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Illustrations OF HOSPITAL PRACTICE: METROPOLITAN AND PROVINCIAL.

TUNBRIDGE WELLS INFIRMARY AND DISPENSARY.

DIPHTHERITIS.

By J. MILNER BARRY, M.D., Physician to the Infirmary.

THE following cases of diphtheritis are reported for the purpose of directing attention to the *post mortem* appearances in the fatal cases, more especially to the presence of fibrinous concretions in the right cavities of the heart, and also to illustrate the treatment that has been found most successful. I am indebted to Arthur J. Cribb, M.B., our house-surgeon, for the notes of some of the cases which were more peculiarly under his care.

CASE I. Fanny Knight, aged 5, a lively, intelligent girl, previously in the enjoyment of good health, was admitted, on March 1st, 1858. On the 24th of February, she had some cough and hoarseness. On the 25th, she was considered to be better. On Feb. 26th, she had more cough, and oppression of breathing, and had a restless night. On the 27th, she appeared to be better. On the morning of the 28th, she had violent fits of coughing, attended with expectoration of "thick phlegm." At 11 A.M. she was seen for the first time by Mr. Cribb, our house-surgeon, who found the neck swollen externally; some greyish exudation on the tonsils and back of the throat; a sanious discharge from the nostrils occasionally; cough occurring at rare intervals when excited by the presence of the membranous exudation, and relieved by its expulsion; apparently not any dyspnoea, no complaint of pain; the respirations slow and prolonged, the air entering feebly but freely into the lungs; pulse rapid, very feeble. The throat was sponged with strong solution of nitrate of silver, and stimulants and nourishment freely administered. She died suddenly, about 2 P.M., the same day.

SECTIO CADAVERIS, March 1st, 24 hours after death. The body was well nourished. The lungs were somewhat congested posteriorly; but crepitating freely; a tubercle of the size of a pea was found in one lung towards the apex. The pleuræ were healthy. The larynx below the rima glottidis, the trachea, and the bronchial tubes as far as the subdivision, were lined with a soft, greyish, thin croupal exudation, easily detached. The rima glottidis was free from exudation or swelling. The glands and papillæ at the base of the tongue were enlarged and prominent. The tonsils had patches of fibrinous exudation on their surface, and their substance looked unhealthy. The heart and pericardium were healthy. *Fibrinous coagula* were found in the right auricle and ventricle.

CASE II. Mary Willard, aged 7, whose younger sister had died of diphtheritis a few days previously, was attacked with symptoms of this insidious disease towards the end of April 1858. When seen by Mr. Cribb, her condition was as follows: The tonsils were enlarged, of a dusky red colour, except in the centre, which presented an ulcerated surface, covered with ashey-grey exudation. The tongue was coated; the breath offensive; the neck swollen; the pulse very feeble. She had no cough; no pain; there was some complaint of discomfort about the throat. She ran about the house and played with her dolls as usual. Lunar caustic was applied daily to the throat; wine, bark, with ammonia, etc., were exhibited; and she appeared to be getting well, going about every day, until May 5th, when she began to vomit everything, but was still able to run about. The condition of the throat at this date

was improved; one tonsil was well, the other looking better, not much swollen, although still ulcerated. Pulse very feeble. She slept much.

May 7th. She slept all day, and did not care to be roused to take food. Wine and beef-tea were now retained. She could speak and sit up when asked to do so; but the pulse at the wrist was almost imperceptible.

May 8th. She asked to be taken out of bed and placed on the night-chair, and expired when she was laid on the bed again.

SECTIO CADAVERIS, May 9th. The tonsils were nearly in a healthy state, with the exception of an ulcerated patch on one of them. The mucous membrane of the pharynx was redder than usual. The mucous membrane of the larynx and trachea was slightly injected. One very small ulcer was observed in the larynx. The heart was firm; the right cavities were filled with *firm fibrinous concretions*. The other organs were healthy.

