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with the compliments of
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THREE UNUSUAL
CASES OF DIPHTHERIA.

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CASE I. *Membrane extending from throat to external ear; use of trypsin; recovery.*—Male, aged six and a half years, white; has Pott's disease of two years duration, affecting mid-dorsal vertebræ; has had discharges from ears since early infancy, and for past nine months. Whenever the ears were syringed, some of the fluid passed into the throat and escaped from the nose, indicating perforation of both membranæ tympani, thus permitting the injected fluid to impinge directly upon the fenestræ of the inner ear, in consequence of which the intralabyrinthine pressure became altered and the patient was made dizzy and nauseated, sometimes vomiting. The left ear had not been discharging for about four weeks.

March 3, 1887. Patient began to complain of slight sore throat, but was not seen by me until two days later, when examination of throat revealed a deposit of doubtful character on the right tonsil; it was easily removed with a mop, except a small piece, size of a large pinhead; the tonsils and fauces were neither reddened nor swollen to any noticeable

extent, and there was but very little enlargement of the submaxillary glands; very slight fever; pulse good. He was not in bed, but was subdued and disinclined to play; directed him to be put to bed at once, and isolated.

4th. Considerably prostrated; membrane now covered about one-third of right tonsil, and a deposit was beginning on the left one.

6th. Membrane has entirely disappeared, but the mucous membrane of the fauces and pharynx was much congested, dark red in color; considerable swelling and some tenderness at the angle of the jaws and upper cervical glands on right side; complains of severe pain in right ear; last night had a smart hemorrhage from the right nostril; no coryza or hemorrhagic discharge from nose to-day; very weak.

Up to this time the treatment had been two grains of calomel every two hours till bowels became loose, then every four hours; stimulants were also given. Henceforth the calomel was discontinued, stimulants increased in quantity, and a poultice ordered over the ear and neck.

7th. Passed a sleepless night on account of paroxysms of excruciating pain, which he referred to the middle of his forehead; right ear now discharges muco-pus freely; right parotid gland swollen and tender; no longer any pain in swallowing; general condition good; poultice to be continued; discharge from ear to be removed with absorbent cotton, boracic acid insufflations; stimulants.

8th. Tragus swollen and tender, mastoid slightly so; pain in head still persists with unabated severity; *no membrane* to be seen in the external auditory canal; treatment continued with the addition of morphia to relieve pain, and syrup of phosphates of iron, quinine, and strychnine.

9th. Dr. C. W. Richardson made the visit with me. We found the external auditory canal filled with a diphtheritic deposit which extended into the concha of the ear, covering the inner surfaces of the tragus and antitragus, and partially filling the incisura intertragica; the external surface of the former not covered by membrane, but swollen, injected, and painful to the touch. The membrane could not be dislodged without force; any attempt to do so was painful and caused the subjacent skin to bleed. In accordance with Dr. Richardson's suggestions, I directed the ear to be thoroughly syringed with a weak solution of boracic acid every hour, after which the external auditory canal and the concha were to be filled with a solution of equal parts of water and liquor calcis; this solution was to remain in contact for five or ten minutes, then powdered boracic acid was to be insufflated in the ear; poulticing was discontinued.

10th. General condition not so good; membrane has extended over the entire concha; swelling of parotid and neck much greater; treatment continued as before. A mixture containing *trypsin* was prescribed:

R.—Trypsin	.	.	.	.	.	gr. xxx.
Sodii bicarb.	.	.	.	.	.	gr. x.
Aq. destillat.	.	.	.	.	.	ʒj.

S. as directed.

I directed the trypsin to be used in place of lime-water solution as soon as it could be procured. The mother was told to syringe the ear every half hour, then to fill the external auditory canal with the trypsin mixture and to paint it over the concha.

11th (A.M.) Trypsin had not been used as directed; only one drop each time had been put into the canal, but had been painted on faithfully. However, the mem-

brane has entirely disappeared from the concha, leaving an excoriated surface. The trypsin was now directed to be warmed (which I had inadvertently omitted previously) and to be applied every fifteen minutes, the ear being thoroughly syringed beforehand. The external auditory canal is still nearly filled with membrane; at no time since it has been present has any of the fluid passed into the throat, nor has any dizziness followed syringing. (P.M.) Since last visit, the trypsin mixture has gradually passed into the throat, as if it made a passage for itself through the diphtheritic deposit. The membrane is said to come away in small flakes when the ear is washed out; the deposit is thinning, and extends less far toward the meatus. The parotid is much less tender. I directed the trypsin to be applied every two hours and twice in the night.

12th. Membrane is disappearing very rapidly; swelling of parotid and neck greatly diminished. Trypsin every two hours.

13th. *No membrane to be seen*; the entire external auditory canal is excoriated and reddened; swelling of tragus and neighboring parts entirely gone. Trypsin discontinued.

