

A Mirror of Hospital Practice.

A CASE OF TETANUS INFECTION FROM AN OPERATION WOUND.

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✓ THE following case appears to me of interest as an example of the worst form of surgical catastrophe, the source of which was traced with great difficulty.

After three years continuous hospital work comprising much surgery under both good and bad conditions, I was transferred to the Jail Department in order to fill a temporary vacancy. My knowledge of jail work was necessarily of a meagre description, but I felt that I was experienced in hospital work and therefore turned my attention particularly to the hospital arrangements of the jail. As I had a fair repute as a Surgeon, there seemed some probability that those prisoners, who had any complaint of a surgical nature, would come forward for operation. I therefore took special pains to overhaul the Hospital facilities for surgical work, investing in a new and efficient steriliser and giving my Sub-Assistant-Surgeons detailed instruction in the proper management of an operation. One of the first prisoners to apply for operation was a young and healthy man with a large congenital hernia complicating a partially descended testicle. The case seemed to me suitable and I agreed to operate. The only operation room was a large and airy room upon the ground floor of the hospital. The room was a good clean room, ventilated by doors opening upon a gravel pathway bounding a wide grass plot. Upon the morning of the operation I satisfied myself that the Sub-Assistant-Surgeon thoroughly understood my instructions and had ample time in which to carry them out. His instructions were that all instruments, silk ligatures, and sufficient gauze for sponges, were to be boiled for at least half an hour. Upon my arrival I made sure that this had been done. The patient's skin which had been prepared in the usual way overnight was again sterilised just before the first incision was made. During the operation the help of the Sub-Assistant-Surgeon was restricted to handing me sponges straight from the lotion and in holding retractors which did not allow his hands to come in contact with the wounded tissues. The operation was a simple one, with which I was perfectly familiar; the partially descended testicle was removed and the cut cord ligatured with silk, the pillars of the inguinal canal were brought together with Kangaroo tendon taken straight from the hermetically sealed bottle sent out by a maker of repute, silkworm gut sutures were used

for the skin incision, and no drainage was considered necessary. The operation was completed quickly and without confusion, *i.e.*, there was no running to and fro during the progress of the operation.

The patient's temperature remained normal throughout, and he was well and free from pain or discomfort until, upon the morning of the 8th day, he complained of some stiffness of the jaw muscles. The wound was dressed the next morning, and at this time the diagnosis of tetanus was obvious. The wound was perfectly healed, there was no discharge, swelling, or tenderness, and the dressings could have been used again as they were dry and free from blood or other discharge. The patient died upon the 9th day. I opened up the wound about half an hour after death and took out the ligatures with care. Around the silk ligature used for tying the spermatic cord were about three drops of dark thick pus; the wound as a whole was soundly healed, so that I was obliged to use a scalpel in order to open it up. A smear from the pus around the silk ligature showed a few bacilli similar in size and shape to tetanus bacilli; these bacilli were more numerous in the fluid expressed from the silk ligature. I placed ligatures from the wound under the skin of various white rats; the rat which harboured the silk ligature developed tetanus and died, the others remained healthy.

In considering the sources of infection there seemed to me to be five possibilities:—

(1) Hands of the operator or of his assistant: I had satisfied myself before operating that all usual precautions as to the cleansing of hands had been properly carried out, and had made the Sub-Assistant-Surgeon wash side by side with myself, and I was satisfied with both his and my own washing.

(2) Patient's skin: the sterilising of this had been as thorough as I had always been accustomed to have carried out. Moreover, if either of these causes had acted, it seemed almost certain that they would have given rise to a general infection of the wound with the more usual pyogenic bacteria, as well as to the tetanus infection.

(3) Instruments: if the Sub-Assistant-Surgeon was to be believed, the preliminary sterilising of these had been efficient, and I knew that there had been no soiling during the operation.

(4) Ligatures: the Kangaroo tendon had been handled by myself only and had been taken straight from the sealed bottle.

Silkworm gut: that this was sterile, was, I think, shewn by the sound surface healing of the wound.

Silk: the animal experiments seemed to suggest that this was the source of infection.