CASE III. Mercy Jane Hughes, aged 9, a fresh coloured, healthy looking girl, was quite well on May 18th. On the 19th, she complained of not feeling well, and was seen by Mr. Cribb on the 21st. On May 22nd, I saw her at her home, in bed. The neck was much swollen; the right tonsil was much engorged, coated with white pseudo-membranous exudation, and so much enlarged as to extend across beyond the median line. The left tonsil was somewhat reddened, but not otherwise altered in appearance. There were swelling and redness of the soft palate and pillars of fauces.

May 24th. She was brought into the Infirmary, as she was getting rapidly worse. The submaxillary and cervical glands were much swollen. The mouth was partly open. The fauces were red and swollen. The tonsils lay in apposition, coated with fibrinous membrane. The breathing was hurried; the countenance was anxious; the pupils were rather dilated; the extremities were cold. She excreted an abundant thick nauseous and very fetid discharge from the throat. She vomited everything. She lay on either side indifferently. Pulse very feeble, quick. She was ordered bark, chlorate of potash, and blisters to the throat and neck; brandy, arrow-root, port wine, etc. In the evening an enema, consisting of two ounces of beef-tea, two ounces of port wine, and ten minims of compound spirits of sulphuric ether was administered and retained.

May 25th. She slept quietly during the night, and appeared to be somewhat rallied. She could now swallow and retain beef-tea and brandy. The enema was repeated, but soon rejected. Breathing was hurried, muffled.

Evening. The injection was repeated, substituting arrow-root for the beef-tea. This was retained. Lunar caustic had been all along freely applied to tonsils and fauces.

May 26th. She died at 2 A.M.

SECTIO CADAVERIS, May 27th. The body was well nourished; half an inch of fat was found under the integuments. The tonsils were ulcerated, sloughing, containing a lymph-like substance deposited in streaks through their substance. There was fibrinous exudation on the soft palate, on both sides of the uvula and velum, on both surfaces of the epiglottis, and in the ventricles of the larynx, about one-twentieth of an inch in thickness. The submucous tissue of the trachea was injected, vascular, and dotted. The upper lobe of the right lung was attached posteriorly by a tough pleuritic exudation, containing granules of tubercular matter. A few crude tubercles of small size were scattered sparsely through the parenchyma of both lungs. One of the bronchial glands was filled with cheesy matter. The lungs were otherwise healthy, crepitating, but notably dry and pale. There was no pleural or pericardial effusion. The heart was healthy, firm. *A tenacious coagulum, consisting of very firm, tough, pinkish yellow fibrine, filled the right ventricle,* was entangled beneath the tricuspid valves, extended into the auricle, and was prolonged into the pulmonary artery for an inch and a half beyond the bifurcation. The left cavities were empty. The liver was dark, congested, exuding blood freely when sliced. The stomach was corrugated, contracted, and dotted with numerous little ecchy-

mosed spots. The kidneys and remaining viscera were healthy.

CASE IV. Ellen Waters, aged 4, a healthy looking child, was quite well on May 21st. She complained of slight indisposition and feverishness on the 22nd. On the 23rd, she had slight soreness of her throat, but could swallow without complaint or difficulty, and played about as usual. On May 25th, she was brought into the Infirmary; and, on examination, the tonsils were found to be much swollen, almost touching, hiding the uvula and pharynx, and covered with yellowish pseudo-membranous exudation, ash-coloured in the centre. The tongue was loaded with dirty yellow fur. The breath was excessively offensive. The neck was swollen considerably, especially below the angles of the jaw. Pulse feeble, rapid.

R Potassæ chloratis 3j; acidi hydrochlorici 3j; tincturæ ferri sesquichloridi 3j; aquæ puræ 3vj. M. Fiat mistura, ejus sumatur cochleare unum amplum omni bihorio.

A blister was applied, like a cravat, to the throat and neck, removed in two hours, and replaced by linseed-meal poultices. The fauces were swabbed with a strong solution of lunar caustic (a drachm to the ounce); and beef-tea and wine were ordered to be administered at short intervals.

