

assumed an unhealthy look. I consider the fact, then, as settled beyond question—M. Guérin's dressing prevents the approach of air to the wound.

But is that sufficient to prevent occurrence of traumatic fever or pyæmia? To this I cannot reply so categorically; for while M. Alphonse Guérin, as I myself saw, had a very remarkable series of cures, I have not always been so fortunate.

Of my first series of six amputations on account of wounds received, only one patient survived. That was a young officer whose forearm I amputated near its middle, at the Rothschild Hospital, the twenty-fifth day after gunshot fracture of the carpal and radio carpal articulations, with burrowing of pus within the sheath of the flexors, and continuous fever which seemed to be leading to pyæmia. I performed then a consecutive amputation during prolonged traumatic fever, and as I found altered pus and a few eschars in the spongy tissue of the lower ends of the radius and ulna, as, in short, there were signs of putrid osteo-myelitis, I feared that purulent infection might already have begun without having as yet manifested itself by chills. Happily this fear was not realized. The fever did not increase after the operation. It even diminished little by little. The patient suffered more pain in his stump than the others did; he was first carried into the garden on the twelfth day. When we removed the dressing at the end of the twenty-first day we found the wound very rosy, covered with a thick layer of creamy, inodorous pus, which had also soaked into the superficial layers of the cotton; the bones were covered with granulations, the concomitant erythema was not very marked. After having cleaned the limb well, I applied another similar dressing, which was equally well borne for twenty days. At the end of that time the wound, still rosy and covered with laudable pus, had diminished to one quarter its original size. I applied a simple dressing of cerate, and a fortnight afterwards cicatrization was complete.

The five other patients whose limbs, an arm, forearm, two thighs, and a leg, had been amputated in June, July, and August, 1871, died.

But of this I have two explanations to offer. First, in four of these cases the operation was a consecutive traumatic amputation, and performed a little late, from the twenty-fifth to the thirtieth day after the wound was received. The fifth patient, whose forearm was amputated, was operated upon rather earlier, but under particularly serious circumstances. His right hand had been crushed in a printing machine. The injuries were such that a cure was still possible, and I had, therefore, tried to save the hand. But on the fourth day there appeared one of those sudden, rapid gangrenes which promptly invade all the tissues and are accompanied by an intense fever, another variety of septicæmia by absorption of the putrid substances which are formed in the neighbourhood of living parts before the vessels have had time to become obliterated. It is rarely, no matter what you may do, that death fails to follow this gangrenous septicæmia. Nevertheless, as only twenty-four hours had elapsed since the gangrene began, and in spite of the high fever (pulse 130, temperature 103°), I considered it my duty to propose amputation, and it was

accepted. The fever of infection continued, and, as so often happens after intense and prolonged traumatic fever, a violent chill, the sign of pyæmia, occurred on the sixth or seventh day after the amputation; others followed, and the patient died before the cotton dressing had been renewed.

One of the four others had undergone rather late amputation of the thigh for a gunshot wound, involving the synovial membrane of the knee, and followed by suppurative arthritis with rupture of the upper cul-de-sac and effusion of the pus into the deep cellular tissue of the thigh between the femur and the quadriceps. I had proposed amputation on the eighth day, as soon as I had detected the formation and spread of the deep phlegmon in the thigh with very marked febrile movement. The patient had obstinately refused; but about the twentieth day, when the free suppuration of the knee and thigh had exhausted him, when eschars had formed over the sacrum, when the traumatic fever of the beginning had been transformed without interruption into an intense hectic fever, he begged earnestly for the operation, which then offered very slight chances of success. I did it, nevertheless; but the hectic fever continued, and the patient succumbed a fortnight afterwards.

Finally, in the other three patients suffering from gunshot wounds, whose limbs I had not amputated at the beginning because I had reason to expect recovery with preservation of them, and because our primitive and consecutive amputations had yielded only failures here at La Charité, an initial chill, apparently indicating pyæmia, had occurred. But this chill had not been seen by the medical attendants, it was rather vaguely described by the nurse and the orderlies, and as there were some doubts of it, and as, furthermore, the local and general symptoms showed that life was in danger, I amputated and applied the cotton dressing. But the chills promptly recurred and purulent infection showed itself distinctly in all three. Death took place a few days after the operation, and at the autopsies we found metastatic abscesses in the liver and lungs.

