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Chimera ?

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SURGICAL INFECTION :

IS IT A CHIMERA ?*

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In a paper read before the Brooklyn Pathological Society, February 25, 1886, Dr. A. H. P. Leuf, the essayist of the evening, made essentially the following declarations :

1. There are but two methods of wound repair, the first being by primary adhesion and the second by suppuration.
2. Failure to obtain primary adhesion, and other wound complications or sequelæ, depend, not upon the absence of antiseptics, but upon some constitutional state or predisposition.
3. Those who practice antiseptic surgery neglect other and more important measures necessary for the safety and welfare of the patient.

I fail to see that this arraignment of the antiseptic treatment of wounds by Dr. Leuf has brought any new facts to the surface. The arguments advanced are the same that have been brought forward by the opponents of the anti-

* A part of the discussion upon "Surgical Infection" before the Brooklyn Pathological Society, February 25, 1886. As the paper by Dr. Leuf has not been published through the usual channel, the main points of his paper are here made to precede the discussion, in order that the reader may follow the argument intelligently.



septic system since the first introduction of the latter. In the first place, the statement that there are but two methods of wound repair—the first being by primary adhesion and the second by suppuration—is not borne out by the experience of those who practice either of the antiseptic systems or methods. Such a statement ignores entirely the healing by granulation without suppuration under an antiseptic dressing; the organization of a clot, which may fill up a bone cavity for instance, and which likewise occurs without suppuration; and, lastly, sponge grafting. The two last certainly can not be accomplished without the most rigid antiseptics.

Let us glance for a moment at the physiology of repair: First there occurs swelling of the parts, to a greater or less extent, from capillary turgescence. From the dilated capillaries plasma exudes, which infiltrates the adjacent tissues, and, when occurring upon the cut surfaces, constitutes wound secretions. This exudation of plasma is proportionate to the amount of the local irritation, and within certain limits is essential to the needs of the reparative process, and can generally be kept within due bounds by properly protecting the wound from further irritation, and by rest and compression. If the irritation is but temporary, the increased activity in the capillaries, or active hyperæmia, soon subsides; but if the irritation continues or increases, tissue changes occur; these consist in exudation and cell-granulation. These latter always occur where the injury inflicted is sufficient to produce a solution of continuity, and are the essential agents in the reparative process, or building up of new tissue to fill up the breach. Now, anything which produces excessive irritation or prolongs the latter, leads to excessive exudation and cell-germination, and it is the over-production of these cells (the embryonic cells of Stricker), washed away from the surfaces of the wound by the excessive exudation, which

constitutes suppuration. Probably such a thing as absolute primary adhesion never occurs; however closely the wound surfaces are approximated, a delicate layer of new tissue intervenes and constitutes the bond of union.

I will not undertake to enumerate the many causes of failure of union, but there can be no question that this failure may be due to very many and diverse causes. Not the least among these, in my opinion, is that which antiseptic surgeons recognize as infection by poisonous agents, and particularly by organic matter floating in the atmosphere. I presume there can be no doubt as to the existence of this organic matter in the atmospheric air, for this has been abundantly proved by Tyndall. That this largely consists of microscopic germs capable of setting up putrefactive changes in organic fluids is also capable of demonstration, and has been proved time and again. And that their effects are such as produce evil consequences has been shown by Panum, Billroth, Bergmann, Klebs, Pasteur, Koch, Loeffler, and Ogston. The presence of these germs growing in the tissues acts as a source of irritation, just as the presence of foreign substances of a macroscopic nature, such as gravel, sand, or filth of any sort, is known to. This irritation results in increased hyperæmia or afflux, excessive exudation of plasma, over-production of embryonic cells, which latter, failing to become fixed, are thrown off in the liquid plasma, and, as before stated, constitute pus; this in reality is a waste of reparative material. Inflammation may also result from this prolonged irritation, and consists in a stasis in the capillaries, an extension of the area of active hyperæmia, a slowing of the current of blood, particularly at the points nearest the irritation, where it may become arrested altogether. The white corpuscles, or leucocytes, are crowded against the walls of the capillaries, finally penetrating these, and choke up the circumvascular spaces. Exudation of liquor

sanguinis, blocking of the vessels with red blood-corpuscles, and, as a result, the occurrence of redness, pain, heat, and swelling, constituting the classical picture of inflammation, now take place. All this may be directly traceable to the existence of excessive irritation, and this may as certainly be due to the presence of germs deposited in the wound as to the existence of foreign matters appreciable to the naked eye, too great tension upon sutures, insufficient drainage, or allowing "dead spaces" for the accumulation of wound secretions. To be sure, all wounds that are not treated antiseptically do not do badly, for speedy closure and direct contact of the surfaces allow but a relatively small amount of air and its contained organic matter, including germs, to find a lodgment. What few gain access are brought in direct contact with living cells which, possessing certain powers of resistance to the action of pathogenic germs, prevent their development and finally destroy them. That this occurs is an established fact, and that germs do harm in the manner I have pointed out has been equally well proved.

Professor Hamilton, in the paper alluded to by Dr. Leuf, and which appeared in the New York "Medical Record" for January 2d of this year, although pretending, and at first glance appearing, to be perfectly fair toward Lister, certainly can not be said to be just in his condemnation of that surgeon's theory of wound infection and its consequences, inasmuch as, without doing aught else than to call attention to the other causes for failure of primary union, he proceeds to emphasize his own disbelief in the evil effects of these noxious agents by declaring that "the various manipulations and devices for the purpose of excluding the germs . . . serve no other purpose than do the walking, talking, and gestures of the prestidigitator." And this without attempting to deny that germs do exist in the atmospheric air, or to contradict the accuracy of the results

following the elaborate experiments of the investigators to whom I have already alluded. In fact, in a preceding paragraph he admits the value of antiseptics in preventing the decomposition of blood, pus, and serum.

