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ILLUSTRATIVE OF THE
ANTISEPTIC USE OF CARBOLIC ACID.

BY

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ANTISEPTIC USE OF CARBOLIC ACID.

ENOUGH has already been written and published regarding the theory which is familiarly known as the "germ theory," and the principle on which carbolic acid has been brought into use (almost entirely through the exertions of Professor Lister in this country) as an antiseptic. The very existence of the germs has been at times affirmed and at times denied. I have no intention here to discuss that question at all, nor do I greatly care whether their existence be granted me or not.

Carbolic acid has been used by very many surgeons for very many purposes: as a disinfectant for foul sores, as a stimulant for sluggish ones, as means of destroying the spores, which are the primary or secondary causes of many skin diseases, as an agent for the destruction of vermin—such as the louse or the itch insect—as a local anæsthetic of great value in chronic sores or open cancers; even as a soothing injection in cases of chronic cystitis. In many of these methods of application it may prove to be useful; but with these, at present, I have nothing to do. So far as my own experience goes, every application of carbolic acid, as a stimulant application to a granulating surface, has acted as an irritant, and has not aided in cicatrization.

It is of carbolic acid as an antiseptic agent that I wish now to speak, and I do not intend, nor would I venture, to take up the time of the Society by any theorizing, but rather to state the results of experience. Let me, then, briefly state these three—1. Principle; 2. Methods; 3. Results.

I. PRINCIPLE.—In using carbolic acid as an antiseptic, we do so with a double object, 1st, to exclude the air and its contents by means of an antiseptic veil—we can do this in opening an abscess; 2d, to get rid of the septic and pyogenic effects of air which has been already admitted, as in our treatment of compound fractures, excisions of tumours, and amputations.

II. METHODS.—When describing the different cases I am briefly to bring before you, I will notice what was done to each; but it will simplify matters if I first show the different preparations of carbolic acid which we have been working with;—and the Society will remember that the manipulative part of the treatment is still in its

infancy, in a transition stage, and will, we have no doubt, greatly improve, specially in direction of simplicity.¹

A. Carbolic Acid Lotion, or pure glacial acid dissolved in water. This may be used in various strengths, from 1-20 to 1 in 100, the stronger being used for injecting old abscesses and sinuses, washing out recent wounds, etc.; the weaker for disinfecting sponges, cleaning stumps, etc.

B. Carbolic Acid and Linseed Oil.—*a.* 1-6, in this the lint used as the antiseptic veil for opening abscesses is steeped; *b.* 1-12, of this the paste is prepared, with which recent stumps are dressed.

C. Plasters composed of Shellac and Carbolic.—These are of three different strengths, of which the first two, 1-3 and 1-6 respectively, are used as antiseptic protective plasters; the third (1-100) merely in cases where the ordinary lead plaster would be used, with the advantage that the carbolic acid corrects the fœtor.

III. CASES.—*Abscess*.—1. Mr J., a tall, strong young man, showed me a very deep and large abscess in the middle line of the back of the neck. It gave him great pain, and his general health was beginning to be affected. He was anxious not to leave his office. I opened it by a deep incision, and let out about 3ii. of very foetid pus. I used the antiseptic veil of lint (in *c.* 1-6), fastening it tightly with plaster. Next day there were only a few drops of serious oozing, and I dressed it with the strongest carbolized plaster; and though the wound did not heal up for a week, being large and deep, there was no more pus; the daily change of the plaster, with the usual cautions against admission of air, kept it perfectly sweet. He had no pain, attended his office without losing one hour, and there was no unpleasant smell. By any other method of treatment it would have been a case of constant poulticing for days together, he could not have gone to his office from the quantity and odour of the discharge, and the healing would have been much less rapid.

2. Dr Thatcher sent me a boy with an enormous swelling of the cheek, of three weeks' standing, depending on a periosteal abscess of the outside of the body and ramus of the lower jaw, and pointing into the neck. I evacuated about 3iii. of very foetid pus under the antiseptic veil, and on the third day dressed it with the strong *c.* plaster only. My previous experience of such abscesses led me to expect a long suppuration and an ugly scar. From the fourth day there was no pus, and now there is no visible scar whatever.

