cidents and ill effects in certain cases, it seems to me to possess the great preponderance of advantage in the treatment of severe cases; and I believe that the reduction of mortality at any rate far offsets any of those ill effects which we sometimes see.

ANTITOXIN IN DIPHTHERIA.¹

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IT has seemed to me, after listening to this series of able papers on the subject of diphtheria and its treatment, that the most interesting way in which I could take part in the discussion would be to give an account of the results obtained at the Boston City Hospital with antitoxin from February 1st, the date at which Dr. Withington's observations end, to May 31st. In the short time which is allotted me it will be possible to give these results in a rather broad way only, reserving fuller details for some other occasion.

Whatever may be thought of the value of statistics in proving the worth of any form of treatment, it is certain that antitoxin for the present, at least, will be judged chiefly by the figures which are supplied by institutions in which a large number of cases of diphtheria are treated. Yet for purposes of comparison between the present and the past, there is a decided choice in the way such figures are presented. The mortality-rate may be deduced only from the cases in which the serum was injected, or it may be made up from the total number admitted, whether they received it or not. So long as it was not withheld from a lack of supply, but only because the disease either seemed too mild to require it or had already reached the stage where no treatment could avail, the latter method seems unquestionably the fairer, since it entirely eliminates the personal factor in the selection of cases, and gives no ground for the suspicion that the severe ones failed to receive treatment, lest they should spoil the statistics. In the present instance, however, the difference is very slight.

In gathering the following figures, based on the cases admitted between February 1st and May 31st of this year, I have not made the bacteriological examination the supreme test, since I have included several fatal cases which either died so soon after entrance that no cultures were made, or else were such typical cases that the failure to find bacilli on one or two attempts seemed without much doubt to be due to accident. In every case which recovered, however, the diagnosis was made in the laboratory. As a result, a higher death-rate is given than perhaps actually occurred; but if antitoxin can stand this form of treatment, so much more credit is due it. Under this classification, within the period mentioned above, 238 cases were admitted, of whom 60 died—193 being treated with antitoxin, with 47 deaths. If these figures be added to Dr. Withington's, which have already been reported, a total of 358 cases and 86 deaths is given, with a percentage of 24, as opposed to 290 admissions during the same period last year, with 137 fatalities (47.2 per cent.). If we exclude 36 cases which entered moribund, and died within forty-eight hours, and six whose death was not connected

with diphtheria, the mortality-rate is reduced to 13.9 per cent. A comparison of the results obtained in the operative cases, either intubation or tracheotomy, is just as striking, not only in the proportion of recoveries but also in the marked reduction in the number in which such interference was necessary. Of the 290 cases treated a year ago, 77 (26.5 per cent.) required operation, only nine recovering, while in the larger number treated this year operation was necessary in but 41 (11.5 per cent.), and of these 17 recovered. Of the 24 deaths, 14 occurred within twenty-four hours after admission, while 10 received no antitoxin. Of the 31 cases treated by the serum 17 recovered, 54.8 per cent., while in 7 of the 14 fatal cases, operation, injection and death all occurred within twenty-four hours after entrance. As I look back over the past few months I do not think that this marked improvement can be accounted for by any change in the severity of the disease. It has seemed to me that the normal number of serious cases had been admitted, an opinion which is shared by other men who have been following the work there, while similar results obtained in other hospitals all over the world make it extremely improbable that so sudden and universal a change should have occurred. Nor do I think that the smaller number of operative cases and the larger number of recoveries are to be accounted for by any alteration in the type of the disease, but rather that the reduction in the number of such cases, judging from the effect produced in the visible membrane in the throat, is due to the action of antitoxin, partly in preventing the extension of the membrane downwards, and partly in arresting its further development in cases where the larynx is already involved and in hastening its disappearance, since time and again patients were admitted on the borderline of operation, in whom the disquieting symptoms rapidly subsided under antitoxin, steam and calomel sublimations. That antitoxin does not always shorten the time during which the tube is worn is sufficiently well shown by the fact that it was not permanently removed till the seventh day in one patient, the eighth in one, the tenth in one, the twelfth in one and the eighteenth in another. Of the other eleven successful cases it was worn one day by one,² two days by two, three by one, four by two, five by four, and six by one; the average time being six days.