The silk used at the operation had been taken a few days before from a main hank kept in the admirah; this hank was old and in a tangled condition, but it did not contain any obvious ground dirt. The short length used for the operation had been wound upon a glass slide, placed in the steriliser with the instruments and gauze, and boiled for over half an hour, so that, even had it contained tetanus spores, its sterility did not seem open to doubt.

(5) Air-borne infection during the operation: there seemed to be a fair possibility of this as the operation room was upon the ground floor, the windows and doors were all widely open and the weather was hot, and the ground dry; though, as the operation was done in the morning, there was not much wind. Upon the other hand, there had been no running to and fro during the progress of the operation, the wound had been well irrigated out before it was closed, and the operation was a short one. As I had learnt by experience to look upon air-borne infection as the excuse of a careless operator for inadequate aseptic precautions in more usual ways, I was particularly loth to accept such an explanation. I, therefore, made the Sub-Assistant-Surgeon carry out in my presence all the details which he had carried out upon the day of operation. He had placed the instruments first in the steriliser, then a flat layer of gauze to serve as sponges, and upon the top of this gauze he had placed the flat slide upon which the silk had been wound. When the water was added, the gauze floated to the top, carrying the slide with it, and even after half an hour's boiling this layer of gauze was still upon the surface: temperature of the steam over the surface of the gauze was only 82° C. From these experiments I had no doubt but that the silk ligature, so far as tetanus spores were concerned, had not been efficiently sterilised and that it was this inefficient sterilising of the silk which had been the cause of the unfortunate accident. Absolute proof of this could not be obtained, as the silk in question had been used upon several occasions, subsequent to this one operation, and upon these other occasions had been more efficiently sterilised. I did not succeed in causing tetanus infection in animals with silk from the tangled main bundle.

I report this case as an example of tetanus infection due to failure of aseptic precautions, in which it was only after the most careful enquiry that the exact method of such failure was discovered. I was used to operating and had taken, as I thought, the greatest pains to ensure asepsis. At first sight I had every reason to consider that the instruction, which I had given, had been properly carried out. The method of the accident never occurred to me until I made the Sub-Assistant-Surgeon exactly repeat in my presence his procedure; had I not done this, I would have

confidently believed that the infection had taken place in spite of adequate aseptic precautions and would at that time have attributed it to air-borne infection, in which the germ, being tetanus, had not unnaturally remained localised in the neighbourhood of the most deeply seated body, the silk ligature.

THE TREATMENT OF ORIENTAL SORE BY CO₂ SNOW.

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SOME eight months ago I sent a brief note to the *I. M. G.* on the treatment of Oriental sore by CO₂ snow which was based on a personal experience. Since that time the method has been in constant use in Lahore, and a large number of cases have been treated, on the results of which I now propose to offer some remarks. These observations are drawn from the records of 50 patients who attended the out-patient department until sound healing was considered to have occurred. Many patients do not return after the first or second application of the snow, and a still larger number stay away when they consider the trouble is cured, so that, in spite of the great numbers treated, it is difficult to keep many cases under observation until complete healing has resulted. Before discussing these cases I must refer to the sore on my own wrist which was the subject of my first communication.

This sore, which I had looked upon as healed, four weeks later broke down in the centre, and though no Leishman-Donovan bodies could be discovered in it, there can be no doubt but that it was a recurrence. The scar in which the ulceration occurred, was composed of thick tissue, which I have since learned to look upon as unhealthy, and which I now destroy. It was treated by further application of the snow for 30 seconds, and this had to be repeated on two more occasions at intervals of twelve days before final healing resulted. The scar which is now five months old, is thin, supple, and scarcely noticeable.

Another sore which was present on the flexor surface of my right forearm, and in which the Leishman-Donovan bodies were detected, required three applications of the snow at intervals of 12 days for its cure. This sore had a duration of eight months and was just beginning to ulcerate when the treatment was undertaken.

Turning to the cases treated, the following points may be noticed:—

Age.—The patients were of all ages, from childhood to old age, the majority being young adults.

In the children the process of repair after the application of the snow was quicker, and the period of treatment rather less than in the adult.

Number of Sores.—In the majority, 28 cases, only one sore was present. Thirteen cases had two sores, and the remainder three or four.