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Contributors

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ON

THE ANTISEPTIC TREATMENT

OF

WOUNDS.



BY

WILLIAM MACCORMAC, M.A., M.D., M.R.I.A.

FELLOW OF THE ROYAL COLLEGE OF SURGEONS IN IRELAND ;
FELLOW OF THE ROYAL MEDICAL AND CHIRURGICAL SOCIETY OF LONDON ;
MEMBER OF THE SENATE OF THE QUEEN'S UNIVERSITY ;
MEMBER OF THE SURGICAL SOCIETY OF IRELAND ;
MEMBER OF THE ULSTER MEDICAL SOCIETY ;
AND ONE OF THE SURGEONS TO THE BELFAST GENERAL HOSPITAL.

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1869.



ON THE

ANTISEPTIC TREATMENT OF WOUNDS.

MORE than one hundred years ago a learned Irish bishop proclaimed as panacea for all human ills a very simple remedy, tar-water; and it is somewhat curious that for one of the derivatives of coal tar there should be claimed, at the present time, virtues almost as great, and fortunately much more tangible, than those which Bishop Berkeley urged on behalf of his favourite nostrum.

To Professor Lister, of Glasgow, we owe an innovation in surgical practice, which, were it only partially to accomplish all that it assumes to accomplish, would rank amongst the greatest surgical achievements of our day. The successful and rapid healing of wounds and, in addition, rendering them innocuous during the process of healing—robbing them, in fact, of the dangers which so frequently beset them—are the merits claimed by Mr. Lister for the antiseptic method. And no surgeon can exaggerate the importance of such pretensions if sustainable. The question, however, is as yet by no means finally settled; and it is in order that what little experience I have recently gained in the use of this method may be laid before the profession, that I have deemed it expedient to offer this contribution to the pages of the *Dublin Quarterly Journal*.

The nature of the subject, along with its great importance, demands the most careful and candid consideration. And I would here deprecate the attempts that have been made to deprive Professor Lister of the great merit of introducing this plan of treatment.

Carbolic acid has been in use for a considerable time, but not

as it is used by Mr. Lister, and it is the particular method in which the carbolic acid, or other antiseptic, is used by that surgeon which constitutes Mr. Lister's claim to originality. It may indeed be that minute atmospheric germs, in gaining access to the recesses of a wound, prove the active cause of putrefaction. Certainly the researches of Pasteur, and the experiments of Lister appear strongly confirmatory of the theory. But whether this be the true cause or not, there is no one likely to dispute that the contact of putrescent animal matter with a wounded surface is fraught with many dangerous evils, and that the prevention of decomposition in wounds will avert many of the dangers incident to traumatic lesions. Carbolic acid or, to speak more correctly, phenic alcohol appears to possess antiseptic properties of the very highest order; and is perhaps the agent best suited for surgical purposes that could be selected.

At first, I must confess, the results I obtained after the carbolic acid treatment were not so satisfactory as I had been led to anticipate; but on further and more careful trials, more decided benefits were realized, so much so as to lead me to attribute my previous illsuccess to want of familiarity with the method, or perhaps to some carelessness in the application of the dressings. The mode of dressing I have usually employed is not so complicated as that of Professor Lister, since the use of putty or plasters is, in most instances, dispensed with. The wound, all hemorrhage having been carefully staunched, is first washed out with a weak solution, one part in thirty of carbolic acid. The edges are then coapted, and several layers of lint, soaked in carbolic oil, one part in four, applied. The only other precaution needful is to keep the lint daily freshened with oil, and in this way its antiseptic properties seem thoroughly preserved. In cases of compound fractures the simple superposition of some folds of lint soaked in oil, has proved adequate to prevent septic change, without injecting the acid into the wound. In these cases there is usually profuse hemorrhage, and when the wound is small the air is washed out with the blood, so that it appears to me to be in most instances unnecessary, and therefore undesirable, to inject the acid. When abscesses are opened I do not generally think it needful, before incising them, to apply an antiseptic veil of lint. The tension of the parts causes the pus to jet out with more or less force, and so long as any regurgitation of air is prevented no harm can accrue.