3. On 22d February I evacuated sub-carbolically, in Dr Moir's

¹ The exact proportions used at present by Mr Lister are—

1. *Watery Solutions*.—*a.* 1-20, used for freshly-made wounds before applying the plaster, or for injecting compound fractures, etc., while changing dressings; *b.* 1-40, used in changing the dressings of open wounds.

2. *Oily Solutions*.—*a.* 1-4, in opening abscesses; *b.* 1-10, in cases where *a.* irritates; *c.* 1-20, in cases where the lac plaster is too stimulating.

3. *Glycerine Solution*.—1-4, used with an india-rubber tube in dressing stumps.

4. *Spirituous Solution*.—1-5, for injecting old sinuses.

presence, an abscess in the abdomen, which was pointing midway between the umbilicus and the left anterior superior spine of the ilium, and which depended on disease of the vertebræ—letting out from it at least 3xxxvi. of the most foetid pus I have ever smelt. Without carbolic acid I would have expected profuse suppuration, probably blood-poisoning. It was dressed with the carbolic paste.

With it, next day, there had been considerable purulent oozing; smell not nearly so bad; no fever.

Third day.—Slight serous oozing; no smell; no fever.

Sixth day.—Only about six or eight drops of serum on the paste, with no smell. Patient perfectly well. From this date there never has been any pus, nothing beyond a thin, absolutely odourless, serous oozing. The wound is now dressed every fourth or fifth day, with a piece of strong plaster about two inches square. The patient has been out walking, and feels no inconvenience whatever.

Compound Fracture.—J., æt. 40, a labourer, was sent in from Loanhead. His left arm had received two tremendous blows from the handle of a crane in rapid revolution. His injuries were—a very bad compound comminuted fracture of the left humerus just above the elbow-joint. The fracture communicated with two large lacerated wounds, each about $1\frac{1}{2}$ inches in length, and on each aspect of the limb. He had also a most severe compound comminuted fracture of both radius and ulna of the same side; the forearm was bent at a right angle at the fracture, and both bones projected through a wound four inches in length over the dorsal aspect of the ulnar edge of the forearm. The projecting portion of radius was completely stripped of its periosteum. The ulna was comminuted, but did not project so much, nor was any of it completely bare.

It seemed hardly possible to save the limb, and, without the antiseptic treatment, I should have feared profuse suppuration, hectic, perhaps pyæmia.

I cut off with a saw the projecting three inches of radius, and then succeeded in replacing the bones, and restoring great masses of exposed muscles. *All the wounds* were then carefully and thoroughly syringed out with carbolic acid lotion, and dressed in the usual manner with lint soaked in acid and oil; the arm and forearm were placed at a right angle, and protected with pasteboard splints.

I will not give a daily report. There was *no* suppuration from the deeper parts. The man never lost his sleep, nor exhibited any signs of fever.

On the 14th day the arm wounds were so nearly healed as to be dressed with dry lint. There was still a large granulating wound in the forearm, with tendency to protrusion of muscle.

On the 25th day the fractures of the humerus were so far consolidated that passive movement of the elbow was begun.

On the 32d day he was up and walking about.

He has now a useful arm, notwithstanding the great loss of substance in the forearm.

Compound Dislocation of Elbow-Joint.—Matthew Murray, æt. 32, was unloading a truck at Crieff station, when, by a sudden movement of some other trucks, his right arm was crushed between two buffers. He sustained a compound dislocation of the right elbow, the end of the humerus being forced forwards through a deep and long wound (about 5 inches) in the front of the forearm. The ulnar artery was torn across. He was at once seen by Dr J. Gairdner; who dressed the wound with carbolic acid after Mr Lister's method, reduced the dislocation, and tied the ulnar where torn. He was then sent into town by rail. I examined him in the evening, and finding the arm in excellent position, did not disturb the lowest layer of lint, and merely renewed the upper layers.

This was done daily till the fifth day, when for the first time the lower layer of lint was disturbed. The wound was found almost consolidated,—only a superficial granulating edge, 5 inches long, being left.