May 26th. She passed a good night, but the countenance was pale and depressed, and she was dark around the eyes. Pulse very rapid, but a little less feeble. The tonsils were less swollen, thickly coated with the exudation. The breath was nauseously offensive. Breathing was easy. She had no cough. The blisters rose well and discharged freely. The treatment was continued as before.

May 27th. She was still improving, and had slept well. Pulse rapid, but improved in strength. She took her food and medicine well.

May 28th. She passed a good night; her countenance was brighter; the pulse was more firm, less rapid; the tonsils were less swollen; the exudation was clearing off, leaving the surface healthy. The medicine was continued.

She was convalescent on June 1st, but remained in the Infirmary until the 22nd, to recruit her strength.

CASE V. Ann Hughes, aged 11, a tall, fair, and delicate girl (sister of Case III), was admitted May 25th, 1858. She complained of sore-throat, but did not feel indisposed. The tongue was moist, slightly coated. The breath had a peculiar sickly odour. Pulse 98, feeble. Both tonsils were equally enlarged, prominent, presenting a rugged appearance, from depressions on the surface, intermingled with small pus-like points. The fauces and pharynx displayed much vascular injection. The neck was swollen in the submaxillary region. She was chilly all day. The throat was freely sponged with strong argentine solution, and blisters were applied to the throat and neck. Wine and beef-tea were ordered, and also the following mixture:—

R Potassæ chloratis 3j; acidi chlorici 3j; tincturæ ferri sesquichloridi 3j; aquæ puræ ad 3vj. M. Fiat mistura, ejus sumatur cochleare unum amplum omni bihoris.

May 26th. The throat was better, still swollen. A whitish speck appeared on the tonsil. Deglutition was easy. Pulse feeble, 120. The medicine was continued.

May 27th. She was improving. The tonsils were much swollen. The medicine was continued.

May 28th. She was convalescent. The tonsils remained enlarged, with depressions on their surface, as if little pieces had been excavated or punched out of them.

CASE VI. Ellen Goward, aged 11, while in the enjoyment of perfect health, came to the Infirmary on May 30th, 1858, to see Ellen Waters (Case IV), remained a short time with her, and kissed her when she was leaving. On June 5th, she was attacked with shivering, languor, and sore-throat.

June 7th. She applied at the Infirmary, and came under Mr. Cribb's care. She then complained of complete anorexia, and of such soreness of her throat as prevented her from swallowing. On examination, the tonsils and pharynx were found covered with exudation membrane. The tonsils were enlarged, nearly touching in the median line, much injected; and the fauces generally of a dusky red colour. The tongue was coated with a creamy yellow fur. The breath was offensive. The pulse was quick, very compressible. The throat externally was swollen and tender, and there was some discharge from the nose. Hydrochloric acid was applied to the tonsils and pharynx, and mustard poultices to the neck; a powder of calomel and rhubarb was given immediately; and the ferro-chloric mixture, as in Case V, was ordered every four hours. Beef-tea, etc., were given.

June 8th. The throat was not so sore; she could swallow better. The acid was again applied to the fauces. The mixture was repeated, and wine and beef-tea were ordered.

June 9th. There was less membranous exudation on the tonsils and pharynx; no discharge from the nose. The pulse was fuller and slower. Appetite was returning; she could swallow without pain.

June 12th. The tonsils and pharynx were now clear of exudation, but still dusky; and the tonsils still large. She was gaining strength. The application was omitted; the mixture was continued.

June 16th. She felt now quite well as to her throat, but was weak. The pulse gained in power, and lost in quickness; the tongue was clean; the tonsils were enlarged; the voice was husky. She was ordered to have ten minims of tincture of sesquichloride of iron three times a day. The steel was continued until July 1st, when she was discharged.

July 15th. She presented herself casually, when the tonsils were found to have quite subsided, but presented a rough jagged appearance.

