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Drainage of the Abdominal Cavity after Laparotomy.[1]

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COMPLETE closure of the abdominal cavity, even after "unclean" laparotomies, is at present the choice of most German operators, partly on account of the theoretical studies of GRAWITZ, WATERHOUSE and others, who have shown the enormous power of absorption which the healthy peritonæum has, even in the presence of pathological germs, and moreover on account of the admirable clinical results which are obtained in Germany by means of advances in therapeutics, and especially of the transition to a condition of asepsis in operations.

Such results are, however, attained, and to some extent passed, by those English and American operators (LAWSON TAIT, BANTOCK, KEITH, GILL WYLIE, PRICE, CUSHING, PENROSE and others) who use drainage very extensively. I have adopted this procedure more and more, and find in it a rational measure, corresponding to recognized principles of general surgery. When certain definite indications are present, drainage tends to make the course of convalescence after operation less critical in all classes of cases, and, in some of them, to decide the event in favor of recovery.

The introduction of the glass drain by KOEBERLE in 1867 is to be considered as the first stage in the history of abdominal drainage. The second is the use of capillary drainage by Hegar in 1881; and the third, which has now been reached, is the carrying out of *asepsis*. In regard to the *technique* we have to distinguish, first, *simple drainage*, by use of glass tubes, either straight or curved; sec-

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ond, the *intra-abdominal tamponade*, by means of absorbent gauze; third, *combined drainage*, by means of glass tubes which are filled with some absorbent substance. The author employs usually the last method, exceptionally the second and never the first.

Curved glass drainage tubes are used, of various lengths, corresponding to from one-fourth to one-half of a circle; they have a diameter of one centimeter, and are pierced by numerous lateral openings, which are not more than one millimeter in diameter.

Having been made aseptic by washing with soap, boiling and keeping in a solution of sublimate (1.500) the drainage tube is washed clean of the latter and is carried into the space of Douglas, so that with its lower concave side it is closely approximated to the uterus. Such curved drains are more sure of reaching the secretions which have to be removed than are straight ones, such as are used by the English and American operators, and the former cannot interfere with either the intestine or the omentum.

After closure of the abdominal cavity any fluid present is to be expelled by lateral pressure, and then by means of a fine copper sound, bent exactly parallel to the tube, an aseptic strip of gauze is to be introduced down to the very *bottom* of the drain, which is open. It is not as well to use wicking, which is nothing more than a rope of cotton. Fresh strips of gauze are to be introduced until little or no fluid can be extracted; then the top of the drainage tube is to be covered with crumpled gauze and masses of wood wool, and the whole is to be hermetically sealed with pieces of adhesive plaster as large as a handkerchief, held smoothly in place by strips passing in various directions. This dressiug is not to be changed for twenty-four hours. Thus there is no drawing out of the fluid with syringes or suckers, but the absorbent qualities of the dressings are utilized until they are fully saturated. The dressing is to be changed under strictly antiseptic precautions; when this is done narrow rolls of gauze are to be pushed into the drain by means of the curved sound until practically all the secretion is absorbed. There is no chance of secondary septic infection. The dressing is to be changed again every twenty-four or forty-eight hours, The drain is to be removed on the third or fourth day provided the secretion has ceased, otherwise from the sixth to the eighth day, or even later.

An accurate estimate of what has been accomplished by drainage can only be deduced from clinical observations.

Experiments on cadavers, and on animals, which have been performed by HEINRICIUS, LOEBKER and DELBET prove nothing in this respect. There is no question here of drainage of the whole abdominal cavity, but of that of narrow spaces, mostly in the neighborhood of the pouch of Douglas, the uterine appendages, or the uterus itself.

Drainage is used in order to remove and dry out secretions which may have collected *after* the operation, and for doing this as fast as they are formed, in order that those secreting narrow spaces may be kept dry, which, according to the investigations of COE, MUNDÉ, VAN STOCKUM and TREMBRE, are shut off from the rest of the abdomen as early as the second and third day after the operation. Thus drain-

age works as a *safety-valve*, inasmuch as it permits secretions to escape outwards, which, if they were retained in the abdominal cavity, might furnish nutriment for septic infection.

Whoever has had opportunities for observation of approximately similar cases, treated with and without drainage, soon recognizes the fact that the cases which are drained give far the least anxiety, inasmuch as the course of convalescence is free from the dangers of secondary secretions, and of septic blood poisoning.

