A NON-POISONOUS, NON-IRRITATIVE, ANTISEPTIC DRESSING.

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(PRELIMINARY COMMUNICATION.)

IN practical surgery, since the introduction and general adoption of the antiseptic method of treatment, there has been but slight difficulty encountered in preserving an aseptic condition of the wound during the operation, and the methods now employed are so simple and effectual that a surgeon can be assured by a moderate amount of caution of performing an aseptic operation, there however exists the great question of preserving an aseptic condition of the wound throughout its subsequent progress to recovery, without which the performance of an aseptic operation is useless. Here it has been found that so many circumstances exist as to render the task a very difficult one indeed. That this has been and is generally recognised by surgeons is shown by the many dressings introduced within the few years antiseptic surgery has been in general use. The earlier dressings were of a most complicated and expensive nature, and entailed an immense amount of work, with the frequent result that, owing to their malapplication, the aseptic condition of the wound was not preserved. As the subject became more familiar it was found that certain of the earlier antiseptics were not sufficiently destructive to bacterial life to render a less complicated method of applying the dressings possible, so others and more powerfully poisonous to bacterial life were introduced, resulting in a more simple and comparatively cheap dressing which was strongly antiseptic. But those dressings, owing to the poisonous nature of the drugs used, were found to have a highly irritative local action, which rendered their application in many cases impossible. To obtain a non-irritative dressing which should at the same time possess great antiseptic properties has been the aim of surgeons for some time past.

Some months since I was speaking with Dr. Tichborne, whose work in the chemical world is so well known, on this subject, when he suggested certain drugs which he considered would probably meet my requirements. After due consideration I experimented with those which I thought would be most effectual, chiefly naphthalin and sulphite of zinc; the latter proved so successful in my hands that I am emboldened to bring the result before the profession in the hopes that it will be found of service. I claim for the dressings prepared with this salt that they are non-poisonous, non-irritative, and highly antiseptic, while their application is extremely simple.

The non-irritability is, I consider, proved not alone by the cases I have tabulated at the end of this paper, but markedly so by a case of empyema at present under my charge; in this case alembroth dressing was employed, but after about a week's application, owing to the profuse discharge, a pustular eruption appeared round the wound to the extent of the dressing. This was the cause of such suffering to the patient that I applied sulphite of zinc dressing, with the result that all irritability ceased immediately, and in three days the eruption had entirely disappeared. As to the antiseptic properties of the dressing, I can only refer at present to the practical result of its application, but I consider that such a series of cases as I append, devoid of septic infection, could not possibly be the result of chance.

When at first employing this dressing I applied it to minor cases, and when possible used alembroth dressing to one wound and the zinc dressing to another on the same person, with the result that the wound dressed by the zinc progressed more satisfactorily than that where the alembroth was employed. Encouraged by the results obtained, I now use the zinc dressing on all occasions.

In applying the dressing I sometimes dip the piece of gauze placed in contact with the wound in a weak carbolie solution—this is not, however, essential—and then apply three or four layers of dry sulphite of zinc gauze, the whole being retained in its position by a simple gauze bandage. As will be seen, it is

applied in the usual manner employed in the use of alembroth gauze. With this introduction I will read Dr. Tichborne's report.

As far back as 1870 I (Dr. Tichborne) introduced sulphite of zinc to the profession as an antiseptic. At that time this salt was not in commerce, and the few existing references which were to be found in such books as *Gmelin's Handbook* or *Watts's Dictionary of Chemistry* were anything but correct. In the paper above referred to its properties were described, as also a new process for its preparation, and its use as a general antiseptic suggested; but in 1870 antiseptic surgery, as now understood, did not exist, and we now propose an application of this salt in the form of an antiseptic gauze having special properties. Dr. Heuston gives the result of a carefully conducted series of hospital experiments to which he has submitted it, and which, in our opinion, conclusively prove its great value as an adjunct in operative surgery.

In the original paper read before the British Pharmaceutical Conference, 1870, the chemistry of this salt and the process of making it were dwelt upon very fully; for the purposes of this paper it will, therefore, be only necessary to give concisely a few of the salient points which bear upon the inquiry. Sulphite of zinc is best prepared by mixing in solution six parts of zinc sulphate and five and a quarter parts of sodium sulphite. The new salt forms slowly, and falls as a white crystalline precipitate; it is very insoluble in water, but soluble in an excess of sulphurous acid.

