renal degeneration, and generally may be considered as conditions of very unfavourable significance. The pulse continuing good, the appetite improving, the bowels acting freely under the influence of the purgative, the potassio-tartrate of Iron was given thrice daily.

On the 4th of Dec. more than three weeks after being under treatment, he was sitting up in bed, and appeared generally to be somewhat improved, the face

being however, still adematous particularly in the morning. The quantity of urine passed had greatly increased in the 24 hours, but without the corresponding diminution in the anasarca of the surface which might have been expected from that result.- The specific gravity of the urine was very low 1.005 and the quantity of the albumen seemed increased, as its coagulation by heat nearly rendered the contents of the tube a solid mass.

During the morning of the 6th I was called out of bed hurriedly, convulsions having suddenly come on; they were of the type of those intermitting movements so frequently seen produced by dentition or intestinal irritation. Constant jactitation of the limbs, with rolling of the head on the neck. These continued for several hours, with slight intermissions; the pupils were dilated, the breathing was laboured and quick, the patient being unable to lie down. Pulse 120. Castor oil and turpentine enemata, and mustard poultices to the lower limbs were ordered. The convulsions returned in paroxysms during the whole of that day and the next, and in the intervals the patient was generally comatose, with stertorous breathing, the urine and faeces passed involuntarily and the child died at 9 A.M. on the morning of the 8th Dec.

No information which could be considered satisfactory was obtainable about the earlier stages of this patients

illness, with the exception that he presumedly had had an attack of Scarlet fever.- Whether the eruptive period was distinguished by any untoward symptom, or whether desquamation of the cuticle followed, could not be ascertained, as the mother seemed to have paid no attention to these points. That the secondary affection was characterized by symptoms of unusual severity is undoubted, as was seen by 1st the degree and character of the febrile disturbance: 2nd the renal and pulmonary complication: 3d the cerebral conditions and sequel.

The fever was less of the asthenic type than is usual in these cases; it was more expressive of irritative action, such as usual accompanies local or regional inflammation: nevertheless, the dropsy and extreme pallid look forbad any general or topical depletory measures- The state of the urine, the physical signs within the chest, each told of congestive conditions- formidable obstructions to the purification of the blood by respiration on the one hand, and of its depuration by urinary excretion on the other.

What principle of treatment was to guide us in such complex states?- The broad fundamental, therapeutical principle in such cases may be summed up in a few words. I would say, we must endeavour to bring into activity and act upon those functions and emunctories which are not, or only in a moderate degree, implicated in

the morbid disturbance, and by their agency relieve, if possible, the oppressed and impeded organs. Thus though the surface of the body is anasarcous, we must endeavour to promote its exhaling power; and as the internal mucous surface gives no indication of sharing in the morbid state of the kidneys, we must bring its secretions into activity to purge the system of the accumulated fluid, and vicariously for a time, relieve the kidneys of their office. The intimate sympathy between the skin and kidneys, and between the former and the bronchial mucous membrane when the latter is the seat of inflammation, would entitle us to expect the most beneficial results by vigorously promoting the cutaneous function; but unhappily, in these cases, the dropsical state of the surface of the skin precludes our obtaining much decided benefit in this direction. Warm baths effect oftentimes great temporary relief to the lungs; the breathing becomes less oppressed, and the secretion from the bronchial tubes more free; the hot-air bath however appears to me to be much more efficacious; there is not that same exhaustion which is induced by a succession of warm baths, and, to my observation, the amount of relief felt by the patient is much greater and more effective.

To aid these external appliances, ammoniacal saline may be given internally with advantage, yet I must declare that I have very little confidence in such remedies

unless combined with the treatment upon which I specially insist in these cases, viz the administration of cheonine in some shape or form, combined with active purging, which I now always find yield the best results. It is, however, of importance to choose appropriate means in our selection of a purgative so as to obtain the greatest amount of relief, for it is not every purgative of the Pharmacopoeia which answers this purpose equally well: and that one which acts most directly as a hydrogogue is the best adapted, but which, at the same time, is not followed by any disproportioned exhaustion, or by any torpid reaction. The combination of Jalap and Cream-of-tartar is most admirably suited to these ends, it acts quickly, without depressing the system, is not followed by inactivity, and induces copious watery dejections.