The *intra-peritoneal tamponade with gauze* is used by MICULICZ, FRITSCH, POZZI, TREMB, HAHN and others, and was employed by the author in 1881 after total vaginal extirpation, and in 1884 for the first time in laparotomy. This method has great disadvantages when used as *purely capillary* drainage, free in the abdominal cavity. The gauze which is inside becomes saturated in a very short time, while that which is external gives but little assistance in drawing out the fluid; it is impossible to change the gauze which is inside, and when it is drawn out the fluid with which it is soaked is squeezed out and runs back into the abdominal cavity. The author found by experience in those cases where diffused hæmorrhage, uncontrollable by ligatures, gave the indication for intra-peritoneal tamponade, that combined glass and gauze drainage would accomplish the same result without the disadvantage of the former method. After this the *simple gauze drainage or tamponade was only used for intra-ligamentary retro-peritoneal cavities.*

Ventro-vaginal drainage, which was employed until very recently in myomectomies by A. MARTIN, who in every other respect is an opponent of drainage, can also be dispensed with, since it is perfectly possible to completely remove the secretions through the *abdominal wall alone.*

Washing out the abdominal cavity, moreover, to the dangers of which POLAILLON and DELBET have drawn particular attention, can and must be used very sparingly indeed, in comparison with the *dry toilette* of this cavity.

In regard to the *theoretical reasons for drainage* we may refer to the work of LANDE (*Arch. Gyn.*, 36–3) which was undertaken under advice of the author. Drainage is indicated, first, when *local* collections of blood, or of infected or decomposed secretions *are present*, which it is beyond the power of the peritonæum to make harmless by absorption, inasmuch as this power is diminished from *local* or *general* causes; secondly, if a *secondary* collection of secretion is to be expected, from infection of which septic poisoning is to be feared; thirdly, if *perforation of* (injured) organs, with various contents, such as the bladder or rectum, is to be feared; fourth, if it is desired to shut off large and profusely secreting *raw cavities* from the rest of the abdominal cavity.

Clinically, therefore, drainage will be indicated in numerous salpingo-oöphorectomies, especially where there is pyosalpinx, abscess of the ovary, or pelvic peritonitis with exudation and soiling of the abdominal cavity by pus; also for intra-peritoneal hæmatocele; in cases of irremovable remnants of tumors; in chronic peritonitis; in injuries of the bladder and intestine; or where thick stumps of the uterus have been dropped into the abdomen; or in

cases of extensive rents and defects of the pelvic peritonæum. Drainage is also required in many cases of ectopic gestation; also where there are cavities, after enucleation of intra-ligamentary and retro-peritoneal tumors, especially of those of the kidney, and after evacuation of intra-ligamentary hæmatomata, etc.

Since the publication of the article by LANDE, the author has performed laparotomy fifty-four times, and in these cases has used drainage thirteen times, or, if the case is counted which was operated in Rome in association with DR. LATORRE, fourteen times.

In these cases drainage was used as follows: I. *Simple gauze drainage* or *gauze tamponade* three times; twice *extra-peritoneally*, after enucleation of double parovarian cysts, and after tubal pregnancy with an intra-ligamentary hæmatoma; once *intra-peritoneally*, in exploratory laparotomy on account of sarcoma of the root of the mesentery, complicated by hæmorrhage.

II. *Combined drainage of glass and gauze* was used eleven times, once in salpingo-oöphorectomy on account of chronic inflammation of the appendages; twice for the same malady, complicated by intra-peritoneal hæmatocele; once for the same with tubal pregnancy and tubal abortion; four times for the same where there was pyosalpinx, complicated in two cases by abscess of the ovary; in two cases with free purulent exudation in the space of Douglas; in one case with deep ulceration of the descending colon. In all these cases the pus sacs burst into the abdominal cavity.

Drainage was also used in this way: Once in ovarico-abdominal pregnancy, where there was a blood cavity instead of the fœtal sac; once in a Porro operation on account of a myoma of the body and neck of the uterus, where the stump was dropped; once after ovariotomy for a blood cyst, and hysterectomy, after an attempt at vaginal enucleation of a myoma of the corpus, and traumatic rupture of the uterus. Of all these cases, only the last died. This was a desperate case even before operation, and death occurred by shock. *All the others recovered.* These are the results which speak, with all possible emphasis, in favor of drainage.