Sulphite of zinc exists in two conditions of hydration as a di- or tri-hydrate according to the temperature at which it is dried, as we will assume that in making the gauze and similar fabrics the salt is always dried at 100° C, the composition of the sulphite present will be $\text{ZnSO}_3 \cdot 2\text{H}_2\text{O}$. When dry, sulphite of zinc is a perfectly stable compound, and we have gauze six months old which possesses all its pristine antiseptic properties. We tinge the gauze with an organic dye, and this fact affords an easy method of determining if the gauze, however old it may be, possesses its antiseptic properties, if a little gauze is placed in water and acidulated with sulphuric acid, it at once bleaches from the free sulphurous acid, when wet or in solution it suffers a slow oxidation, and hence its antiseptic power. It is very insoluble in water, being only soluble in that menstruum to the extent of 0.16 per cent. (about $\frac{3}{16}$ grain to the ounce). When such a saturated solution was tested from day to day with a volumetric solution of iodine, its oxidation into sulphate was seen to be very gradual, but very regular. In these experiments, 500 grains of the saturated solution was taken.

Grain Measures of Volumetric Solution of Iodine		converted by 500 grains of saturated	
Age of Solution.		Solution of ZnSO_3 .	
8th day	...	...	82.5
9th "	...	...	66.0
10th "	...	...	50.0
11th "	...	...	25.0
12th "	...	...	10.0

On the eighteenth day, the sulphurous acid was all converted into sulphuric acid. When sulphite of sodium is mixed with sulphate of zinc, the sulphite of zinc is very slowly formed, but is ultimately all deposited, owing to the insoluble nature of the new-formed salt.

This phenomenon adapts it naturally and with ease to the permanent saturation of any fabric, as gauze or lint, and without the intervention of any adhesive material such as starch. We first boil the gauze in water to thoroughly wash and sterilise it; then upon this gauze is poured a boiling solution of zinc sulphate and sodium sulphite in equivalent proportions; when thoroughly mixed and saturated the whole is allowed to stand twelve hours. The zinc sulphite is deposited in and around the fibres of the fabric in microscopic crystals, but soft and even unctuous to the feel. The deposition of the zinc sulphite is represented by the subjoined equation:—

Now, it will be noticed that sodium sulphate is a resultant of the above decomposition; the greater part, however, remains in solution, and we pass the gauze twice under rollers submerged in water with the object of removing all traces of this sodium sulphate which might remain. The gauze may be dyed, with the twofold object of watching the progress of the discharges, and with the purpose of branding it distinct from other surgical dressings.

There are two points which are generally acknowledged: (1) That sulphurous acid is one of our most efficacious antiseptics

(2) that this antiseptic property of the acidulous radical is perpetuated through its salts. It has been shown that sulphite of zinc is always oxidising when in solution, and that this unstable condition of sulphites results in the production of a fluid craving for oxygen, which is antagonistic to germ life.

This brings us to the important consideration of what part the basilius element zinc plays in the work. The use of zinc chloride in rendering the surface of the wound a non-cultivating ground is well known. This action is present to a high degree in zinc sulphide without many of the objections appertaining to the chloride. Zinc salts seem to have a specific action in keeping organisms in check and allowing the formation of healthy tissue; this is shown by the efficacy of the zinc salts in embalming the dead and rendering the tissue an inert and unchanging mass.

I (Dr. Heuston) now bring this paper to a conclusion by a tabular arrangement of the cases, as furnished by the resident, in which this dressing has been applied in the Adelaide Hospital by my colleagues and myself.

Cases dressed by the Sulphite of Zinc Gauze in the Adelaide Hospital between February and July, 1890.

Name.	Age.	Operation.	Date.	Result.
M. T.	42	Amputation of breast	Feb. 18	Suppurated in one place, where great strain was on the stitches; rest of wound healed by first intention.
T. C.	21	Radical cure of inguinal hernia	„ 20	Superficial wound healed by first intention; slight deep suppuration from silk ligatures applied to sac.
F. R.	20	Radical cure of varicocele	April 3	Healed by first intention.
M. C.	—	Removal of strumous glands from neck	„ 8	Healed by first intention.
M. S.	16	Removal of parotid tumour	„ 24	Healed by first intention.
M. H.	20	Arthrectomy	May 21	First dressing May 23rd; healed by first intention. Second dressing May 26th; healed.
S. W.	31	Amputation of breast	„ 29	First dressing June 1st; healed by first intention. Second dressing June 8th; healed.
J. F.	19	Treves's operation for psoas abscess	June 19	Wounds healed by first intention, except where drainage tube existed. Although there was a great discharge from the drainage tube, there was no irritation of skin.
H. Y.	43	Ovariectomy	„ 21	First dressing June 24th; wound healed. June 28th, patient sat up for five hours. July 2nd, all dressings removed, and patient discharged from hospital.
C. W.	20	Nephrolithotomy (Dr. Purefoy)	„ 21	June 24th, wound quite healthy, deep suppuration from drainage tube.
O. B.	19	Excision of knee (Mr. Franks)	„ 27	First dressing July 7th (tenth day); wound quite healed.
J. M.	60	Draining subpatellar bursa	July 3	July 8th, wound healed.
P. O'B.	19	Excision of knee	„ 3	First dressing July 8th; wound healed.
E. S.	7	False cartilage removed from knee-joint on which arthrectomy had been performed two years since	„ 3	Healed by first intention.
A. M.	12	Excision of knee	„ 10	First dressing July 13th; wound healed.
L. R.	30	Excision of knee (Mr. Barton)	„ 19	First dressing July 25th; wound healed.
T. B.	60	Epithelioma of labia	„ 26	Wound dressed several times daily; no suppuration or irritation to present time (July 30th).