I am convinced that in these five patients the conditions were unfavourable, and that consequently their death does not justify a judgment unfavourable to the dressing employed. It is evident that no kind of treatment, however well devised it may be, will always preserve from death those who have undergone capital operations; and furthermore that these operations should be performed before the appearance of pyæmia, and even before traumatic fever has lasted long enough and been high enough to preface the way for pyæmia. That will always be one of the great difficulties in practice, for we constantly find ourselves between two dangers: that of performing amputation upon patients in whom traumatic fever has not appeared at all, or only very lightly, and who consequently, if well cared for, are more likely to recover, but of whom a large number might also recover without amputation; and that of waiting long enough to be sure that the limb cannot be saved, and by thus waiting to allow septicæmia to establish a hold which will compromise the success of the operation. As I have told you before, gentlemen, in dealing

with this difficult subject we are surrounded by uncertainties; we must allow ourselves to be guided by presumptions drawn from the condition of the injury, the previous health of the patient, and his hygienic surroundings. But these are only presumptions, amid which, while trying to do rightly, we are never certain that we are doing what is best.

To return to the infrequent dressing, I told you that, as regards my five cases of amputation at La Charité, I had another explanation to offer.

In two of them I had the opportunity to renew the dressing once, and I showed you that, as in the cases I saw at St. Louis, and as in the one which I myself amputated at the Rothschild Hospital, the wounds on the twenty-first day looked well, the pus was not fetid, and there were no apparent eschars. At the autopsies I found diffuent pus in the spongy tissue of the bones and in the medullary canal, but it did not smell badly, and was not mixed with either blood or sloughs. There was suppurative osteo-myelitis, but it was not putrid, and I am convinced that the septicæmia of which the patient died occurred before the operation.

Besides, I have a second series of five amputations for pathological reasons: one of the thigh, three of the leg, one through the tibio-tarsal articulation; only one of them, that of the thigh, was carried off by purulent infection, the four others got well.

You saw as well as I that the application and retention of the cotton dressing were not painful, and that the principal objection to it in warm weather was that it had an offensive odour. This we found to be due to the decomposition of organic matter which made its way gradually to the outer layers of the dressing, where it became exposed to the air. But this decomposition did not extend to the deep layers, that is, to the neighbourhood of the wound, where the arrival of the air seemed to me to be impossible. There is one other objection, the moist erythema which is often found extending to a certain distance about the wound, and which is due to the prolonged contact of the pus with the skin. This is a very slight objection, it can be easily overcome by means of starch powder, and has no unpleasant consequences.

In short, gentlemen, notwithstanding the failures of which I have spoken, the results of this infrequent dressing, as I have observed them both upon M. Guérin's patients and my own, justify me in saying to you that it meets more satisfactorily and simply than any other the indication of withdrawing wounds from contact with the air, that it also removes one of the causes of the putrid decomposition which engenders septicæmia, and for these reasons it ought to be employed.

Does this mean that of itself alone it will preserve many patients from grave traumatic fever and purulent infection?

I do not dare to believe so; for, as I have previously told you, the pathogenic problem is so complex that the removal of one of its causes cannot lead to a clinical solution which would amount to absolute preservation. I told you how much influence must be attributed to hygienic and individual conditions; I believe to-day that if patients

with wounds (surgical or accidental) dressed as I have described, remained in crowded and badly ventilated wards, many of them would still have putrid osteo-myelitis to a degree sufficient to lead to purulent infection. I also believe that this dressing cannot prevent the consequences of previous alcoholism and of unfavourable moral impressions, such as those which follow in most cases of traumatic amputation from the loss of a limb.

To state it briefly, I accept M. Alphonse Guérin's dressing, but in addition I want the patients to be placed in tents, or in isolated and well-ventilated rooms.

Dressings by pneumatic occlusion and by aspiration.—Starting with the idea that decomposition of the pus and other liquids of the wound by the air is the main cause of the toxic complications, M. Jules Guérin likewise thought that the main prophylactic indication was to protect the wounds from contact with the air. With that view he incloses the part in an impermeable sleeve, to which is attached a tube communicating with an aspirating pump which does the work of a pneumatic apparatus. By means of this a vacuum is procured within the sleeve, and the wound is withdrawn from contact with and from the influence of the air. By this method, to which he has given the name of *pneumatic occlusion*, M. Jules Guérin hopes to prevent not only putrefaction but suppuration also, and to obtain what he calls immediate organization, that is, repair without suppuration, similar to that which takes place in solutions of continuity without open wound or with the small ones of the subcutaneous method.

M. Maisonneuve at about the same time made use of a similar apparatus. He did not think of preventing suppuration, and he announced a different intention, that of removing by aspiration all the liquids and even the gases which are found upon the solution of continuity, and thus avoiding the consequences of the absorption which would doubtless take place if these same liquids should remain upon the wound. To obtain this result M. Maisonneuve recommended that the aspiration should be repeated eight or ten times each day, and that from time to time a little water or carbolic solution should be injected, and then removed by the same means.

