Remarks
ON
SOME POINTS IN THE HISTORY OF ANTISEPTIC SURGERY.

BY LORD LISTER, F.R.S.

THE following unfinished letter to Sir Hector Cameron was written early in 1908, before the delivery of his Lectures on the Evolution of Wound Treatment, but never sent to him. I have been assured that it would have sufficient interest for some readers to warrant its publication.

MY DEAR CAMERON,

It seems superfluous for me to write anything to you with reference to your coming lectures. But perhaps in what I shall say, there may be here and there points which may interest you.

In treating surgical cases antiseptically I always endeavoured to avoid the direct action of the antiseptic substance upon the tissues, so far as was consistent in the existing state of knowledge with attaining the essential object of preventing the development of injurious microbes in the part concerned.

In compound fracture, to which, in 1865, I first put in practice the antiseptic principle, I applied undiluted carbolic acid freely to the injured part, in order to destroy the septic microbes already present in it; regarding the caustic action which I knew must occur, as a matter of small moment compared with the tremendous evil which it was sought to avoid. But when this had once been done, no further direct action of the antiseptic upon the tissues occurred. The carbolic acid formed with the blood a dense chemical compound which, together with some layers of lint steeped in the acid, produced a crust that adhered firmly to the wound and the adjacent part of the skin. This crust was left in place till all danger was over, its surface being painted from time to time with the acid, to guard against the penetration of septic change into its substance. Meanwhile in the undisturbed wound the beautiful result occurred that the material of the crust within it, and the portions of tissue which had been destroyed by the caustic, were replaced by living tissue formed at their expense.

That dead tissue, when protected from external influences, was so disposed of, was a most important truth new to pathology: and it afterwards suggested the idea of the catgut ligature.

I do not remember whether you saw the case that led me to apply the antiseptic principle to abscess. The patient was a woman above the middle period of life with lumbar abscess. Taught by the disastrous results that sooner or later followed the evacuation of such abscesses, whether by valvular opening or by cannula and trocar, I left the case undisturbed; till one day, on looking at it, I found that nothing but epidermis seemed to intervene between the pus and the external world, so that if left for another day, it would in all probability burst.

I therefore resolved to open it and apply a dressing which should imitate, as much as circumstances permitted, that which we used in compound fractures. The pus which escaped on incision was as thick as any I ever saw. Mixing some of it with undiluted carbolic acid, I applied some layers of lint soaked with the mixture to the wound and surrounding skin and covered them with a piece of thin block tin moulded to proper shape, such as we used for covering the crust in compound fracture. This metal covering, which prevented loss of carbolic acid by evaporation and soaking into surrounding dressings, was fixed by strapping, and a folded towel was bandaged over it to absorb discharge.

Next day, on changing the dressing, I was greatly astonished to see nothing escape from the incision except a drop or two of clear serum. What was now to be done? I had no longer any pus to mix with the carbolic acid. But it occurred to me that I might make a satisfactory crust by mixing carbolic acid with glazier's putty. Accordingly I sent to the dispensary for some whiting and boiled linseed oil, and making a solution of one part of carbolic acid in four of the oil, rubbed it up with whiting in a mortar, thus making a carbolic putty. This I spread on a piece of block tin and applied it as I had done the first dressing. There never was any further discharge of pus; the serous oozing diminished rapidly, and before long healing was complete.

In that case, as there was no spinal curvature, I could not be sure that the abscess was connected with the vertebrae. But similar results afterwards followed the same treatment where discharge of bone showed that such connexion existed and also in suppuration of the hip-joint, whether attended with shortening of the limb or not, scrupulous care being taken to keep the affected part completely at rest. The time required for final closing of the sinus was, however, generally much longer than in the first case.

Precisely the same beautiful result, so entirely novel and so full of deep interest both for pathology and practice, was seen when acute abscesses were treated in the same way; the only difference being that in the acute cases the serous oozing which followed evacuation of the pus came much more rapidly to a conclusion.

In order to ensure freedom of escape for the serum, a narrow strip of lint soaked with a solution of carbolic acid in four parts of olive oil was inserted in the incision. But the antiseptic substance was never from first to last applied to the cavity of the abscess, as such treatment could only have been productive of needless irritation.

I continued to use a strip of lint as a drain for about five years with perfectly satisfactory results. But in 1871 having opened a very deeply-seated acute abscess in the axilla, I found to my surprise, on changing the dressing next day, that the withdrawal of the lint was followed by escape of thick pus like the original contents.