CASE I.—The first time I had occasion to use the antiseptic method was in August, 1867. On the first day of that month a quarryman, forty years of age, was in the act of withdrawing a charge of powder from a quarryhole. The blast went off spontaneously, the poor man was driven to some distance by the violence of the explosion. When admitted I found him suffering severely from shock. His face was tattooed by the gunpowder, the right eye destroyed by effusion of blood within the globe, and the anterior lamina of the left cornea engrained with small particles of charcoal, which with some difficulty were picked out by means of a sharp pointed hook. Both forearms were lacerated. The right had only sustained a severe flesh wound, but on the left side the ulna was extensively comminuted, and the soft parts covering the bone were literally blown away through an extent of three inches of the middle of the forearm. The parts were, in addition, blackened and much contused. I removed three or four loose portions of bone, and ascertained the condition of a much larger piece, about an inch and a-half long, which, although comparatively loose, I considered should be left untouched. The wound was then filled up with pieces of lint steeped in a saturated solution of carbolic acid, while a padded splint was bandaged along the anterior surface of the limb.

It is unnecessary to detail the progress of the case further than to say that the carbolic acid was renewed as often as required in the dressings. The discharge of pus from the wound proved limited. There was likewise a small amount of swelling in the limb, unattended with pain or other signs of inflammation, which disappeared in a few days. On the 15th the wound is reported as granulating, and in every respect healthy. In five more days the wound in the arm is stated to be nearly filled up, and the patient had sufficiently recovered from his other injuries to be able to sit up. On the 25th of August, he is reported as convalescent, the wound of the broken arm is almost perfectly whole, while that in the other arm is only beginning to cicatrize. In short, the compound fracture of the ulna, comminuted though it were, appeared to cause, in no respect, more constitutional disturbance than if it had been an ordinary simple one.

CASE II.—The next case I should wish to report is that of a labouring man, fifty-eight years of age, who had previously enjoyed good health. Whilst engaged unloading a truck, laden

with railway metals, the horse suddenly started forwards, and an iron rail, which was being taken off the cart at the moment, fell heavily, crushing the man's leg against some rails lying on the ground.

The result was a compound comminuted fracture of both bones in the lower third of the leg. A small wound, from which issued a free arterial stream, led down to the broken tibia. The soft parts were evidently much contused. Carbolic acid dressing, with carbolized paste, was applied, and in about ten days it was ascertained that the wound had healed without suppuration. In six weeks the limb was put up in a starched bandage, and the patient was able to sit up the day after. No more pain or inconvenience was complained of than would necessarily attend the occurrence of a simple fracture. The patient left the hospital in less than seven weeks after the accident.

CASE III. was that of a young man, under the care of my colleague Professor Gordon. Whilst adjusting a driving-belt he missed his footing, and in his fall his leg passed between two cog-wheels. The injury inflicted was so severe, both of the soft parts and of the bones, that Dr. Gordon feared amputation would be unavoidable. He determined, however, to make an attempt to save the limb. The parts were dressed with the carbolized lotion, carbolic paste being superimposed. The patient progressed very favourably. In six weeks the splints were removed, union having taken place. A superficial granulating surface, which took a long time to heal, alone remained. The man otherwise made an excellent recovery—one which could scarcely have been anticipated after such a severe and extensive injury.

CASE IV.—John O'Neill, fifty years of age, was brought to hospital in a state of great intoxication on the 26th December. No history could be procured as to how he met the accident. He had been picked up in the street, brought to his own house, and thence to hospital. He had probably been run over by a street car, and left as he lay by the driver. On admission he was still labouring under great excitement, and could with difficulty be restrained. Indeed, so violent was his conduct that he succeeded before I saw him in converting a simple fracture into a compound one. The limb was put up temporarily by the resident pupil in Cline's splints. When I visited the man early next morning, I found that he had spent a very restless night, and had completely

disarranged the apparatus. The limb was swollen with extravasated blood, and appeared also much contused. Both tibia and fibula were broken about three inches above the ankle-joint. The former bone had been extensively comminuted, and there was a small wound leading down to the fracture, caused, as previously mentioned, by the protrusion of one of the fragments. From this, venous blood was oozing copiously. The fracture, which had been much displaced, was readjusted, lint soaked in carbolic oil was laid over the wound, a back and two lateral splints were applied, and the whole apparatus was swung in a suspension cradle. Three days after, the state of the patient was very satisfactory. The pulse had fallen to 84. There were no signs of constitutional distress, or of local inflammation; in fact, the skin of the limb had become wrinkled in consequence of the partial subsidence of the swelling. The dressings and splints were not touched, but a quantity of carbolized oil was daily poured into the lint. The patient states that he is suffering hardly any pain, and only experiences such inconvenience as his constrained position necessitates.