He never had a bad symptom of any kind; no fever. Passive motion was commenced on the 18th day, and on the 56th day he was dismissed, with a very free amount of movement at the elbow in all directions. The usual history of such accidents is a very different one.

Injury of a Large Joint.—1. J. D., aged 52, on the 10th of August, was carrying a scythe, slipped his foot, and fell on it, cutting right into his left knee-joint, above the patella. This occurred before six in the morning. It was bound up by his friends. He was conveyed some miles in a cart, and then 25 miles by rail, and admitted into hospital at 9.30.

A wound, four inches in length, was found extending from the inner and upper edge of the patella upwards and downwards. The tendon of the quadriceps extensor was divided, and the knee-joint opened into by a hole which admitted the finger.

The house-surgeon sponged out the wound *and the upper portion of the joint* with a solution of carbolic acid in five parts of boiled linseed-oil, stitched up the wound, and applied the usual carbolic acid protective dressing. A Gooch splint was put on behind the joint, and fastened by a figure-of-eight bandage; the limb laid on an inclined plane, and ice applied over all. *Vesp.* pulse 68.—Was ordered m. 30 of sol. mur. morphinæ.

11th.—No pain; ice continued; pulse 68.

13th.—Still quite well; wound healed, but knee slightly swollen; pulse 68.

20th.—Still perfectly well; pulse 64; stitches taken out to-day.

30th.—Swelling completely gone.

2d September.—Patient can flex and extend the joint nearly as well as ever.

13th.—Dismissed cured.

2. J. A., æt. 13, was working in a factory in Leith Walk on 2d

April. He was holding a piece of wood below a steam-hammer, when a portion of the wood flew out and struck him on the right knee-joint. It inflicted a skin wound between $2\frac{1}{2}$ and 3 inches in length, which exposed the ligamentum patellæ without dividing it, and, running right across the front of the joint, opened into it on its inner side. Considerable venous oozing existed.

The wound and the exposed part of the joint were carefully washed out by Dr Lawrie with a watery solution of carbolic acid (strength 1-40), then stitched up with catgut threads soaked in carbolic oil, and then dressed with a layer of the strong plaster (1-3), covered by oil-silk.

3d April.—Slight oozing of bloody serum; no putrefaction.

4th.—This has much diminished; Gooch splint put on behind.

5th.—There is now no discharge.

6th.—The dressing is merely tinged with yellowish serum.

7th.—To-day the limb was not disturbed. There is no pain; no foetor. The boy's pulse, which was 80 on admission, has never risen above 84. His tongue is clean, and there has been no fever.

Wound is now (April 15) almost healed. There has been no inflammation of the joint, nor any suppuration.

CASES OF AMPUTATION.

It is only within the last four months that we have been applying the carbolic acid treatment to stumps. I will report the only cases in which I have used it in the hospital—four in number.

1. *Amputation of Forearm.*—Robert More, æt. 28, paper-maker, on 4th December, got his hand and arm caught in the revolving straps of a stationary engine. The hand and lower part of forearm were completely smashed, and elbow bruised severely.

I amputated by a long anterior flap in middle of forearm; secured the radial and ulnar arteries by fine threads soaked in carbolic acid, and then cut close; twisted the other vessels; washed the wound most thoroughly with the lotion (1-30); stitched it up carefully, except a small opening, which was stuffed with a piece of lint soaked in carbolic acid. This was removed by Dr Lawrie in the evening, and the wound was again syringed with the lotion, and then limb dressed with carbolic acid paste and oil (1-12).

Report.—The layer of lint next the stump was not touched till 10th December, the 6th day,—the patient having had not the slightest pain, or any indication of fever. His pulse never rose above 72. He held up his own stump to be dressed, and moved the arm freely.

11th December.—Patient when asleep knocked all the dressing off, and the stump was found to be firmly healed, except the edge, which was granulating. Patient up, walking about the house.

12th.—Dressed stump again; for, owing to exposure to air, there was a little pus.

15th.—No more discharge.

24th.—20 days after operation patient left hospital.

2. *Amputation of Thigh.*—26th December.—W. W., æt. 64, was run over by a train some time during the night of the 25th December, near Carstairs. Lay on ground all night, from 10 P.M. till 5 A.M.; lost an immense deal of blood, and was brought in by train. No pulse at wrist on admission. His right leg was shattered to the knee; indeed, the foot hung only by a few tendons.