It occurred to me that in that deep and narrow incision, the lint, instead of serving as a drain, might have acted like a plug, and so reproduced the conditions present before evacuation. Taking a piece of the india-rubber tubing of a Richardson's spray producer that I had used for local anaesthesia at the operation, I cut holes in it and attached knotted silk threads to one end, so improvising a drainage tube. This I put to steep for the night in a strong watery solution of carbolic acid, and introduced it in place of the lint on changing the dressing next morning. The withdrawal of the lint had been followed by discharge of thick pus as before; but next morning I was rejoiced to find nothing escape unless it were a drop or so of clear serum. This rapidly diminished, and within a week of the opening of the abscess I was able to take leave of my patient, the discharge from the abscess cavity having entirely ceased.

After that case I used drainage tubes as a rule in the treatment of abscess. But it is well to remember that if such a tube should not be at hand, a narrow strip of lint, sterilized of course with some trustworthy antiseptic solution, will in almost every case answer the purpose equally well.

The crude carbolic acid which, under the name of German creasote, was supplied to me by my colleague Dr. Anderson, Professor of Chemistry in the University of Glasgow, was a brown liquid which had been adulterated with water, and this lay on the top as a clear layer, destitute of any flavour of carbolic acid. This led me in my first paper on compound fracture to speak of carbolic acid as absolutely insoluble in water. But when it was afterwards produced in a comparatively pure condition in colourless crystals, it proved to be capable of being taken up by water, though twenty parts were required for the purpose. The watery solution, however, though weak numerically, showed itself to be exceedingly potent as an antiseptic. Having applied it to a foul sore in the palm of the hand, I found, on changing the dressing next day, that all putrefactive odour had disappeared.

This enabled me to use carbolic acid for washing wounds after operations and so to extend the application of the antiseptic principle to surgery in general. In the state of knowledge at that early period it seemed imperative to apply a powerful germicide to the wound before closing it. To use undiluted carbolic acid for operation wounds, as I had done in compound fracture, was out of the question; and carbolic oil, though I did indeed try it, was ill adapted for the purpose. But the watery solution could be satisfactorily used not only for washing the wound, but also for purifying the surrounding skin, the hands of the operator and the instruments.

The entire absence of carbolic acid in the layer of water on the "German creasote" with which I made my first attempts with compound fractures indicates that there

were present in the crude product substances for which the acid had incomparably greater attraction than it had for water. When purified from these substances, it is indeed soluble in water, but only in small amount; and being so feebly held by water, it is free, when in watery solution, to act upon other matters for which it has stronger attraction. Thus was explained the remarkable germicidal energy of a lotion containing only a twentieth part of carbolic acid, as illustrated by the foul sore in the hand before referred to.

With linseed oil, on the other hand, the acid could be mixed in any proportion, and being firmly held by the oil, it was mild in action, though present in the large proportion of 1 to 4, as used in the carbolic putty. The 1 to 4 carbolic oil is bland when applied to the tip of the tongue, whereas the 1 to 20 watery solution is intolerably pungent.

The acid in the watery solution, while potent in action when applied, is soon dissipated, whereas it is slow in leaving the oil. Hence the watery solution, powerful but transient in operation, was admirably adapted for application to a cut surface as a detergent, while the carbolic putty, bland in action and serving long as a store of the antiseptic, could be used with good effect not only for abscesses, but also as an external dressing for operation wounds; and for that purpose I long employed it. The putty was used in a layer spread on calico, freely overlapping the skin around the wound, and covered with a folded cloth to absorb the serum that flowed from beneath its edges. Although this mode of dressing gave place in time to others which were more convenient, the change effected under its use at that early period was of the most striking character: healing without suppuration, pain or fever, instead of being the rare exception, became the rule, and operations were safely performed which had previously been utterly prohibited on account of the danger that attended them; while pyaemia and hospital gangrene, which had before been disastrously rife, were banished from my wards.

Epidermis is a substance for which carbolic acid has special attraction; and this, coupled with the facility with which the acid blends with oily matters, renders it peculiarly fitted for purifying the skin about the seat of operation and the surgeon's hands. Another property which aids its action as a detergent, is its great penetrating power, not limited by the products of its chemical action upon organic substances.

I used the 1 to 20 watery solution for rendering the patient's skin and the hands of myself and my assistants aseptic throughout the forty years during which I practised on the antiseptic principle, and I never had any reason to doubt its efficacy. No long time is required for its action. In my private practice the purification of the skin was as a rule not begun till I entered the patient's room to perform the operation. The part concerned was then thoroughly washed with the 1 to 20 carbolic solution, and was kept covered with lint soaked with the same lotion while the instruments were being attended to and the anaesthetic administered; the whole process occupying only about a quarter of an hour. Yet experience showed that this brief period was sufficient.