Those cases where not otherwise mentioned were operated on by Mr. Heuston. MR. KENDAL FRANKS said he had found so much cutaneous irritation following the use of the mercurio-cyanide gauze that he was glad to put to the test of experience the gauze dressing described by Mr. Heuston. He had been very fairly satisfied with the alembroth gauze, though it also occasioned irritation of the skin. He has now used the sulphite of zinc gauze in many cases. In every case he has found the wound to run a perfectly aseptic course, and in no case had he seen the slightest irritation of the skin beneath the gauze. It would, he thought, prove a valuable addition to surgical dressings.

MEMORANDA: MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, ETC.

PANOPHTHALMITIS AND REMOVAL OF THE GASSERIAN GANGLION.

THE following case will support the probability of the panophthalmitis and loss of the eye being caused by the removal of the Gasserian ganglion. The daring brilliancy and success of Mr. Rose's operation¹ needs no comment from me.

J. B., a substantial middle-aged farmer, had been operated upon by me three times for epithelial cancer of left lower lip. Disheartened by its fourth appearance I took him to Mr. Jonathan Hutchinson, who removed the recurrent growth by a large V-shaped incision. It returned again after a rather longer interval. He then consulted an American cancer curer (quack), and I lost sight of him for a time. In a shorter period than after Mr. Hutchinson's operation the cancer returned with the addition of agonising pains in the left side of his face and head, which he was told was neuralgia. Ashamed of leaving me, and his pocket smarting under the abstraction of the fees of the American, he had put off calling me in for some time. The growth on this sixth appearance was not in the free border of the lip, which had been extensively destroyed by very painful caustics, but was seated under the mucous membrane of the reflexion from the maxilla to the lip, and was of the size of a walnut. The neuralgia of the left side of the head, face, and jaw had disappeared and the tumour was painless.

I took him again to Mr. Jonathan Hutchinson to decide upon the utility of another operation. Mr. Hutchinson pointed out the absence of the temporal, masseter, and other muscles on the left side supplied by the sensory branches of the fifth nerve, and in the most lucid manner demonstrated the uselessness of any operation in the mouth, as there was almost certain evidence of a growth under the dura mater having destroyed the Gasserian ganglion on the left side. There were no cerebral symptoms.

Shortly afterwards the left eye was attacked by severe inflammation, and being totally uninfluenced by treatment, went on to suppuration. Although its appearance was that of the most violent inflammation, with swelling, redness, and heat, there was no pain, and he calmly looked at me when passing a bistoury into the eye. It suppurated well and soon healed. The growth in the mouth rapidly increased and was accompanied by an enormous appetite. It never ulcerated, as he was seized after a few months with coma and died in a few days.

Till the coma appeared he was perfectly sane, and beyond a slightly increased natural irritability had no brain symptoms. The most earnest entreaties failed to obtain a *post-mortem* examination.²

Kimbolton.

J. HUGHES HEMMING, M.R.C.S., ETC.

REINFECTION, RECRUDESCENCE, OR WHAT?

UNDER the above heading in the issues of September 27th and October 11th of the BRITISH MEDICAL JOURNAL I read with interest the letters by Drs. Greene and Squire. Cases of scarlatina, where a second attack supervenes with but a short interval of time between that and the first, are rare enough to be recorded. Such are the two cases which came under my notice two years ago.

On November 16th, 1888, I was called in to attend two boys, R. and V. T., aged 11 and 9 years respectively, and found them suffering from a well-marked attack of scarlatina. Both cases terminated favourably, without complication, in due course, I making my last visit on December 5th, when desquamation had almost ceased.

On January 19, 1889 (45 days after my last visit therefore) I was again summoned to attend these boys, and to my surprise found them stricken down by a second attack of scarlatina. As before, both cases proceeded to recovery without any bad symptoms developing. In both attacks the symptoms of the disease were well marked, there being no doubt as to the nature of the complaint.

It is curious to note that on both occasions these two children

¹ BRITISH MEDICAL JOURNAL, November 1st, p. 1012.

² As well as I can remember this is only the second instance of return of lip epithelioma in an experience of more than 40 years in a decidedly cancerous district.