Regarding the local changes in the visible membrane in the throat, in none of the cases which have come under my own observation have any extraordinary effects been seen; although large pieces have occasionally exfoliated as under any form of treatment, it has usually disappeared in a perfectly orderly manner. The most remarkable effect produced in the membrane has been its failure to extend except in rare instances, and in many of these the advance seemed to have been permitted by the small size of the dose, a second injection being often sufficient to check further progress; as a result the active stage of disease is shortened, the membrane disappears sooner, since less is formed, septic absorption is diminished, and the swelling of the cervical glands and the infiltration of the tissues of the neck rapidly subside. In some of the cases, even of those accompanied by the constant oozing of a fetid bloody discharge from the nose and mouth, where sepsis had already produced such serious cellular changes that recovery was im-

¹ Remarks before the Massachusetts Medical Society at the Annual Meeting, July 12, 1895.

² This patient died, six weeks later, of scarlatina.

possible, the local effect on the membrane and the improvement in the child's sense of comfort and in his mental condition seemed to justify its use. It has often seemed in such cases that antitoxin had done all that could be expected of it in counteracting the diphtheria toxine, the patient dying not because it had failed to do its proper work, but because it is no more able to excite a dead cell than is electricity to stimulate a dead muscle. Such failures suggest that these cases might have been saved by an early injection, but the death of a few where treatment was begun within the first two days proves that some other factors beside time are at work, which may not be clinically evident, perhaps a mixed infection.

The story of antitoxin is, however, not all told in chronicling only its good effects; unfortunate accidents have undoubtedly followed its use, but the cases which have come under my own observation have been practically free from such results. Various forms of skin eruptions have been comparatively frequent and have at times been attended by considerable constitutional disturbance and fever and the appearance of a trace of albumin in the urine, but the condition of the patient was never such as to give rise to anxiety. In some half-a-dozen of these cases the joints became swollen, tender and painful, but this almost invariably passed off within forty-eight hours. Rarely after one injection the eruption reappeared ten or twelve days later, the relapse being at times accompanied by more serious symptoms than occurred with the first manifestation.

In a disease where complications are common under any form of treatment, the evidence must be very conclusive before the charge that antitoxin is responsible for the occurrence of endocarditis, broncho-pneumonia, nephritis and paralysis can be sustained, and is not supported by the cases now under consideration. In order to determine in what proportion such complications existed, I have gone carefully over the records of these 238 cases, but regret that the figures obtained can be regarded as only closely approximate, since the histories are not always sufficiently explicit; but when doubt existed I have tried to err on the side against antitoxin. All cases, for example, have been classed as broncho-pneumonia in which slight signs in the lungs, as noted in the records, were accompanied by a rise in the respirations and temperature, though in many of them the process in all probability was confined to the bronchi, and I have also included those cases in which it developed during the course of scarlet fever acquired subsequent to admission. Those in which it existed prior to the injection are naturally excluded. Under such a system 25 instances were found, in 11 of which it evidently contributed to the patient's death. The occurrence of traces of albumin in the urine was common, as it always has been, at times immediately following the injection of the serum, once or twice in large amount. In a certain proportion of the cases, as Dr. Morrill's statistics show, this must be looked upon as its result, though in others it was probably an accidental coincidence. In a few cases in which both a chemical and microscopic examination of the urine was made before and after its use by Dr. Ogden, no change was discovered. In only 25 cases did the amount of albumin rise to as much as a large trace as reported from the laboratory, while in only one, the fatal issue being preceded by convulsions, could the condition of the kidneys be

considered as taking more than a very remote part in causing death.