For the past few days, patient has been unable to retain anything in the stomach, so that it was necessary to resort to nutrient enemata; a mixture of bismuth and creasote was given by the mouth.

16th. Stomach no longer irritable; is hungry; wants to be dressed and get up.

From this date his convalescence has been rapid and satisfactory; no paralysis has yet occurred.

REMARKS.—The extension of diphtheritic membrane to the external ear is such a rare accident that most otologists do not even mention it in their books. Those who do speak of it—*e. g.*, Politzer, think that

it is almost exclusively in scarlatinal-diphtheria that it is found. Doubtless in my patient, the chronically inflamed mucous membrane of the middle ear afforded a very fertile soil for the diphtheritic deposit, and the previous perforation of the membrana tympani allowed its extension without hindrance to the external ear, where the parts were already irritated from the long-continued discharges.

It is interesting to note that the deposit in the throat was not at all extensive, and that the involvement of the ears seems to be an extension of the membrane from the naso-pharynx, where a fresh deposit took place after that on the tonsils had disappeared. The epistaxis and the sudden and marked increase in the swelling of the cervical glands appear to me to indicate plainly the very moment that the naso-pharynx first became affected.

On account of the accessibility of the external ear, both to observation and to treatment, I had hoped to decide definitively the value of trypsin as a solvent of diphtheritic membranes.

But just how much was due to the trypsin, and how much to the mere macerating effect of the watery solution in which it was suspended, and also to the natural tendency of the membrane to exfoliate, is very uncertain.

This much, however, was observed, that while under the lime-water treatment, the membrane was evidently extending, yet very soon after the trypsin began to be used this tendency to spread was checked, and within twenty-four hours the thinnest part of the deposit, namely, that in the concha, had disappeared and within three days not a vestige of membrane was visible in the ear. Moreover, after the first few applications, the trypsin mixture opened a passage for itself through the obstructed external auditory canal

into the throat. On the whole, I am inclined to regard trypsin with favor, and shall certainly try it again at the first opportunity.

CASE II. *Diphtheria, paralysis of the diaphragm; death.*—Female, æt. six years, colored. Illness began Oct. 5, 1886; was first seen by me four days later, when patches of diphtheritic membrane were found on both tonsils, and on velum palati, with moderate enlargement of submaxillary glands. During the next few days the membrane continued to spread and to increase in thickness until on the 11th of Oct. it covered the whole of both tonsils, the pillars of fauces, the uvula, and the velum palati; the neck was enormously swollen. Eight days later the membrane had entirely disappeared, and the neck was of natural size. The voice, however, had been noticed to have a nasal intonation for a few days previously, and there was slight difficulty in swallowing, liquid coming back through the nose; during the entire attack there was but little fever; the prostration was excessive.

The treatment was tincture of chloride of iron and chlorate of potassium, and the following gargle:

R.—Liquor. sod. chlorinat.	. . .	ʒiv.
Aquæ menth. pip.	. . .	ʒijss.
Glycerine . . . . .	. . .	ad ʒiv.

This gargle was not distasteful to the patient, and controlled the fetor completely. Brandy was given freely. Oct. 21. Syrup of the phosphates of iron, quinine, and strychnine, and syrup of iodide of iron were substituted for all other medication. She improved slowly but progressively, and as I did not anticipate any further trouble, I ceased my visits on Nov. 2d.

About a week afterward I was summoned to see

her again. She had been seized suddenly the night before with very high fever and vomiting. In the interval between my last visit and this time, paresis had developed in both legs, and in the muscles of the neck also, to such a degree that the head drooped forward upon the chest. She could raise her head, however, but could not hold it erect for more than a few seconds; there was a good deal of trouble in deglutition, as the velum palati was now paralyzed completely. I prescribed a simple febrifuge. The next day found her about the same, except that the fever was much less. Prescribed $\frac{1}{4}$ th grain of strychnine in suppository three times a day. On the following morning she was extremely weak, wholly unable to swallow, could not rid the pharynx of mucus, which was very abundant and tenacious; respirations were labored, but not accelerated; examination of lungs negative. Strychnine continued; nutrient enemata with brandy ordered. In the afternoon the embarrassment of respiration was greater; the breathing was almost entirely costal, the abdomen scarcely moving. Strychnine continued.

11th. (A. M.) Could swallow liquids more readily, but they caused coughing. (P. M.) Seems brighter and stronger; great quantity of mucus in pharynx. Administered $\frac{1}{2}$ d grain strychnine hypodermatically.

12th. (A. M.) Passed a very restless night, but there were no toxic symptoms from the strychnine. Rids the pharynx of mucus with less trouble. (P. M.) General condition unchanged; almost no action of the diaphragm, as shown in the act of coughing, particularly. Strychnine suppositories continued.

