The Lister Frieze : Policlinico Umberto, Rome.

LISTER JUBILEE NUMBER.

Remarks

ON

PLUGGING WITH IODOFORM GAUZE IN OPERATIONS PERFORMED IN CAVITIES OF THE BODY.

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THE principles laid down by Lister for the treatment of wounds apply not only to breaches of continuity at the surface of the body, but also to organs situated deep down in its cavities. We may count upon cure everywhere if we protect the wounds from contact with all outside morbid agents tending to produce inflammation and suppuration, and if we conduct the blood and the products of transudation from the wound into dressing material well suited to absorb them and to neutralize their action.

These conditions—indispensable for securing safe healing—must be modified according as they are carried out at the surface of the body or inside its cavities. In the latter case the principal proceeding is to pack the wound with pieces of sterilized gauze impregnated with iodoform powder. The method by which this is done in my clinic was described as long ago as 1887 by my former assistant, Professor von Bramann.

I propose to describe the method in three operations in which the pharyngeal-oral cavity has to be opened (1) resections of the upper jaw, (2) operations on the tongue, and (3) the total extirpation of the larynx, in order to determine whether by its means we have been able to avoid infection of the wounds.

The total resection of the upper jaw we perform by either Velpeau's or Dieffenbach's incision. The soft parts being cut through, excision of the bone is commenced by pushing backward the periosteum on the floor of the orbit up to the fissura orbitalis inferior. Into the latter a needle is then inserted and carried along the posterior surface of the malar

bone, reappearing at its lower edge. Through the eye of the needle a thread is drawn, followed by a Gilgi wire saw. The connexion of the upper jaw with the nasal and frontal bone is then severed with bone-cutting forceps. Upon this, the soft palate is detached from the hard palate, and the latter sawn through in its middle line with the Gilgi saw. Finally, the upper jaw is levered out from the sawcut plane and drawn forwards by strong bone forceps, whilst the soft parts are dissected by scissors and the upper jaw severed from the processus pterygoideus of the sphenoid bone by a light stroke of a chisel. Into the large cavity a sterilized bath sponge is then introduced and pressed tight. On its removal we proceed to ligature any gushing branches from the internal maxillary artery, or this vessel itself. We then pack the whole large wound-cavity with iodoform gauze, making use of a very long strip of gauze, hardly two fingers wide. With this we pack all niches and recesses of the wound, until the whole large cavity is closely stuffed, bringing out the end through the nostril on the operated side. The wound in the soft tissue is then sutured all over, the strip of gauze being left hanging out of the nostril. The advantage of this method is, that the patients are able to eat and drink directly after the operation, for the gauze is so tightly pressed that it does not fall out of the cavity, whilst it can be still further secured in its position by means of a few sutures drawn from the mucous membrane of the cheek to the mucous membrane lining the piece of upper jaw left standing. These sutures are so arranged as to form a kind of net on which the tampon rests, thus securing it from falling into the mouth. We are accustomed to leave the tampon undisturbed for several days—even as late as the tenth day—before removing it. The wound is then found to be partly cicatrized, the remaining part being clothed with good granulations.

In cases where we have been obliged to remove the eyeball, or even pieces of the interior or superior orbital wall, a second plug was introduced into the orbit, and carried up to the denuded dura, and this too has been left undisturbed for six or eight days.

Up to the year 1900 I had performed 47 total and 23 partial resections of the upper jaw by this method. Of the 47 total resections, 7 patients died, 4 of broncho-pneumonia, 1 in collapse, 1 of pulmonary embolus, and 1 of supervening erysipelas. Of the 23 partial resections, 1 patient died; in this case too the cause was pneumonia. Thus we were successful in avoiding infection of the wound in every case but one—that is, the death from erysipelas.

A danger peculiar to resections of the upper jaw is pneumonia from aspiration. In the greater number of our operations we have endeavoured to avoid it by preliminary tracheotomy and plugging of the trachea. In no case did I hesitate to administer chloroform, since all danger of suffocation through flow of blood into the air passages was obviated by the preliminary plugging of the trachea.