The discovery of only four cases of paralysis among the records, only one of which seemed likely to be serious, may be in part accounted for by the fact that it is often of late development, and may have come on after the patient's discharge. It is also possible that some slight cases, when it was confined to the throat, were overlooked, but the figures even then give no support to the idea that it is more common after antitoxin than under other circumstances. Cases where systolic murmurs developed in the cardiac area were sufficiently common, and many of them persisted till the patient's discharge, but as most of the patients were under observation but a short time it is impossible to say how many were permanent, and statistics on this subject would have little value either way.

With the use of antitoxin as a prophylactic measure my experience is limited to about a dozen cases, all of whom escaped the disease. The infection of the two gentlemen who preceded me in charge of the wards, and my own escape after an immunity dose of 250 units of Behring's serum, is probably nothing more than an odd coincidence.

Before the 8th of April almost all of the cases were treated by Behring's antitoxin, or that furnished by the Pasteur Institute of New York; but in a few instances Aronson's was also used; since then a supply has been most generously provided by our State Board of Health, sufficient for most of the patients who needed it, and I am very glad of this opportunity to acknowledge our indebtedness to them, and to congratulate them on the prompt way in which their material was furnished to the profession, and the success which has attended its use.

Under ordinary circumstances the patients received a dose varying from 500 to 1,500 units on the day of entrance, and again on the following day or the day after, if the progress of the case seemed to require it. In a few of the fatal cases very much larger amounts were given, while some of the successful results followed the injection of 100 c. c. (1-50,000) of the State Board of Health product given in the course of six or seven days. Contrary to the opinion which I understood Dr. Park to express, there seemed at times a distinct advantage in these large doses.

The anterior and outer surface of the thigh was the site usually selected for the insertion of the needle, and the local reaction was usually slight, though a few of the children complained of considerable pain on movement of the leg for the first twenty-four hours or so. In order to avoid the possibility of any interference with the performance of their duties by lameness, several of the house-officers, who took an immunity dose, selected the upper arm for the seat of the injection, and in nearly every instance it was followed by marked swelling, which was accompanied by intense itching. In four or five cases an abscess resulted, but as this also followed in a few instances during the same period the hypodermic injection of a drug, and ceased after a serious conversation with those who were responsible for the administration of the serum, they were probably the result of some failure in technique.

Other treatment consisted in the use of iron, brandy and the cardiac stimulants, feeding by the nasal tube being resorted to in appropriate cases with apparently brilliant results. The only local treatment was the

irrigation of the nose and throat, when the child did not resist too strenuously, with a normal salt solution, or with Dobell's. After the membrane had disappeared, an effort was made to hasten the departure of the bacilli with mild peroxide of hydrogen solutions, boracic acid or lemon juice. Croupy cases were treated with steam and calomel sublimations.

In conclusion I would say that the careful observation of these cases, most of which were under my care during a portion at least of their illness, has changed my position from that of a good deal of scepticism regarding the value of antitoxin to one of considerable optimism. While it has not fully justified all the claims of its most ardent supporters, since death sometimes occurs even when the injections are made early in the disease, in cases which seem clinically appropriate, a marked reduction in the mortality-rate has followed its use. In the rank and file of cases the exfoliation of the membrane is hastened, the amount of septic absorption is diminished, and the danger from this source therefore decreased, while of those which are complicated by laryngeal stenosis, a smaller proportion require operation, and of these a relatively larger number recover. Even in hopeless cases the membrane may clear up under its use, while its effects in counteracting the diphtheria poison are frequently seen in the brighter mental condition and improved sense of well-being of the patient. Unfortunate results have occasionally followed, perhaps from some idiosyncrasy on the part of the patient, perhaps from some chemical change or decomposition in a particular specimen, but whatever its cause, in the face of its many advantages, such accidents should no more deter us from its use than the occasional death from ether should prevent its employment as an anesthetic, though it might suggest some limitation to its administration as a routine practice to every patient. Even if all the cases of broncho-pneumonia or albuminuria which were observed could be ascribed to it — an impossible task in a disease where such complications are common under any form of treatment — they are more than offset by a reduction of fifty per cent. in the mortality-rate.