REMARKS. In the cases here narrated, death occurred from asthenia, not from obstruction in the respiratory organs; and such I believe to be the usual mode of death in diphtheritis, confirming a remark of Dr. Watson, that "the tendency to a particular mode of death will prevail in, and characterise, a whole epidemic." The presence of fibrinous concretions in the right cavities of the heart in these three fatal cases, I regard as of great importance in a pathological as well as in a therapeutical point of view. If we can ascertain beforehand in what direction the enemy will make his approaches, we shall be prepared to meet him, and perchance to baffle his attacks. In diphtheritic affections, the state of the throat, the extensive swelling of the neck, and the distressing dyspnoea, tend to divert the attention from the heart, and to direct it predominantly towards the air-passages and lungs. But if we keep in mind the fact that the dyspnoea is occasioned by impediments to the passage of the blood from the heart into the lungs, and is not attributable to blocking up of the air-channels; that, in short, death arrives by asthenia and not by apnoea, we shall know what to guard against, what to do, and what to leave undone. A case of diphtheritis recorded in the recent edition of Dr. Watson's classical *Lectures*, in which tracheotomy was fruitlessly performed, will serve to illustrate my meaning.

"This disease [diphtheritis] has recently (November, 1855) proved fatal in the family of an esteemed member of the Council of this college. The patient, a young man about 17 years of age, was carried off after less than four days of illness. The respiration became at last laborious, and tracheotomy was performed by Mr. Stanley—but in vain. In the larynx and trachea there was no trace of that sort of coriaceous membrane which covered the tonsils, velum palati, and fauces generally. The centre of the swollen left tonsil was occupied by a sloughy abscess, while the right contained about a drachm of genuine pus. At no time during the progress of the disorder was any kind of lowering treatment admissible." (*Lectures on the Principles and Practice of Physic*. Fourth edition, vol. i, p. 865.)

The state of the heart is not noticed. It is evident, that in this case, the laborious respiration did not arise from pulmonary obstruction.

The physicians of the seventeenth and eighteenth centuries were perhaps disposed to attribute too much importance to the presence of coagula in the heart, whilst the tendency in modern times has been rather to underrate their influence. Some twenty years ago, when engaged in drawing up my inaugural essay on *Endocarditis*, I had occasion to inquire minutely into the nature and mode of formation of these *polypi cordis* of old authors; and I then endeavoured to demonstrate that, in general, concretions found in the left side of the heart are deposited under the influence of some inflammatory condition of the blood, and that those found in the right cavities depend on stasis of the circulating fluid.* I will not now take up the subject anew, but will rather, in preference, refer the curious inquirer to Dr. B. W. Richardson's able experimental and philosophical treatise,† in which all that relates to the forma-

* *Endocarditis: an Inaugural Dissertation*. By J. Milner Barry, M.D. Edinburgh, 1837. pp. 17-21.

† In the third volume of Testa's *Work on the Heart*, there is much curious matter in reference to *polypus cordis*. *Vid. Testa, Trattato delle Malattie del Cuore*. 3 vols. 8vo. Bologna, 1811.

‡ The Cause of the Coagulation of the Blood. By B. W. Richardson, M.D. London, 8vo. 1858. Chap. iii, and Appendix on "Depositions of Fibrine in the Heart and Blood-vessels during Life."

tion, symptoms, diagnosis, etc., of cardiac concretions, is treated of in a masterly manner.

A feeble rapid pulse, pallid countenance, dilated pupils, cold extremities, and vomiting, are symptoms suggestive of the forming of clots in the heart, although not absolutely pathognomonic. The local symptoms are rarely characteristic. Death occurs suddenly and unexpectedly in many of these cases.

In the following case, which I saw in private practice, in consultation with Mr. Turner, death seemed to have been occasioned by suffocation.

