THE BLOOD-CLOT DRESSING IN CLOSING THE WOUND IN OPERATIONS FOR SIMPLE MASTOID ABSCESS.*

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This paper is based upon my experience in thirteen consecutive operations for simple acute mastoid abscess in which I have closed the wound primarily employing the coagulated blood as a dressing for the dead spaces in the exenterated mastoid.

These thirteen cases had a necessary detention in the hospital of ninety days. This would show an average of 6 12-13 days for each case, and, to be absolutely specific, all left the hospital at the end of seven days except one, who left on the sixth day. This patient developed a mild attack of erysipelas on the fourth day, but the mastoid wound was not invaded. Psychic conditions peculiar to the patient made it better for her to go home and I made but three or four visits to her after her departure from the hospital. The mastoid wound did not make the visits necessary because the wound had healed with a linear scar with two points of stitch abscess.

Another case of a young woman with a nursing baby developed a double mastoid abscess with suppuration from both ears. Her mastoids were exenterated and closed with catgut sutures over a blood-clot dressing. She left the hospital on the seventh day, returning to her home in the country twenty miles distant, and I saw her twice afterward. The left skin wound opened for one-half of a linear inch, and for the depth of the skin. This closed under a scab and was dressed a few times by the family doctor, who applied a pad held in place by rubber plaster.

It has required nine years for me to arrive at a conclusion concerning the value of blood-clot dressing which should have been immediate, if tradition, rather than reason, coupled with knowledge, had not guided my way. And I can assure you it was necessity which brought me the courage to try the blood-clot dressing in a modified form in the first instance.

I had operated a child two and a half years old for acute mastoid abscess following scarlatina, and the father would not leave the child, who was very nervous. I concluded on the second day that I would withdraw the small roller gauze drain, close the wound with a sterile pad and send the child home. Further dressing or

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manipulation seemed out of the question and I made a virtue of necessity and left the wound dressed. Each day the dressing was inspected, and as it seemed to be satisfactory I left it in place. In ten days the wound was quite solidly healed. I began to think it feasible to close the mastoid wound with a blood-clot for a framework.

My next case was a young girl of fifteen years who was convalescing from an attack of typhoid fever, in the course of which she developed a mastoid abscess. She was weak, nervous and apprehensive of pain. The wound was closed with catgut suture over a blood-clot, and in seven days the wound was solidly healed and she could have left the hospital, so far as the ear was concerned. Her physicians, Drs. George W. McCaskey and Miles Porter, Jr., kept her in the hospital until a large bed-sore, which had developed previous to her coming to the hospital, had healed.

Since this case I have closed all wounds over the blood-clot in simple acute mastoid abscess with the astonishing result of an average hospital attendance of seven days. In the face of my experience it would seem fair to give the method a trial; yet such is the force of custom and habit that even an ocular demonstration is not sufficient, as I was made aware in an experience with one of my colleagues last winter. In the case of a young woman twenty-four years old, in whose case I was called in consultation and requested to operate, I asked the doctor if he had had any experience with the blood-clot dressing, and he said he had not. I explained the method in detail and when I opened the mastoid we found the sinus and dura exposed. He said, "You would not use the blood-clot dressing in this case, would you?" I told him I had used the blood-clot dressing in cases with much larger exposure of the dura and sinus with perfect success, and would use it in that case. He expressed astonishment at the short time required for healing and the short stay of the patient in the hospital.

I am aware that many of our best surgeons do not use it, or have used it and put it aside. You all know that the use of the blood-clot for closing dead spaces in bone is an old procedure and founded upon perfectly scientific data.