On Jan. 9, a fortnight after the injury, the limb was examined for the first time. On removing the splints it was evident that the swelling had completely subsided. The patient complained of no pain, or even of much discomfort. The inner layer of the carbolized lint was firmly cemented to the wound, and was not removed. There was not a trace of suppurative action about the parts. The apparatus was reapplied as before. On January 19th more than three weeks after the accident, the splints were readjusted a second time, and the wound dressed. On removing the lint the wound was found to have perfectly healed without a sign of pus. Without any exaggeration, it may be affirmed that this compound fracture was causing no more difficulty of any kind than if it had been a simple one. On January 24th, four weeks after the man's admission to hospital, he was fast recovering, and in all respects convalescent. The patient has since left the hospital perfectly well.

CASE V.—Patrick Kelly, who states that he is forty years of age, but who looks ten years older, was admitted to hospital on July 31st, 1868. He is a plasterer by trade, and had fallen from a scaffold no great height a short time previously.

He was a very intemperate man, and in 1851 had had a paralytic seizure which largely deprived him of the use of his left arm and leg. His utterance is thick, and he protrudes the tongue to one side.

On examination I found the right leg fractured at the junction

of the lower and middle third of the limb, and the soft parts around much contused. There was a wound just above the inner condyle of the left humerus, which affords access to the elbow-joint, and into which the finger easily passed to the opposite side of the limb, right through the joint. A careful examination proved that there was considerable comminution of the lower end of the humerus. A large piece of bone, corresponding to the termination of the internal condyloid ridge, lay loosely in the orifice of the wound, and was removed. Several other pieces could also be felt more or less loose. In short, the amount of injury appeared so extensive, and the antecedents of the patient so unsatisfactory, that his prospects, under any form of treatment, seemed to me most unpromising.

Primary excision of the elbow-joint, with the possible alternative of amputation should the injury appear too severe to justify an attempt to save the limb, was very strongly urged. The man stoutly refused to permit anything whatever to be done, except simply to dress his arm. Carbolic oil was therefore applied on lint, and an angular splint, to support the joint, bandaged to the limb. Some slight oozing of blood followed, which coagulated in the dressings. The fracture of the leg was put up in splints in the usual way, resting on the outer side. Except soaking the dressings daily with fresh oil, the arm was not disturbed until August 8th, nine days after the injury. During this time the man complained of no suffering from the injured arm, and there were absolutely no signs of local inflammatory action, or of general disturbance. The fractured leg, indeed, gave more trouble than the arm, as there was a great deal of swelling accompanied by the formation of numerous bullæ, filled with dark-coloured serum, the patient being very restless. On removing the lint covering the wound of the elbow, a small quantity of matter was seen. On clearing this away the opening appeared quite filled up with granulations, level with the surrounding surface. Carbolic lotion was now substituted for carbolic oil in the dressings. On the 16th September, six weeks after admission, I find the report in the case-book is that up till this date the patient has progressed in every respect satisfactorily, and that he is now quite convalescent. He left the hospital soon afterwards, perfectly recovered from the consequences of the accident.

Whatever share the antiseptic treatment may have had in promoting so successful an issue in this case, there is no doubt that, taking all the circumstances into account, this very serious injury

of an important joint proceeded to a favourable termination in a manner quite exceptional. There was throughout absolutely no sign of inflammation about the elbow, and the compound comminuted fracture of the joint seemed to cause less annoyance to the patient, and to invoke fewer signs of constitutional irritation or inflammation, than did the simple fracture of the leg. At the time Kelly left the hospital he enjoyed very considerable power of extending and flexing the arm, the motions of pronation and supination being also preserved, and the freedom of these would doubtless become largely increased through time and exercise.