Extirpations of the tongue, or of large pieces of the tongue, the seat of carcinoma, I invariably carry out by Langenbeck's method—that is, by a lateral sawcut through the lower jaw. From the angle of the mouth on the affected side an incision is made transversely across the cheek, reaching to the anterior edge of the masseter. From this an incision is carried down through the cheek and the submaxillary region, reaching to the edge of the sterno-mastoid muscle. This incision exposes the bifurcation of the common carotid artery. The cancerous glands are now removed, and invariably also the glandula submaxillaris salivaris, for the reason that its capsule contains lymph glands, which are sure to be affected early in cases of lingual carcinoma. Next the lower jaw is sawn through, the periosteum and mucous membrane at its inner surface having been stripped back with a blunt raspator. Gilgi's wire saw is again used, the sawcut being inclined obliquely from the top and the back downwards and forwards. The incision starts above from the alveolar edge at the angle formed by the central portion of the lower jaw and its ascending branch. The Gilgi saw can easily be held so as to give the cuts a second oblique direction—that is, from within outwards. Two sharp hooks are then fixed into the dissections of the canalis infra-alveolaris, and the two parts of the lower jaw pulled asunder. Lastly, the mucous membrane of the oral cavity is dissected just in front of the arcus palatoglossus, the cut being made in the same direction as the skin wound. The tongue is now freely exposed, and can be operated on as though it were at the surface of the body. The wound which remains in the floor of the oral cavity and in the lateral wall of the pharynx is then tightly plugged with iodoform gauze, in the manner previously described in the upper jaw operations.

After operations in which the tongue has been either entirely or in great part removed, the danger of supervening pneumonia from aspiration is even greater than after total resection of the upper jaw. We have therefore been careful to arrange our operations in such a manner that no blood or other fluid can possibly flow from the oral cavity into the air passages. For this purpose we always proceed to ligature the lingual artery after the submaxillary gland has been excised. The artery is easily reached, as the anterior and posterior bellies of the digastric muscle are visible, as are also the mylohyoid muscle and the fibres of the hyoglossus, below which the artery lies. One need but seek it in the small triangle between the hypoglossal nerve, the edge of the mylohyoid muscle, and the edge of the posterior belly of the digastric muscle just opposite. If one strips the muscular fibre aside with two small forceps the artery comes into view. There is far less bleeding from the incisions in the tongue than when the artery has not previously been ligatured.

After every complete extirpation of lingual carcinoma we establish a fistula close to the laryngeal orifice. The incision by which the mucous membrane in front of the arcus palatoglossus was severed brings into view the epiglottis behind the dorsum lingue. And here the assistant, armed with a small sponge, is able to catch every drop of blood that would otherwise flow into the larynx. On completion of the operation on the tongue, one seizes that part of the two margins of the mucous membrane incision nearest to the epiglottis, draws it forwards and downwards, and sutures it to the outer skin of the lower angle of the mouth. By this proceeding the epiglottis itself, and with it the opening of the larynx, is brought into a position close behind the external wound, almost adjoining the skin of the neck, which is drawn inwards by the sutures. The establishment of this short, wide, unremovable derivative channel is preferable to any drainage tube, which might kink or become displaced, or might irritate the epiglottis, and thus cause coughing and choking. Thanks to the sawcut across the lower jaw being oblique, it can be united immediately by a few wire sutures. On each side of the section two holes are bored with the electric drill, and the wire threaded through them. The mucous membrane on the inner

surface of the lower jaw is then sutured over the wire so as to ensure this being well healed over. The soft tissues are likewise united by suture over the outer surface of the sutured saw wound. I have thus, in most cases, been able to avoid the formation of small sequestra on the sawcut. From that portion of the wound situated above the fistula which we established in the lowest section of the skin wound, the tampon is introduced into the lower part of the tongue, and brought to the spot at which parts of the floor of the oral cavity have had to be removed. In the same way we proceed to cover any wounded surface on the lateral wall of the pharynx.

I have performed 159 operations by this method; 131 of my patients recovered, 28 died, but not one of cellulitis of the throat or floor of the oral cavity; of the deaths, 16 occurred in the course of the first hours following the operation, or during the first two days, shock being clearly responsible for them. Sometimes I was obliged to prolong the operation considerably in order to remove the entire branch of the lower jaw and the parotid also in cases in which the cancer had encroached so far on the bones and soft parts. This was accompanied by severe hæmorrhage, which was probably the cause of death. Of the remaining 14 deaths, 5 were caused by pneumonia from aspiration. In the majority of these cases the above-described fistula between skin and mucous membrane had not been established. They date from the first period of my professional work in Berlin. Three patients succumbed to early recurrences while still in hospital; and 2 died suddenly at a later stage of pulmonary embolus.

