

The causes of suppuration are, according to Lister;

- (1.) Excited nerve action.
- (2.) The direct action of a stimulant.
- (a.) Septic. (b.) Antiseptic.

Now take the case of an abscess. The pus here present has resulted from inflammatory processes acting through the nervous system.* There is tension, this operates mechanically, and again through the nervous system, increasing the formation of pus. The surgical indication is to give vent to the pus. Supposing this be done, the element of tension is removed, pain is relieved, and the formation of pus through an excited nervous action terminates. But common experience shows that in a short time pus begins again to be secreted, and continues to be formed until the abscess cavity, in process of time, closes. The germ theory explains this renewed formation of pus by the admission of septic organisms, their multiplication in the abscess cavity and the irritation of its walls by the products of their metabolism. And the practice at inference is, exclude the germs.

To do this it is not necessary to inject the abscess cavity, as some have done, with strong antiseptics, nor is it necessary to wash newly made wounds with potent germicides. These simply stimulate the exposed tissues to form pus, and indeed, by lowering the vitality of the tissues may enfeeble them in their struggle with the invading microbes. Lister has always been very careful to apply his antiseptics as little as possible to the surface of the wound. As he himself said, twenty years ago; "the injured tissues do not need to be 'stimulated' or treated with any mysterious 'specific,' *all that they need is to be let alone.*" The problem there is to exclude the germs. How are the germs admitted to the wound, or to the abscess cavity? By far the most common way is by means of the hands and instruments of the surgeon. Then let these be thoroughly cleaned, not with soap and water only, desirable though this be, but with some effective germicide. Lister's plan from the beginning has been the use of a 1 to 20 solution of carbolic acid.

The wounds are infected through the medium of the air. The air in itself is harmless, but the dust it holds in suspension teems with many forms of microscopic life, and though all of these are not capable of

inducing suppuration in wounds, there is much danger especially in the neighbourhood of diseased and decaying matter that septic organisms may infect the wound.

It is impossible to prevent the air from reaching the wound, but we must attempt to exclude the germs by a proper dressing. Thick layers of gauze or cotton wool may filter the air before it reaches the wound.

It is in the secretions of the wound that pathogenic organisms thrive; if the secretion fill the dressing and reach the surface, the dressing is useless for the germs can multiply in the albuminous fluids held in its meshes, and so gain access to the wound. The dressing is worse than useless, for it simply enlarges the area open to infection. But if the dressing, gauze, jute, or wool be so prepared with antiseptic agents as to render the wound-fluids oozing into it noxious to the septic germs, the object has been attained, and, provided the discharge be not excessive such a dressing may remain on for a considerable time, several days or even weeks in succession.

And such dressings are now within the reach of every practitioner. The gauze prepared with the double cyanide of zinc and mercury, which was introduced two years ago by Lister, continues to give great satisfaction. Writing in December last he says of it that "taking all circumstances together it is better than anything else that we have used."

A clear understanding of the principles of Listerism will enable any of us to carry out the practice, and we say deliberately that the practitioner who does not, so far as he can, give his patient the benefit of antiseptic treatment, comes short in his duty.

We may not all find it necessary or desirable to perform operations, but few of us can escape the responsibility of treating accidental wounds. Let us try to do the best for our patients in the clear light of science. *Imprimus non nocere.*

First of all, let us be careful not to introduce septic mischief; let us see that our hands and instruments are clean, not in the ordinary sense only, but in a scientific sense. Nothing can be better for this purpose than carbolic acid. Its extremely penetrating power makes it especially useful for sterilizing the hands, and the skin in the neighbourhood of the wound. While it has the great advantage over the mercurial solution of not destroying the instruments. For cleansing and sterilising a wound which has been

* See Phil. Trans. (Proc. Roy. Soc.), 1858. "On the early stages of inflammation."