The patient in this last case was much benefited by these purgative remedies; the febrile state was lessened, the tongue became moist, and doubtless, from the amount of fluid drawn away by the cathartic, may be explained the great increase in the specific gravity of the urine. There was manifest abatement of the dropsical condition, and the breathing was easier and expectoration more copious. Continuing this plan of treatment, the improvement became sufficiently pronounced to justify the administration of chalybeates. At the same time, however, the state of the urine revealed by the microscope, together with the

appearance of that peculiar pigmentary condition observed in combination with the albumen, suggested a very unfavourable prognosis, although I was not without hope that the renal degeneration had not reached that stage at which ultimate, though remote, recovery might be possible. The casts of the tubes were partly transparent, partly granular. The few epithelial corpuscles visible within the tubes were filled with fat granules, and the tubes contained many scattered fat granules; highly refractive, and completely removed by ether. These microscopic conditions indicate an advancing stage of degeneration, and if spread through both kidneys, must be quickly followed by an imperfect elimination of the chief urinary constituents; and this was evident by the singularly watery state of the urine, its specific gravity not exceeding 1.005, but containing abundance of albumen, and this latter **associated** with a peculiar pigmentary matter, rendered visible after boiling by the addition of nitric acid. Experience teaches us that this pigmentary condition, in combination with albuminous urine, is of the very gravest import. It is always associated with the most advanced stage of renal degeneration, and in every instance, in which I have seen it, it has been quickly followed by fatal results. We should not then be unprepared for the development of unfavourable symptoms wherever this peculiarity

of the urine is observed; so that notwithstanding the apparent improvement for a time in the case detailed above, owing to the diminution of the dropsy of the surface, I expressed my fears at the time that this hopeful state would be but temporary. And surely nothing can exhibit the value and importance of frequent examination of the urine in such cases more forcibly than the fact here obtained, and the unfavourable inference deduced.

In all other respects there was an apparent amendment, and if the prognosis had been based only on the general aspect of the patient, it might fairly have been inferred that all was going on well.- An important point must be noted in the above case- namely, the suddenness and abruptness with which the symptoms of uræmic poisoning commenced. In some cases, particularly in adults, the indications are progressive; but here all other things being promising, convulsions suddenly supervene; they intermit, but coma characterizes their remission, and the patient dies in about 48 hours after the first indication of the urinous poison acting on the nervous centre. Can anything be done in a crisis like this?- are there no remedies available for such a state? These cases of convulsions are not always fatal; sometimes in the intervals consciousness returns, such offer a better prospect for remedial agents

than when the patient remains comatose.
In either state, however, an effort should be made to excite the bowels to active excretion, Enemata of castor oil and turpentine, or croton oil, will be found best suited in obtaining that object. Are there any therapeutical means by which this sequel of scarlet fever can be averted?. I will not boldly say there is, but I know that for the last 7 years of my practice I have treated hundreds of cases of scarlet fever with Liq Chlorine, and where the medicine was carefully and regularly given, I can truly say that I never once met with such a termination as fatal Hæmaturia, and even when I am called in to treat such, even in the worst cases, as long as the ability to swallow is unimpaired I invariably order it with the confident expectation of observing great benefit resulting from its administration, the agency of which, according to the hypothesis of Bricho depends on its union with the Carbonate of ammonia, into which the urea in the blood is converted, and which he considers to be the poisonous agent in these cases of fatal uræmia. I cannot give proofs of this doctrine, but whether the hypothesis be true or false, my experience tells me that very great benefit is invariably derived from Chlorine administered in the form constantly employed by me in the treatment of such cases as

those already described,- (the formula for preparing which I note below) and I can truly say without the slightest hesitation that I firmly believe, that if the Liq Chlorine were freely and regularly given from the commencement of the attack in all cases of Scarlet fever, we would have generally one annoyance less to deal with in our fight with that scourge of our families and patients, Scarlet fever and its sequela, Hæmathuria and uræmic poisoning.

Gordon Carmichael.
Surgeon.

Rowantree Bank House
Alexandria, Dumbartonshire
24th Febry. 1841.

Formula for the Preparation of Liq Chlorine

℞ Potassæ Chloras pulv:
Acidi Muriatici aa ℥i solve
add Aquæ destillat ℥viii
Liq ℥ij to ℥i given every 4 or 6 hours according to age.

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