TOTAL EXTIRPATION OF THE LARYNX.

A decided advantage is gained by plugging with iodoform gauze after total extirpation of the larynx. The large wound cavity on either side of the pharynx, between it and the lateral muscles of the neck, is most neatly and tightly packed with the iodoform gauze, which very soon adheres firmly by suction. In my first operations this was the only means I employed for preventing the flow of saliva and other fluids from the oral cavity into the trachea. Later on, we advanced to other precautionary methods. At present we consider that an essential part of after-treatment consists in completely shutting off the trachea from the oral and pharyngeal cavity, by suturing it to the external skin at the lower angle of the mouth and by forming two lateral cutaneous flaps, which are then united, above the trachea, with the posterior circumference of its transverse section. Thus the trachea is enclosed by skin all round. Still, saliva and mucus might flow into it from the part of the wound which lies above these two lateral cutaneous flaps, and this danger must be guarded against by carefully stuffing that part with iodoform gauze tampons. As these tampons become soaked, they can be easily exchanged for fresh ones. Another advantage gained by uniting the trachea with the skin by sutures is, that no silver or vulcanite cannula need be worn.

I will not go into other methods calculated to shut off the oral cavity still more completely from the air passages. My assistant, Dr. Graf, has prepared a table of my operations for laryngeal cancer from 1883 to 1896, in order to ascertain the number of lasting cures achieved. During the years in question I performed the operation 48 times in all—20 total extirpations of the larynx and 28 one-sided operations or excisions of small segments. Of the 20 total extirpations, 6 patients died soon after the operation, not one of cellulitis of the throat, but all of pneumonia from aspiration, which in several cases assumed a decidedly chronic character. Up to 1890 I had performed 11 total extirpations of the larynx, and of these 11 cases, 5 died. From that time onward I never performed the operation without shutting off the mouth and throat cavity from the trachea, and of the 9 subsequent cases, only 1 died.

EXCISIONS AND RESECTIONS OF THE RECTUM.

In my opinion, the influence of plugging with iodoform gauze is nowhere so strikingly shown as in excisions and resections of the rectum. In these operations I invariably stuff the entire wound cavity round the rectum with iodoform gauze—the rectum being either drawn on one side or else close up to the anal orifice. The gauze is then left un-

disturbed for six or eight days. I have even attempted to operate on cases at an advanced stage of the disease, without the preliminary establishment of an artificial anus. I confess that I have repeatedly gone too far, and have had ill results in consequence. Of late years my radical operations have been confined to small and movable cancers, and since then my immediate results have been much more favourable.

From 1888 to 1899—that is to say in the course of eleven years—I carried out 125 radical operations for cancer of the rectum. In 60 of these 125 cases excision of the rectum, in 65 cases resection, was performed. Among the 60 excisions of the rectum the coccyx and part of the sacrum were removed eight times, the coccyx alone was extirpated twenty-one times, whilst seventeen excisions were performed without any bone operation. In about half these cases the peritoneum was laid open. Nine of the 60 patients died shortly after the operation. In no case was death caused by either infection, peritonitis, or cellulitis of the pelvis. Seven patients died in collapse, in one case decubitus with an early recurrence and a severe cystitis, and in another an embolus of the pulmonary artery were responsible for the fatal issue.

As regards the 65 resections of the rectum, in nearly all the peritoneum was laid open. On several occasions numerous cancerous lymph glands had to be enucleated from the mesocolon. On two patients among the 65 laparotomy had to be performed, and the carcinoma removed through the peritoneal cavity. One of these patients died of peritonitis, the other is still alive. The remaining 63 cases were all operated on from the os sacrum. The coccyx alone, or the coccyx with part of the sacrum—was removed seventeen times without any osteoplastic operation. Temporary resection of the coccyx was performed eight times, and temporary resection of the sacrum and coccyx thirty-eight times, as has been described by my assistant, Professor Schlange. This radical operation is, it must be admitted, very dangerous, for of the 63 cases, 30 died, all close upon the operation. Thirteen died in collapse after some hours or a few days, eleven later on, two died of after-operations performed three and nine weeks after the primary operation, three died of inflammation of the lungs, one of pulmonary embolus, one of cystitis, five it is true of peritonitis brought on by infection of the wound, and one of pelvic cellulitis. In all the remaining cases—thirty-four in number—this inflammation was prevented by the plugging.

An Essay on Scientific Surgery, THE ANTISEPTIC METHOD OF LISTER IN THE PRESENT AND IN THE FUTURE.