CASE VI. is an interesting one. An intemperate man, called Barry, forty-five years of age, fell whilst drunk. According to his own statement he merely tumbled off his feet on the edge of the footpath. He had been celebrating, after his fashion, a rather notorious anniversary in the North of Ireland, the 12th of July, on which day the accident occurred. However produced, we found that he had sustained an extensive contused wound, some six inches long, stretching from the back of one condyle of the femur right across the front of the knee-joint to the other. The patella was transversely fractured at the middle of the bone. The quadriceps extensor tendon, where attached to the upper border of the patella, was also torn. Of course the knee-joint was extensively laid open, and the articulating surface of the lower end of the femur could be touched and seen.

Formerly not much hesitation would have been shown, under these circumstances, in amputating the thigh. I placed the limb, however, in a carefully prepared straight splint, and carbolized oil was put on the wound after it had been cleaned and sutured. As additional safeguards against inflammation, Signoroni's tourniquet was adjusted over the course of the femoral artery, near the groin, and a bag of ice applied to the joint. The day after, the parts were found to be somewhat swollen, the patient experienced pain, the pulse was 112, and the tongue was furred. These symptoms soon subsided, and five days after the accident the pulse was only 100, and the tongue cleaning, while the swelling around the joint was diminishing.

I need hardly enter into further details. The edges of the wound sloughed to a slight extent, and when the sloughs were thrown off, healthy granulations occupied their place, and these, by the 12th of August, had almost quite cicatrized. Perfect

bony union took place between the broken fragments of the patella, and, what is yet more strange, ankylosis of the knee-joint did not occur. The man left the hospital on the 28th of September, and he could then flex the limb through fifteen or twenty degrees. As the treatment employed was somewhat complex, one cannot exactly mete out to each remedial agent its due share in promoting recovery, or say how far anyone was paramount. It may be interesting to quote a case mentioned by Mr. Syme in the *British Medical Journal* for January 4, 1868. A farm servant, fifty-three years old, cut his knee open with a scythe, dividing the quadriceps extensor tendon. Carbolyzed oil was freely used, both inside and over the wound, and a splint to keep the limb straight was applied. Not the slightest constitutional or local disturbance followed. The stitches were removed on the fourth day, the wound being healed, and the patient left the hospital with a strong and flexible limb in a month. This result Mr. Syme justly characterizes as a very remarkable, if not unprecedented occurrence. My own case is one of more extensive injury to the same joint, inflicted in a much ruder manner, and yet recovery rapidly took place, under what appeared most unfavourable circumstances. The real question at issue is how far the antiseptic treatment employed in these two cases promoted these remarkable, but certainly not unprecedented, recoveries. I have the most distinct recollection of a case which happened about fifteen years ago, when I was House Surgeon in the hospital of which I am now the Surgeon. A man about fifty years of age was admitted with extensive compound comminuted fracture of the patella, caused by falling on his bent knee from a considerable height. I readily passed my finger into the cavity of the joint, through the fragments of the broken patella. The patient would not submit to amputation, and he recovered perfectly with a useful limb. Antiseptic dressings in those days were not much thought of.

CASE VII.—A lad of fifteen had his hand caught in a fluting machine in one of the mills. A wound, opening into the wrist-joint, extended from the ulnar border of the palm round the base of the thumb, as far as the base of the metacarpal bone of the index finger. The soft parts on the radial border of the wrist had been completely severed. The trapezium and trapezoid bones were both injured, the scaphoid bone was displaced backwards, and the joints of the second row of the carpus were laid open. Carbolyzed oil

dressings were employed, and a palmar splint, extending up the forearm, was applied. Although such severe injury had been inflicted upon a very complex joint, there ensued only a moderate amount of inflammatory swelling, with but trifling suppuration, and recovery proved so rapid that in a fortnight the site of injury was found occupied by a superficial granulating surface, of which the greater portion had cicatrized in the course of the third week. In five weeks the boy left the hospital, the power of motion of the thumb, no doubt, greatly impaired, and with a good deal of stiffness of the wrist, but otherwise likely to have an extremely useful hand.