This method of closing the wound in mastoid operations was first proposed by Dr. F. B. Sprague, of Providence, R. I., and put into practice by Dr. Clarence John Blake, of Boston. Twenty-five years ago Dr. Blake began his experiments with the patient's blood as a framework for closing and reconstructing the bone in a mastoid wound, and he has written largely and enthusiastically upon the

results. I heard his paper, "The Value of the Blood-Clot as a Primary Dressing in Mastoid Operations," read at the Toronto meeting of the British Medical Association in 1906, and I dismissed the consideration of it with the thought that the method was a fad and a dangerous one. But now, with results which have added so much to the comfort of my patients, which have so shortened the time of detention in the hospital, which have left only a fine line in a rounded mastoid contour, I feel that I want to excite your enthusiasm to an equal pitch with mine and to the end that we may use the blood-clot dressing as the safe and conservative dressing for the closure of the exenterated mastoid in cases of acute abscess of this bone. I have nothing to add to the operation either in the way of technic or physiologic knowledge of the blood as a natural germicide and physical framework for the growth of osteoblasts. It must, however, be insisted that the surgical operation be a complete one, both within the exenterated cavity and upon the overlying soft parts. Every vestige of softened bone must be removed without consideration of the extent of the removal or of the parts involved. We must go to the dura within and to the skin without. Every bleeding part in the osseous cavity must be regarded as a source of possible subsequent infection and removed by the curette. After the mastoid cavity has been made clean from the tip to the bottom of the antrum, a free incision is made in the drum high up and a piece of rolled gauze inserted down to the incision in the drum after the canal has been made clean with alcohol, ether and hot sterile normal salt or alkaline solution.

I use no fluids or chemicals, such as bichloride, in the mastoid cavity, nor any preparations which would lessen the germicidal powers of the blood-clot to be subsequently used. Sterilization of the skin is secured by a painting of the skin surface with a 2 per cent. solution iodine; the external ear and the hair line as well for an inch within its border. The hair is not shaved or disturbed in any manner. This, however, is a matter of individual interpretation. After considering the results following the use of the blood-clot in closing the dead spaces in the operation for mastoid abscess we find them superior to the results obtained in the usual method of packing with gauze and securing the closure of the wound by granulation. The results are better in three particulars and they comprise about all that goes to make up good surgery, viz., rapid healing, no pain to patient in dressing the wound, and no deformity. I am recounting my successes. I have had no failures. Yet I am not insensible of the fact that others have had failures and they have been such as have led them to abandon the method.

I do not presume their failures have been due to bad technic, because they are masters in their special work. At the 17th International Congress of Medicine, held in London, in 1913, Prof. Mygind, of Copenhagen, read a paper on "Secondary Suture After Simple Resection of the Mastoid." He said:

"There is no doubt that there are many drawbacks attached to the ordinary after-treatment of simple resection of the mastoid process for acute osteites by the filling up of the osseous cavity with granulation. The chief of these drawbacks is that the healing process is lengthy, taking generally from six to twelve weeks. Thus the average duration of the cases not complicated with cerebral abscess, sinus thrombosis or meningitis treated at the Ear and Throat Department of the Copenhagen Commune Hospital is about seventy-four days.

"It would, therefore, seem reasonable to suppose the various efforts made to abbreviate and simplify this after-treatment would have been received with interest, and also that surgeons who had been successful in their attempts would have found followers. This, however, had not been the case, and two methods which in particular mark a distinct progress have not gained the recognition they deserve. I refer to the use of primary suture after filling up the cavity in the bone with blood-clot, as first suggested by Frank B. Sprague, of Providence, U. S. A., and first performed by Clarence Blake, of Boston, in 1906. * * * I have for some years in a number of cases which are suitable for such treatment used primary suture, and have obtained primary healing."

I may perhaps explain that these remarks are preliminary to Mygind's description of the use of the blood-clot in closing the mastoid wound in from eight to twenty days after doing resection primarily and using gauze packing. As a matter of fact, I do not see that Prof. Mygind's operation for secondary suture differs in any essential from the method I employ for primary closure. He opens the wound and scrapes out all soft granulation tissue, freshens the edges of the wound and then allows it to fill with blood which he permits to coagulate. Under this method the aditus to the antrum is closed off and reduces to the minimum the danger of this avenue for infection of the blood-clot. I wish to refer again to Prof. Mygind's paper and quote:

"The following figures will show the extent to which this method abbreviates the after-treatment of resection of the mastoid process. As I have already mentioned, seventy-four days is the average time at the Copenhagen Commune Hospital's Ear and Throat De-

partment for closing the cavity in the mastoid process with the usual treatment, whilst the corresponding figures for cases of secondary suture which healed, practically speaking, *per primam* was only twenty days."