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SINCE the year 1868, when I had the honour and good fortune to see the master at Glasgow and to be initiated by him in antiseptic surgery, I have followed him so faithfully in the advancement of his method that I feel authorized to associate myself with his pupils and those experts who, taking advantage of a happy date, have joined together to celebrate it by a written monument.

Lister is a direct follower of Pasteur. Like his forerunner, he has had the good fortune, which is given to so few discoverers, of being able to witness the complete development and success of his own work. He has been able himself to present to his contemporaries the discoveries of his genius, to develop and defend them, to see them appreciated, and, finally, utilized throughout the world.

It is difficult to form a just judgement on such facts, because they are contemporaneous and too close to us; they have not the prestige that time and distance give. Moreover, we are bound to take note of controversies and disputes. After an opposition, which was so fierce at first, we find ourselves face to face with an entire school which maintains that the surgery of Lister is at an end, that it has had its day, and that progress has swept it away.

Yet any one who is really acquainted with the history of surgery in our time knows that the advent of Lister produced a colossal result. It produced in the evolution of our science

such a revolution that we ought to judge it as though centuries had passed. Have we not seen in twenty-five years a progress such as past centuries never made?

In my writings I have maintained that we ought to say that the whole of surgery was born from Lister. The future will ratify this judgement. History will easily show that active surgery—the science of operating—only began with him.

The work of Lister, like that of Pasteur, cannot be compared with any that preceded it.

If, as so many people consider, Lister had only introduced a local application unknown before, and valuable above all others; if he had merely introduced methods of dressing wounds, the formulas for which were happier than those conceived of by his predecessors, he would have ranked among the benefactors of humanity, and have taken a place comparable to that of other illustrious masters.

But that was not his work. In the past centuries—since the time of Aristotle—the existence of infinitely little organisms was often suspected, and the mechanism of their action conjectured. Had he merely affirmed that once more, in his turn, and without proofs, Pasteur would not have made any discovery. But he himself gave a demonstration, experimental, and in a way mathematically exact. He discovered the evolution of the infinitely little, and opened those fruitful paths along which the science of to-day advances.

It was the same with Lister. Before his time the protective influence of certain applications to wounds was well known. The surgery of our day has forgotten too much the practice of the old surgeons, and also the statements of certain contemporaries with regard to the value of some kinds of applications. For a long time some sagacious observers had endeavoured to explain the accidents which befell wounds exposed to the air, and had attempted to protect them from it. But all these strivings towards the truth miscarried because surgery kept itself within the domain of empiricism—in the domain of art, so to speak. The uncertainty of the result kept it in a condition of despondency. The surgeon showed audacity when he dared to expose his patient to events the result of which he could not foresee.

Lister gave a scientific basis to surgery. He made it rest on established truths. He swept away that uncertainty in which the greatest surgeons up to that time had left it. Inspired by the ideas of Pasteur concerning the infinitely little and on fermentations, he conceived the idea that the infinitely little and its germs of all kinds, scattered everywhere in the outer world, strove against the natural efforts of the organism towards repair. His first practical attempt consisted in withdrawing a compound fracture from the action of these germs. He recognized that without cutting off the access of air he was able to transform this compound fracture into a centre in which the process of repair was identical with that occurring at the centre of a simple fracture. He could at will withdraw it from those complications of wounds which he maintained were of a septic nature. To free the wound from germs was sufficient. He removed those which had collected in it, he prevented the introduction of new ones at the time of dressing, and their access during the interval between the dressing and the final cicatrization of the wound.

The use of antiseptic materials—that is to say, materials destructive to germs with which wounds had become infected—became the foundation of his method. For this purpose he recommended carbolic acid, but recognized at the same time that all agents destructive to germs could afford that essential condition—that is to say, asepsis of the wound. The genius of Lister showed itself in this: that, starting from a fundamental observation verified scientifically, he succeeded in determining the general laws of repair.

Happily for humanity, Lister had manifold aptitudes. A scrupulous scientific observer, he succeeded in finding in his micro-biological studies the scientific proofs for which he was searching. An accomplished surgeon and clinical observer, he studied the evolution of a wound down to the minutest detail. He knew how to devise new surgical methods for protection; how to make the local action of antiseptics understood; how to follow the evolution in the soil—that is to say, in the wound; how to make plain the conditions which favoured local protection against germs; and, later, how to protect the wounds from a secondary