Clinical Department.

A CASE OF ANEURISM OF THE THORACIC AORTA.¹

BY SARAH M. CRAWFORD, M.D.

E. F., married man, sixty-four. Born in Basel, Switzerland. Came to Massachusetts in 1858. Clerk in banking-house in Boston over thirty years.

Family history good. Grandparents, uncles and aunts died at advanced age. Parents died of pneumonia — father at fifty, mother at seventy-two.

Patient was five feet, ten inches in height, erect, broad-shouldered and compactly built. Normal weight about 185 pounds. Complexion and eyes dark; hair originally black, not much whitened by age. Health always robust until three years ago, when he received a blow on his chest over the region of the heart. He was struck, while crossing Devonshire Street in Boston, by iron pipes or railroad iron which projected from the end of a loaded wagon or truck. He had waited

for the team to pass, not seeing the projecting irons, which struck him as the team whirled round the corner. He did not fall, but was faint and sick. He went at once to his office in State Street, closed up for the day, and went to his home in Longwood Avenue, Roxbury. He continued to feel faint, sick and shaken up; took claret frequently through the afternoon and evening (using an entire bottle); could not eat dinner, and sat up very little. His wife applied wet compresses and arnica. The next day was Sunday. He remained in the house, resting on the sofa throughout the day; no particular pain, but lame and sore. The skin over his chest was quite extensively discolored. His wife said that the discoloration covered a place as large as her two hands. Monday he resumed his ordinary occupation and said very little about his injury. In a few days he appeared to be as well as usual; but he soon began to have a slight cough, to which he paid little attention.

In November, 1892, he had an attack of what he called *la grippe*; did not consult a physician; went to his office every day and did his usual work, favoring himself when he could by sitting instead of standing at his high desk, as was customary with him. He felt weak and miserable, but would not give up. He never felt well afterwards. His cough grew worse; he had occasional shooting pains in his chest; his throat was troublesome; and he complained of shortness of breath, and of weight about the chest.

He consulted Dr. Wm. Wesselhoft; was under his care a few weeks. Cough did not improve, although not very distressing and not constant. He then consulted Dr. Greene, of Nervura fame; afterwards, Dr. Copeland, under whose care he remained about six months, going to his office twice a week for treatment of nose and throat.

In January, 1894, through the influence of his wife, whose family physician I had been for many years, he consulted me. He now weighed about 170 pounds. He complained of cough, choking, and inability to swallow solids, and of dyspnea after exertion, irritation of the throat and pressure on or in the chest. He had occasional shooting pains in chest; appetite fair; bowels regular; sleep good. His cough was laryngeal, loud and barking, with a metallic ring. Upon examination, I found tongue normal, throat dark and congested, the mucous membrane of the whole pharynx much swollen, and the uvula twice its normal size. There were two irregular streaks about an inch long, extending longitudinally on the posterior wall of the pharynx, where the mucous membrane looked rough and granular.

Physical signs: By inspection there was a lack of elasticity in the movements, and a slight difference in the size and shape of the two sides of the chest in front, the left being the more prominent; in the back the right side just below the scapula was more prominent than the left. The percussion note on the right side was a little higher in pitch, and tympanitic. On the left there was diminished resonance. By auscultation, the respiratory sounds were heard more distinctly over the right than over the left chest, and occasional sibilant and sonorous râles were heard over both lungs. The area of heart dulness was normal, and nothing abnormal was detected in the sounds or rhythm of the heart. Pulse was 78. I prescribed sulphate of strychnia (one-thirty-second of a grain), and cod liver oil, three times a day. I treated the throat by appli-

¹ Read before the Norfolk District Medical Society, December 28, 1894.