These two authors have repeatedly published their methods, but not the exact proportion of successes obtained in cases of the kind in which prophylaxis is most necessary, those in which the patients are liable to have acute suppurating osteo-myelitis, and above all they have not told what this proportion was in cases which, while being treated in this way, were obliged to remain in the more or less vitiated air of a hospital ward.

This absence of statistics and the complicated nature of the apparatuses have prevented other surgeons from adopting this method. As for myself, I waited for the publication of favourable results, and this publication not having come I have done nothing about it. Besides, I had other reasons for not using it. It always seemed to me that in order to procure an absolute vacuum about a wound we should have to make very tight constriction over a certain extent of surface, and that this would cause great pain, and perhaps gangrene of the

skin. Now, I feared lest these complications, especially the pain, might compensate for the advantages of the vacuum, and add a new cause of poisoning to those which already existed. I said to myself that, if Jules Guérin's and Maisonneuve's patients did not suffer, it was probably because the compression was not very tight, in which case the air would enter between the skin and the apparatus, and thus the intention would not be realized. Let us withhold our final judgment until a sufficient number of successes to compel conviction have been published. While waiting for these let us use M. Alph. Guérin's infrequent dressing if we wish to withdraw our wounds from contact with the air. It seems to me to meet the same indication by much more simple means; and let us not forget that, whatever mode of occlusion is employed, we must still protect the patients from the consequences of vitiated air.

Disinfecting dressings.—If, for one reason or another, the previously mentioned dressings should not be accepted, we could return to an idea which has preoccupied surgeons for a score of years, that of dressing large wounds which expose to traumatic poisoning with substances which have, or are supposed to have, the property of destroying the miasms or toxic principles produced by the decomposition of organic liquids.

I told you in another connection that chlorine water, alcohol, permanganate of potash, and a solution of 1 or 2 per mille of carbolic acid had been employed for this purpose. You have often seen me use a mixture of equal parts of alcohol and a solution of carbolic acid of the strength of one part of the acid to three hundred of water.

I think I may assure you that experience has not shown the efficacy of these different agents, at least from the stand-point which we now occupy. I do not deny that they have a certain value in superficial wounds, or in the superficial part of deep ones, either by retarding the establishment and diminishing the abundance of suppuration, as alcohol certainly does; or by exciting the surface of the wound and provoking the formation of granulations, as Labarraque's chloride of soda does, or by destroying certain of the miasms, although this is not so clearly demonstrated as some seem to believe. But what has never been proved, and what I doubt, is that these agents have the power of preventing eschars and putrefaction in the deep parts of compound fractures, and especially in the cavities and cells of the bones. I admit that they modify the secretion, and, up to a certain point, the alteration of the liquids, but for the present I deny that they prevent the formation of eschars and putrid matter, and the consequences of the contact of air with the mortified parts; and I formulate my opinion clearly as to the use of these different topics in telling you that they have the power of accelerating or retarding cicatrization, but they cannot prevent death by traumatic fever or purulent infection.

You have recently heard recommended a mode of dressing, the value of which is supposed to be due to the disinfecting action of carbolic acid used in a certain way, and in stronger doses than formerly. It is the one called *Lister's dressing*, from the name of the English surgeon who recommended it. It is arranged in the following way: the

wound, which has previously been united by sutures (supposing the case to be an amputation), is then covered with lint soaked in strongly carbolized oil (boiled linseed oil 5 parts, solid carbolic acid 1 part). That forms the immediate or permanent dressing, that which is to remain in contact with the wound for two or three weeks. Over this first layer is placed a second, consisting of a paste made of the same carbolized oil and Spanish white (subcarbonate of lime) so mixed as to have the consistency of putty. This paste is put between two cloths, and ought to overlap the permanent dressing a quarter of an inch on all sides. It is to be renewed every two or three days. Lastly comes a piece of oil-silk entirely covering the rest. I should add that energetic compression of the stump is previously made with a band of vulcanized rubber.

I ought to point out to you, gentlemen, that while this dressing may be regarded as a disinfecting one on account of the use of a considerable quantity of carbolic acid, nevertheless it is so arranged as to act in other ways than that of disinfection. Thus, there is a permanent portion which, if I have properly understood it, dries upon the surface of the wound, adheres to it, and preserves it from contact with the air. The paste, although renewed every two or three days, also seems to me to prevent the action of the air. And, finally, there is the compression, which, as in M. Alphonse Guérin's dressing, may easily diminish the chances of absorption. In short, I see mainly in this something which recalls the infrequent dressing; and perhaps Mr. Lister's success, and that of my colleague and friend M. Leon Labbé here in Paris, may have been due as much to occlusion as to disinfection.