CASE VII. I was sent for in haste to see, at 7 A.M., September 19, 1857, Master O., aged 8. On the 15th he was a little indisposed; better on the 16th; he complained of his throat on the 17th; and was seen on the 18th by Mr. Turner, who then noticed a patch of white membrane on the pharynx. He applied lunar caustic to the pharynx freely, ordered a rubefacient liniment, and directed bark, beef tea, and wine to be given at short intervals. I found him sitting up in bed, the face flushed, countenance anxious, mouth partly open, nostrils dilated, breathing hurried, suffocative, not stridulous; the breath was very offensive; a dirty yellow discharge flowed freely from the nostrils whenever the respiration became difficult; the throat and neck were much swollen; the tongue was foul; the tonsils, velum pendulum palati, and fauces generally were dusky red, where not covered with the dirty-white membranous exudation, which, however, overspread a large portion of the fauces. When this was detached, the surface underneath looked raw, and was of a lurid red colour. He coughed off occasionally a bloody gelatinous-looking fluid and portions of membrane from the throat, with temporary relief to the breathing. The throat was well sponged with a strong solution of lunar caustic; and tonics, stimulants, and nourishment, were assiduously administered.

2 P.M. I was sent for with urgent haste, and reached the house in a few minutes; but the poor little patient was dead ere I arrived. He had been going on well, apparently improving, and the breathing easier for two or three hours, when a fit of coughing came on, he threw out his arms, became dark in the face, and—was dead.

We concluded that when the cough came on, a portion of the membranous exudation became detached, dropped into the *rima glottidis* and caused immediate suffocation. We could not procure a *post mortem* examination.

This was strictly a sporadic case. We were unable to trace any infection, and the disease did not spread through the boarding school, in which there were several little boys of about his own age.

In Case VI, that of Goward, the disease seemed to have been communicated by direct infection.

In a clinical lecture recently delivered by Professor Laycock,* diphtheritis is attributed to the presence of the microscopic fungus named *Oidium Albicans*, discovered by Professor Berg, of Stockholm, in thrush, the *aphthophyte* of Gruby. I have not as yet met with it in any microscopic examination of the diphtheritic exudation that I have made. The membrane effused in idiopathic diphtheritis so far as I have observed, is a loose fibrinous structure containing numerous plastic corpuscles and occasionally pus-globules. The *Oidium* will probably be found only in pellicular affections occurring in persons with broken down constitutions.

The treatment which proved most successful was that employed in cases IV, V, and VI. The success attending the administration of the muriated tincture of iron in erysipelas, and of chlorine, chlorate of potash and hydrochloric acid in low fevers, and in scarlet fever, as reported from time to time by various practitioners of good repute and extended experience, suggested the idea that these valuable therapeutical

agents might be advantageously tried, either singly or in combination, in the treatment of diphtheritic affections, which are connected by so many analogies and such various affinities with the diseases referred to. In accordance with this view a ferro-chloric mixture was prescribed, in the care of Ellen Waters (Case IV); and the benefit accruing to her from its exhibition was so decided, as to lead to the use of a similar mode of treatment in the cases which subsequently presented themselves at the Infirmary, two of which are reported above (Cases V and VI). The mixture was taken very readily by all the little patients; but it might be made more palatable by the addition of simple syrup, or of syrup of orange or ginger. I am inclined to think that the chlorine, disengaged by the action of the acid on the chlorate, exerts a considerable influence as a curative agent, locally and generally, when thus prescribed.

The treatment of diphtheritic affections might perhaps be briefly summed up as follows:—

1. *Internally.* The ferro-chloric mixture, modified according to the age of the patient and other circumstances.

2. *Externally.* A cravat of blistering-plaster applied for an hour or two, and replaced by poultices. In less urgent cases, terebinthinate epithems.

3. *Topically.* Swabbing the fauces with a solution of lunar caustic (a drachm to the ounce); with a mixture of chlorinated soda and glycerine; or with hydrochloric acid.

4. *Dietetically.* Beef-tea, wine, brandy at short intervals.