We must not forget that there is a marked difference in the recuperative power between patients who attend a public clinic and those who come to your private office, and the difference is in favor of the private patient.

Some who have not followed the experiments upon the blood and are not familiar with the fresh blood as a natural germicide, will be led at first blush to regard the blood as a first-class culture medium for the development of micro-organisms and feel that they are locking up in an infected cavity all the elements for a first-class case of suppuration. Such, however, is not the case.

Dr. H. O. Reik, of the Johns Hopkins University, has been an enthusiastic investigator in the use of the blood-clot dressing, and, that I may get him squarely on view, I will quote from his article, "The Blood-Clot Dressing in Mastoidectomy, Considered Physiologically," printed in *A. M. A. Journal*, March 31, 1906:

"If a mastoid wound be dressed with sterile or antiseptic packing at the time of operation, the period of healing will vary from three weeks to several months. Very rarely will complete closure occur in less time, and I have frequently seen cases that required dressing over a period of six months." I wish to quote a little further from this paper: "The primary object of this dressing is to obtain healing of the wound by first intention, but when this occurs other advantages accrue; for instance, the normal contour of the mastoid process is restored, the resulting scar is a mere line and the period of healing is reduced to five or seven days, with practically no after-treatment. No deformity, almost no scar, and primary union constitute on the whole a stake worth playing for. On the other hand, in cases in which the blood-clot fails to organize there is no additional risk to the patient. * * * The wound may be dressed and packed in the usual way."

Many investigators in the realm of physiology have come to the same conclusion in regard to the germicidal properties of the blood. Metchnikoff, Nuttall, Fodor, Vaughn and Novy have published their findings. From their experiments we may draw the following conclusions: The normal human blood possesses, in varying degree, bactericidal power; this power is greater in drawn blood than in blood circulating in the vessels; the microbe destroying substance is found in the serum, but is resident in the leucocytes; the germ-

icidal power of the blood diminishes after forty-eight hours and is soon lost altogether. If 16,000 germs were injected into an animal, the animal still lived, whereas, if more than 16,000 were injected, the animal died. If 16,000 of the same germs were placed in 1 cc. of blood drawn from the animal, all the germs were destroyed in a few minutes and after a few minutes more no germs could be reproduced from the clot.

Vaughn and McClintock showed to their own satisfaction that the leucocytes produced a proteid which has the power of destroying germs and that the proteid is attributed to nuclein. I do not wish to do more than recall to your mind the results of the physiological experiments upon which the germicidal property of the blood rests.

A principle to have universal application should always work in the same way. But a principle which fails in its application may fail because of technic or because the premises may be perfect in one case and not in another. I cannot do better in closing this paper than to quote from Blake's paper referred to above and read at the Toronto meeting of the British Medical Association in 1906:

"4. That the blood-clot is not an inert filling material merely, but has in its serum a protective defence viable for at least forty-eight hours after formation of the clot, and its clot a repair material capable of effecting closure of the antral and the surgically produced cortical openings and of traversing the unified mastoid space.

"5. That the use of the blood-clot completely filling a carefully exenterated mastoid cavity results, when it persists, in healing by first intention in a varying percentage of cases.

"6. That the persistence of the blood-clot during the period of its protective viability only, even though it then break down and come away entirely, results in the formation of foundation granulomata, which are a basis for subsequent repair with speedier and more satisfactory results in healing than are obtainable when the wound is dry-packed from the beginning.

"8. That the only cases to which the blood-clot dressing is inapplicable are those in which, on account of pyogenic invasion of surrounding structures, it is desirable to keep the mastoid cavity open as a path of access, and those in which a systemic condition of the patient, or the extent of the local infection, does not warrant the expectation of speedy repair."

Some will say that the principle of the blood-clot is bad surgery. If bad surgery produces such brilliant results, let us have more bad surgery, for, in the final analysis, results are what count.

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