The important point, however, is to know if this dressing succeeds. Upon this we should consult foreign sources of information, English chiefly, and French ones. I make a distinction between them because we are especially interested in the cure of the wounded here among us, under the influence of our atmospherical hygiene and the constitution of our patients. Now, I know that M. Lister's statistics show fine results, and that thus far there are no French ones. It is true that the dressing has been but little used in France, but still it has been sometimes, notably by Messrs. Labbé and Cruveilhier. But whether because the trials have not been numerous enough, or because they have not been as satisfactory as Lister's, nothing has been published.

Here, too, another distinction must be drawn. Lister has succeeded chiefly in pathological amputations. In France, for the past year, almost all our amputations have been for traumatic causes. Perhaps that is the reason of our lack of success. We had to deal not only with traumatic lesions, but with men who were fatigued, demoralized, chilled, fated inevitably to suffer the consequences of the overcrowding to which the great number of the wounded exposed them. For these reasons few amputations have succeeded, whatever the dressing employed.

This question of the influence of dressings is then too recent to be definitely answered here in France by the facts. The answer will

depend upon future operations performed in pathological cases, and for the traumatism which surgery allows us to observe in time of peace. Until then I confine myself to the two principal prophylactic measures of which I have spoken: favourable atmospherical conditions, and M. Alphonse Guérin's infrequent and occlusive dressing.

Simple and painless daily dressings, etc.—Remember, gentlemen, that the cotton dressing has not yet been often used for compound fractures, especially for those due to gunshot injuries. I should hesitate to recommend it for the latter on account of the need of watching for, and treating the diffuse phlegmons which are always so likely to occur during the first few days. Remember, too, that this kind of treatment, although it has been used, especially after amputations, is not suitable for all of them. If then for any reason you are led to use daily dressings, I advise you to make them so simple that their application and renewal can be made without movement, and especially without pain. In case of a fracture the limb should be placed in a wire splint; after an amputation the stump should be placed upon a slightly raised cushion covered with oil silk. Without seeking immediate union, you should yet place the edges of the wound in the most favourable position possible, and should cover them with two or three compresses wet with a mixture of alcohol and carbolic acid solution, which can be removed and renewed without giving any shock to the limb, and without causing pain and exciting the fear of its daily renewal. I have spoken elsewhere¹ of these simple and painless dressings, and I believe that under favourable atmospherical conditions very good results could be obtained with them.

¹ Mémoire read before the Congrès Médical, 1867.

PART V.

DISEASES OF THE ARTICULATIONS.

LECTURE XXXIII.

DIAGNOSIS OF TRAUMATIC DISLOCATIONS.

- I. Generalities upon this diagnosis—Search for deformity and abnormal prominences and depressions. II. Application of these generalities to a dislocation of the shoulder—Search for the subacromial depression and the prominence formed by the head of the humerus. III. Application to a dislocation of the elbow backwards—Depression below the humerus—Search for the olecranon, internal epitrochlear, and radial prominences—Lateral mobility. IV. Application to an iliac dislocation of the hip—Search for the head of the femur and the great trochanter.

GENTLEMEN: I. You see from time to time in the wards patients affected with traumatic dislocations which have remained unrecognized for a longer or shorter time.

In the course of the year two men have been admitted with dislocations of the shoulder; dating in one from twenty-two days, in the other from two months before. I was able to make the reduction in the first, but it was impossible in the other.

Last year I made with the Jarvis apparatus, modified by Robert & Colin, an unsuccessful attempt to reduce a dislocation five weeks old of the right elbow. The patient had been attended by two physicians who had not recognized the lesion, and who contented themselves with putting on leeches and poultices.

I have told you of a consultation to which I was called several years ago in a provincial town, for a supposed non-consolidated fracture of the neck of the femur, which was a supra-pubic dislocation unrecognized for more than six months. Errors of this kind are always prejudicial to the patient, for of two things one: either the dislocation is afterwards recognized and reduced—but only after having occasioned useless pain, and, furthermore, associated with the slower and less complete re-establishment of function always found in articulations which have long remained displaced; or else reduction has become impossible; the patient has only the resource of a more or less imperfect pseudarthrosis, and finds himself in a condition of impotence or infirmity which he would have escaped if his surgeon had recognized and treated the dislocation.

The error is sometimes due to insufficient practical instruction,