5. If the stomach rejects food, or if the powers of life are failing, enemata as in Case III.

Good nourishing diet, with porter or wine, and steel will be required for several weeks after convalescence has set in, as debility and anæmia are very marked sequelæ of the disease.

ST. GEORGE'S HOSPITAL.

DIPHTHERIA.

[Communicated by G. GODDARD ROGERS, M.D., Medical Registrar.]

CASE I. Sarah B., aged 22, housemaid in the family of a gentleman, to whom we recently alluded as having lost his wife and four children either by diphtheria or malignant throat affection, was admitted on June 28th, under Dr. Pitman, with pain on both sides of the throat, and difficulty in swallowing. Six days previously she felt faint, and complained of pain in a spot corresponding to the left submaxillary gland, which gradually became worse, and spread to the right side. It was unaccompanied by rigors or vomiting. No swelling or redness were perceptible externally over the seat of pain. Her voice was natural, and breath not at all offensive. A small white patch of membrane was visible on the right tonsil; this, when removed, left the surface somewhat redder than natural. She complained much of thirst; her tongue was furred; pulse 90 and rather weak; bowels open; urine clear and healthy. Her spirits were very good, and her countenance as cheerful as if she were in her usual health. Dilute hydrochloric acid was ordered to be applied to the throat night and morning, and the following mixture to be taken every four hours:—

R. Acidi hydrochlorici dil. ℥x; tincturæ ferri sesquichloridi ℥xv; potassæ chloratis gr. x; tincturæ calumbæ ʒj; infusi calumbæ 3 xj.

Six ounces of port wine were also given.

The following entry occurs in the clinical book:—"On tearing out a bit of membrane which was spat up after the application of the acid, and placing it under the microscope with a quarter power, there appeared, 1. Granular matter; 2. Pus; 3. Epithelium of the 'pavement variety'; 4. Pieces of translucent homogeneous membrane; 5. A few fusiform, nucleated bodies resembling fibre-cells."

June 29th. There was more difficulty in swallowing. Her general health appeared equally good.

June 30th. Even liquids were swallowed with very great pain. She always slept well at night.

July 1st. Deglutition was easier. The right tonsil was quite clean. On the left tonsil there was a patch of false membrane.

July 2nd. No change had occurred.

July 3rd. The left tonsil was nearly clean. Her spirits were not so good. She complained of dysphagia, and had

* Clinical Lecture on Diphtheria as caused by the *Oidium Albicans*, etc. By T. Laycock, M.D. (Medical Times and Gazette, May 29th, 1858.)

† On the Treatment of Erysipelas by Muriated Tincture of Iron. Monthly Journal of Medical Science, 1853. Papers by Dr. Balfour, Mr. Hamilton Bell, etc.

On Chlorine in Scarlet Fever. J. Braithwaite on the Use of Oxygenated Muriatic Acid, in Duncan's Annals of Medicine, vol. viii, p. 96. Taynton and Williams, in Medical Gazette, vol. iv, p. 432.

On Chlorate of Potash in Scarlet Fever. Dr. H. Hunt in Medico-Chirurgical Trans., vol. xxvi, p. 142. Watson's Lectures, vol. ii, p. 909.

On Chlorate of Potash in Low Fever. Dr. Garnett, in Duncan's Annals of Medicine, vol. ii, p. 409; vol. iii, p. 445. Copland's Dictionary, art. "Fever." Watson's Lectures, vol. ii, p. 854.

On Chlorate of Potash and Hydrochloric Acid in Scarlatinal Affections. Blyth, in Medical Times and Gazette, April 1853; and Dr. Hamilton Roe, in Lancet, March 1858.

On Hydrochloric Acid in Low Fever. Clinical Lecture in Lancet, Jan. 30th, 1858, by Dr. T. K. Chambers, who refers to Dr. F. W. Mackenzie.

Prize Essay on the Cause of the Coagulation of the Blood, *ut supra* cit. Appendix 5. On the Alkalies and Acids as Remedial Agents. By B. W. Richardson, M.D.