13th. Lividity of nails and hands; respiration

exceedingly labored; paralysis of diaphragm now complete, being shown by the fact that the epigastrium and the hypochondria were drawn inward during inspiration instead of being curved outward, as normally. Moreover, the protrusion produced in health by the descent of the diaphragm could not be felt. The lower ribs, during inspiration, were raised excessively and with a heaving motion. The cervical accessory respiratory muscles being already paralyzed could not be brought into action, hence there was but very little motion of the upper part of the thorax. Strychnine continued; mustard plasters applied to back of neck and to chest, and heat to extremities.

14th. (A. M.) Much to my surprise, could now swallow milk and brandy without the least trouble; otherwise her condition was the same. Gave $\frac{1}{98}$ th grain strychnine, hypodermatically. (1 P. M.) Much worse; hypostatic congestion of lungs had now developed; mucus accumulating rapidly in trachea and bronchi. Gave $\frac{1}{98}$ th grain of strychnine and four minims of tincture of digitalis and tincture of belladonna, hypodermatically. (8.45 P. M.) In my absence patient died very quietly, having become very cyanotic. There was no evidence that the strychnine had produced its toxic effect.

REMARKS.—Paralysis of the diaphragm is mentioned in our text-books as one of the rarest among the sequelæ of diphtheria, but when it does occur, the case, as a rule, terminates fatally. It seems very odd that this child should regain the ability to swallow so completely, and yet be so near to death. Whether the strychnine was of any service, or whether it did harm, it is impossible to say. At first I hesitated to employ it on account of the elevation of temperature, which, however, was never

above 101.5° after I began to use it. The sufferings of the patient were dreadful to behold, and the utter inability to relieve them by any therapeutic measures was profoundly impressed upon me.

CASE III. *Diphtheria with extensive disturbance of sensation.*—Female, æt. ten years, colored. When I first saw her she was three weeks convalescent from a moderately severe attack of diphtheria. The only trouble she complained of at this time was great difficulty in walking (not so much from weakness, as from unsteadiness of gait), and slight difficulty in swallowing, fluids returning in part through the nose. I found that she was analgesic in legs and arms, but for lack of time deferred making a thorough examination until several days subsequent. Prescribed $\frac{1}{8}$ th grain strychnine in solution, three times a day, and syrup of iodide of iron.

The following are my notes of what was discovered at the next visit: Nasal intonation of voice; paralysis of velum palati; gait ataxic, worse when the eyes were closed; inability to stand steady with the feet together and eyes closed; patellar reflex absent; some muscular weakness of legs, especially the right one, and of the right arm; complete loss of sense of smell as far as could be detected by spirits of camphor, cologne water, and kerosene; sense of taste absent over entire tongue; says she cannot taste salt, pepper, or strychnine, which I applied; hearing apparently normal; she has been very short-sighted for several years, but thinks she cannot see as well as formerly; no satisfactory test of sight could be made; complete analgesia was found over nearly the entire body, including the face and head, the exceptions being a circumscribed space in the palms of both hands, and in the soles of both feet, also along the sides of the spine in the dorsal region, but

even in these parts the sensation of pain was much diminished. At any of the analgesic parts a pin could be thrust entirely through a fold of skin without the least pain to the patient. The mucous membrane of lips, mouth, and tongue, also, could be pricked as hard as possible, without producing the least pain. There was great diminution of the tactile sensibility. This was tested by means of a rough æsthesiometer in the shape of a pair of carpenter's dividers, with very sharp points. Nowhere could she detect that she was being touched with more than one of the points, even if they were four or five inches apart. She was also unable to distinguish heat from cold. For this test, two vials, one filled with hot water, the other with cold water, were used.

Several other physicians examined the patient subsequently, and found the same condition that I did, so that there was no deception; the girl was unusually intelligent, and very willing to submit to examination. There was no evidence of hysteria, either now or in the past.

The strychnine was continued in the same dose ($\frac{1}{16}$ th grain) for several weeks without any unpleasant effects, except for the first two or three days, during which there was slight stiffness of the jaws and neck, and a feeling of general uneasiness.

After one week of treatment she began to complain of the bitterness of the medicine; could taste other things also; her gait was improved considerably. Two weeks later, could smell for the first time, and was able to swallow without difficulty. She continued to improve, and, in about six weeks from my first visit, all the abnormal conditions had disappeared, and she was perfectly well.

UNUSUAL CASES OF DIPHTHERIA. II

REMARKS.—It is not infrequent to find more or less disturbance of sensation preceding or accompanying diphtheritic paralysis, but usually confined to the paralyzed parts. I have not been able to find any case reported in which the disturbance of sensation was so great and so extensive, as in this patient. Such cases are, probably, quite rare, but I believe not so rare as one would at first suppose, for my patient was quite unaware of her condition, which would have escaped unnoticed without the very careful examination that was made.