I amputated, to give him a chance, through the lower third of thigh; and though several times on the table he appeared to be dead, and required artificial respiration, he was got to bed alive. He was dressed in same manner as Case 1. He lived four days, during which time he never thoroughly recovered consciousness. The stump did not seem to give him uneasiness.

This case could hardly count either for or against the method of dressing.

3. *Amputation at Ankle.*—John Ovenston, æt. 23, got his right foot smashed to a jelly by the wheel of a railway engine.

8th January, 2 A.M.—I had very little room, but succeeded in getting a heel flap, though with some misgivings, as I had to cut within half an inch of the incision made by the flange of the engine wheel. Vessels tied and wound dressed, as described in Case 1.

9th.—No pain, no discharge; a drop or two of semi-coagulated blood.

10th.—A drop or two of odourless serum.

11th.—No pain; the cloth from the stump was cut up and sent to the different resident medical officers, to be examined microscopically for pus. Various opinions were given.

This was the whole progress of the case. Patient states that from the first day till the 17th day he never felt the slightest twinge of pain. There were never more than two or three drops of colourless odourless serum. On the 17th day the patient, of his own will, tried to walk on the bare stump, and made it bleed a drop or two. Since then it has been dressed simply with dry lint, and patient left for the Convalescent House on 25th February, still maintaining that, except during his unfortunate walk, he never felt any pain whatever. His pulse never rose above 80, nor had he the slightest trace of fever.

4. D. M., æt. 29, had suffered for many years from enlargement of the tibia with central abscess. For this Mr Syme trephined his tibia on 16th January, and after boring through nearly an inch of very dense bone evacuated about a teaspoonful of foetid curdy pus.

Profuse and very foetid suppuration followed. On the fourth day the patient became wildly delirious, with a dry tongue, and a pulse varying from 120 to 140. This continued for a week, till his case seemed almost hopeless. Osteomyelitis had obviously attacked the whole medullary canal, and a great part of the dense bone was dead. The ankle-joint was opened into. On the 27th his condition slightly improved, and his tongue was a little better, but he had a distinct

pyæmic rigor, and the peculiar odour of pyæmia was evident. On the 29th he had another rigor; but he was not delirious, and though his pulse was over 120, and the discharge was most profuse, I determined to give the very poor chance afforded by amputation close above the knee-joint. This I performed on the 30th. I need not give details. On the 4th of February he was attacked by pneumonia of the base of left lung. On the 6th he was covered by a copious miliary rash, and from that date he has been steadily improving. He has spat up large quantities of pus, and had another large abscess in left thigh, perhaps explaining the two rigors; but he has had no more rigors, and the suppuration, though present, has been very much less than in ordinary amputations of thigh.

He is now (April 15) convalescent, and is able for a daily walk on crutches.

One case of psoas abscess has died, and one only, since we began to open them with antiseptic precautions; and in this one carbolic acid could not be used, on account of extensive hæmorrhage into the sac of the abscess. Putrefaction occurred, as of old, and the patient died of blood-poisoning within a week.

The cases I have reported are merely examples out of the many we have had, illustrating the same great practical fact, that the use of carbolic acid dressing as an antiseptic method, followed out with due care, and with the great precautions which are essential to success, is able in some cases practically to get rid of suppuration, in nearly every case greatly to diminish its quantity, and entirely to destroy its fœtor.

I have not selected my cases because they were specially successful ones, but because they were under my own care. Mr Syme has had many amputations as good,—one much more striking than any of mine. We count our psoas abscesses opened in this manner with success, not by units, but by tens.

I trust, however, that the cases I have mentioned will prove to the Society that we are warranted in believing that in the antiseptic principle, explain it as you will, and simplify it as I hope we may, we have a very great addition to our means of combating disease.

Even if on theoretical grounds surgeons may deny the possibility of preventing suppuration, and ignore our facts, still, if it be granted that by this method we can diminish the amount and destroy the fœtor of pus, we have done much to improve the sanitary condition, and diminish the fatality, of our great hospitals.