CASE VIII.—I had recently occasion to amputate the thigh in the lower third of the limb for a large cartilaginous tumour of the tibia, occurring in a young labourer. Carbolized dressings and antiseptic ligatures were used. The stump was not touched for a week, save to pour carbolized oil upon it daily, and on the dressings being taken off, the flaps were found united firmly almost throughout. At the external angle of the wound, the only part unclosed, there had been a slight oozing of blood, and one drachm of innocuous pus escaped. From the very first the patient enjoyed the greatest comfort and relief, and there was no constitutional disturbance whatever. One fortnight after the operation, it is reported in the case-book that all the ligatures are gone, and that the flaps are both deeply and superficially united without a trace of sinus. In short, the patient is quite convalescent, and able to get about. His general condition is excellent, and the only complaint he made since the limb was removed was that he did not get sufficient to eat. Such complete union after amputation of the thigh, without either general or local disturbance of any sort, is a clinical fact of sufficient rarity to be worthy of record.

I need scarcely weary the patience of my readers by detailing other instances in which I have used carbolic acid dressing. I have employed it in various ways to wounds, after opening abscesses, as an application to non-infecting venereal sores, and to phagedenic and other ulcers, with the most beneficial effects. Sometimes I have met with disappointment, but generally the results have been extremely satisfactory and encouraging. The instances I have cited are perhaps, on the whole, the most important and illustrative that have come under my observation, and merit, I think, the serious attention of practical surgeons.

These and similar cases, occurring as they have done in the practice of so many surgeons, must surely be more than mere coincidences. No doubt wounds healed kindly before carbolic acid was heard of, and on the other hand some forms of injury, taking place in unhealthy subjects, will do badly under any kind of treatment. But all this notwithstanding, the results which have been achieved since the antiseptic method has been used, appear such as to cause what was formerly the exception to become the rule. It was heretofore a most exceptional matter to see a compound fracture of the lower limb unite, as if it had been a simple one. Surgical fever, often of the severest type, necrosis of portions of the bone, diffuse inflammation and suppuration of the limb, with tedious recovery, or hectic and death, were anything but uncommon. The experience which I have had leads me to hope and believe that such accidents will become rare when antiseptic principles of treatment shall be more generally recognized and adopted.

The conclusions I am disposed to draw in respect of the surgical uses of carbolized dressings are—first, that by their means those conditions which promote the formation of pus are sometimes wholly prevented, at other times greatly diminished in power, and that when pus is formed it proves quite innocuous, not prone to decomposition, and not injuring the wounded surface with which it is in contact. Secondly, I think the amount of pus is diminished when suppuration does occur. Thirdly, I have been much struck by the absence of those results of serious injuries, so apt to ensue both in the neighbourhood of the wounded parts, and constitutionally. I have observed over and over again the almost total absence of pain, inflammatory swelling, and surgical fever where such might otherwise have been expected to occur. In extensive injuries, involving the deeper seated parts, it has appeared to me, carbolized dressing being resorted to, that those structures heal more readily, and that the wound soon becomes merely superficial, a granulating surface closing in, and protecting the tissues beneath. When this result is attained it then becomes no longer necessary to continue so rigidly the antiseptic treatment, and the wound may be treated like any ordinary superficial ulcer, with such applications as may appear best suited to promote healing, amongst which the carbolized lotion should occupy a high place. Fourthly, I am disposed to believe that pyemia will become comparatively of rare occurrence, but to establish this as a certain fact will require a very long series of observations. The theory that Professor Lister offers to account for all this is one of great simplicity, and one

which so far explains the facts observed, and until one more satisfactory shall be offered, we are perhaps bound to accept it. However, be it true or false, by acting strictly in accordance with its requirements, the surgeon will, I believe, procure results which he could not otherwise anticipate. I think the candid and truly scientific manner in which Professor Lister has promulgated his discovery, is deserving of great praise. It is now for surgeons to examine into his claims in an impartial and scientific spirit. It is only, I would add in conclusion, by a largely extended and carefully contrasted experience that such claims can be fairly and sufficiently tested. For this reason I have come to the conclusion that the results at which I have hitherto been able to arrive, in respect of the uses of carbolic acid in antiseptic surgery, are deserving of the consideration of the readers of this journal.