It may perhaps be argued that under the carbolic putty or any other dressing containing carbolic acid, that volatile agent was perpetually acting on the skin and may have made up for deficiencies in the original purification. But during several years before I gave up practice, the dressings did not owe their virtues to any volatile antiseptic.

I may mention in illustration one of my latest operations. The patient was a lady advanced in years, with a large ventral hernia below the umbilicus. It was producing serious symptoms; and attempts to reduce it having failed, her condition had become exceedingly grave. I only began to disinfect the skin when she was already partly under the influence of the anaesthetic. The umbilicus contained some drops of opaque liquid of a highly offensive character. I cleansed its folds carefully with the 1 to 20 carbolic solution and washed the skin over and around the sac with the same lotion. The sac was opened by a median incision, the upper end of which extended to the umbilicus. Into further details of the operation I need not enter. On changing the dressing (of cyanide gauze) it appeared that, in her frail condition, the margins of the skin at the upper end of the incision had lost their vitality over an extent of about ½ in. in length and $\frac{1}{10}$ in. in breadth at each side. I afterwards left the dressing unchanged for several days, when I found that the sloughs, the upper ends of which encroached on the umbilicus, so foul before the operation, had been replaced by new living tissue, and complete cicatrization had occurred without the formation of a particle of pus.

I cannot but think it a happy circumstance that the substance which I employed first in endeavouring to apply the antiseptic principle should have been so admirably adapted for detergent purposes. And it has grieved me to learn that many surgeons have been led to substitute needlessly protracted and complicated measures for means so simple and efficient.*

As an instance of trouble misapplied in this matter, may be mentioned preliminary washing with soap and water. If carbolic acid is the disinfectant used, such washing is not only wholly unnecessary, but is, I believe, positively injurious; as it must tend to check the penetration of the germicide into the substance of the epidermis, by saturating it with water for which carbolic acid has so little affinity. That this practice is superfluous is, I venture to think, proved by my experience, as I never in any case adopted it.

The incomparably greater attraction of carbolic acid for epidermis than for water was strikingly illustrated by an experiment not hitherto published.

Here my letter was broken off, in consequence of other engagements. But I afterwards wrote to Sir Hector Cameron what I had intended to say on this subject and he was good enough to incorporate my remarks in his second lecture (see BRITISH MEDICAL JOURNAL, April 6th, 1907, p. 799).

CYSTIC TUMOUR OF THE SUPRARENAL BODY SUCCESSFULLY REMOVED BY OPERATION,

WITH NOTES ON CASES PREVIOUSLY PUBLISHED.†

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INTRODUCTORY REMARKS.

MANY observations have recently been published about the pathology, diagnosis, and treatment of tumours of the suprarenal body and of new growths developing in other organs from "rests," as they are termed, of adrenal tissue. An instance of the latter type of tumour was reported by myself last year.‡ In the autumn of 1906 I removed a kidney subject to "hypernephroma," the patient surviving the operation for three months, but there were secondary adrenal deposits, one appearing as a vaginal polypus. Eleven months later I removed a tumour situated in the left lumbar region. It proved to be a cyst of the suprarenal body itself, unilocular and full of a bloody fluid. Henschen would rank it as a *struma suprarenalis cystica haemorrhagica*. I will now relate my case and afterwards make some mention of previously reported instances of cystic tumour of the suprarenal body large enough to be of clinical and surgical interest.

THE CASE.

C. L., aged 62, was admitted into my wards in the Samaritan Free Hospital on October 1st, 1907, on account of an abdominal swelling and pain.

She had been married for thirty years, and had borne nine children, the last confinement occurring eighteen years before admission. There had been no abortions. All the patient's labours were normal except the last, when the forceps was applied. She had never suffered from any puerperal complication, but enteroptosis developed during the later pregnancies.

In 1897 she was laid up with influenza, which left her very weak and liable to bronchitis; at the same time she suffered from frequent attacks of pain after food and vomiting. The influenza troubled her again several times; on the last occasion, which was in 1904, she became deaf in the left ear.

History of the Present Illness.—The dyspeptic attacks, which had never ceased entirely, became severe last summer

* The fear sometimes expressed of poisonous effects from carbolic acid, as used in antiseptic surgery, is, so far as my experience goes, entirely groundless.

† Read at a meeting of the Surgical Section of the Royal Society of Medicine, June 16th, 1908.

‡ Malignant Vaginal Polypus, secondary to an Adrenal Tumour of the Kidneys. *Trans. Obst. Soc.*, vol. xlix, 1907, p. 182, and *Journ. of Obst. and Gyn. of Brit. Emp.*, vol. xi (June, 1907), p. 449.