I fail to appreciate the argument set forth by Dr. Leuf that, when primary union fails, the fault lies not with the absence of antiseptics, but with the predisposition of the patient—an inherent something which forms an insuperable barrier to rapid repair. While I am willing to admit that the existence of a well-marked dyscrasia may lead to failure of repair, just as it may lead to failure of union in a fracture, yet, if this were true to the extent stated, wounds occurring in patients afflicted with syphilis, tuberculosis, and struma might be expected to break down and suppurate almost constantly, even under antiseptic treatment. That this is not true, my own experience, as well as that of my colleagues who follow antiseptic rules in operating, clearly shows. In 1884 I visited the wards of Professor Esmarch, in Kiel, and was shown more than thirty cases of excision of the knee joint done in a rigidly antiseptic manner and without drainage. These excisions were done for destructive disease of the knee-joint, and, as one can readily believe, occurred for the most part in broken-down persons, the subjects of struma. Here certainly the treatment was handicapped to the fullest extent by the existence of a well-marked "predisposition," and yet these patients were all doing well, and primary union of the soft parts, with complete consolidation of the bony structures, was the rule, and that ordinarily under but one dressing. Volkmann, of Halle, declared to me that, so great was his faith in the antiseptic system, he believed wounds should heal without suppuration or other accident, no matter what the patient's general condition might happen to be.

It is not pretended, as stated by the essayist of the evening, that general infection is caused by the direct entrance of bacteria into the general system, although the researches of Ogston would tend to prove that micrococcus poisoning is the chief factor in the production of septicæmia and septopyæmia. The absorption of the products of decomposition from the pabulum upon which germs feed and in which they grow—in other words, the ptomaines almost invariably present in putrescent animal fluids—is, when they are absorbed in considerable quantities, sufficient to account for all the symptoms. It may be a question of bacteria poisoning, micrococcus poisoning, or ptomaine poisoning.

The subject is a vast one, and but scant justice can be done it in such a discussion as this. There are a few more points, however, to which I would beg to refer. The experience of Mr. Tait has often been alluded to. I doubt if that noted and brilliant surgeon was ever a very enthusiastic antiseptist. He tried the method very faithfully, I have no doubt, for I know him to be a painstaking and conscientious surgeon. He “tried his tea-kettle, and gave it away,” thereafter getting equally good, if not better, results. But the field of surgery which he particularly cultivates and for which he has done so much is not the one in which great gain has been hoped for, even by Lister himself. The peritonæum does not seem to have that greediness, so to speak, for germs and their products evinced by other tissues, and, in fact, has recently been proved to be a much more tolerant and tractable membrane to deal with than was formerly supposed. It is in compound fractures, large incised wounds, and injuries of that class, that the differences between the old and the antiseptic treatment are the most marked. I happened to enter the profession at a time when all the great advances in surgery of this century, except the antiseptic treatment of wounds, were yet fresh in the minds

of, and fully elaborated upon in the lecture-room by, the masters of the art. With all these fully impressed upon me, I strove to get the best possible attainable results. The results of the best of these earlier efforts, I assure you, can not at all compare with what is to me now an every-day experience.

I am not an advocate of the typical Lister dressing. I believe it to be cumbrous, expensive, and open to other objections as well. I believe in the application of a dressing which will allow of the free entrance of air, and thus favor the rapid desiccation of the discharges. The moss dressing of the Germans or the paper-wool dressing introduced by myself fulfills all the requirements of dry wound dressing perfectly. Of course, this is only to be applied after all so-called "dead spaces" have been provided against by drainage or suturing, and the wound has been sterilized and closed. But that Lister's or any other dressing of an antiseptic nature prevents us from knowing what is going on in the wound, is a fallacy. Baron Larrey, the elder, the great master of French surgery, as well as the equally clear-headed and successful English teacher of our art, Sir Astley Cooper, in their day declared against meddling surgery; and the reasons given for this are as cogent now as then. Failure of drainage, sepsis, and other untoward conditions, are quickly announced by the thermometer or by the occurrence of pain. The time occupied and material used in an antiseptic dressing are trivial matters compared to the absence of necessity of frequent changes, to say nothing of the surgeon's peace of mind when he feels the assurance that all will go well with the wound as well as the patient, and that if failure occur it is through no fault or neglect of his own. The requisites in these days of simplicity in dressing are few and inexpensive. Mercuric bichloride, or even common salt, or diluted vinegar, if nothing

better is at hand, is easily obtainable, and sawdust, or absorbent paper torn into narrow strips and made into a cushion, constituting the before-mentioned paper-wool, is all that is really needful, in addition to what good surgery always requires, namely, cleanliness and proper measures for closing the wound and draining it; or, these not being deemed needful in the particular case under notice, support and compression.

The charge that those who practice antisepsis do not pay proper attention to the preparation of their patients, or become so absorbed in the antiseptic idea as to be oblivious to everything else in and about the operation, requires no refutation at my hands. So far as my observation goes of the gentlemen so accused, this argument against antiseptic treatment is based upon a purely gratuitous assumption.

I regret my inability, without encroaching unwarrantably upon the time of the society or the privileges of those who are to speak after me, to go over the ground covered by Dr. Leuf's paper more thoroughly. I have endeavored to state my own convictions and the grounds for them, and to declare to you that, in the light of the researches of experimenters in the field of bacteriological science, and the experience of those who, acting upon the suggestive results derived from these experiments, treat wounds antiseptically, in my opinion the surgeon who does not take into account every possible source of danger that may overtake his patient, including in this the noxious influences arising from the entrance of germs into the tissues, is criminally negligent, and directly responsible, both to his own conscience and to the world at large.



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