

lenged me the other day to show him the literature where Duehrssen cites only 2 per cent. of recurrences with his method of vaginal suspension. This is cited, as will be stated in my paper the day after to-morrow, in Duehrssen Zeile: 20 photographic plates for illustration of gynecologic operations, in special conservative colpo-celiotomy, Berlin, 1902, Kargers Verlag, page 17.

DR. J. H. CARSTENS, Detroit—I want to say, in defense of American operators, that we can show men here in this country who had thirty, forty and sixty cases without a death and they operated by the abdominal route.

DR. J. WESLEY BOVEE, Washington, D. C.—I agree thoroughly with the author of this paper. I believe that the vaginal route is the proper route for this kind of work. It is the route for carcinoma when we intend to do a radical operation in but rare cases. In ruptured tubal pregnancy it is really a toss-up whether it is the preferable route or not. If adhesions, which are beneficial, in these cases, are present, and an accumulation of blood, etc., way down in the pelvis, we can take it out in this way, but if we have rupture with much blood in the peritoneal cavity, or perhaps a living fetus, with the sac, then the vaginal route is out of place, and the abdominal route is the only one to use. I had a case recently of ruptured tube, with a three and a half months' live fetus, much blood in the abdominal cavity, which I could not have discovered if I had gone through the vagina. We must not forget that there is a pelvic brim, and work above it can not be done through the vagina.

DR. SETH C. GORDON, Portland, Me.—I do not believe Dr. Humiston voices the sentiment of the gynecologists of this country when he says that operations by vagina are increasing. I believe they are decreasing and very rapidly, too. The case he cited was one strictly for the vaginal operation, and I make this emphatic because I am satisfied that if I had adopted the same route in a similar case, I would have saved my patient.

DR. CHARLES P. NOBLE, Philadelphia—I agree with Dr. Humiston that in fat patients the abdominal route presents many difficulties, but I do not believe for one moment that vaginal hysterectomy is on the increase, either in this country or in any other country. Some years ago Dr. Jacobs of Belgium came over here to teach us to do vaginal hysterectomy. He saw what good work was being done with the abdominal route and he is now the leading abdominal operator in Belgium. The same thing is true of Segond of Paris. So far as cancer is concerned, there is great reaction in Europe for the abdominal route.

As to the relative merits of these operations in extrauterine pregnancy, I have done about seventy-five typical operations and have had one death. This patient had both phthisis and nephritis. Of four cases I operated on from below, two had to be reoperated on from above. In one hydrosalpinx developed and in the other a tubal mole developed. One of our members had hemorrhage a number of times and had to go in from above, after having started from below. We are not going to gain anything by giving up the good thing we have in the abdominal operation for the uncertainty of the vaginal route.

DR. HUMISTON, in closing—A few years ago I did nothing but the abdominal operation, and I considered I had a low mortality, but since I carefully selected the route applicable to each case, my mortality is still less. I make one vaginal hysterectomy where I make six abdominal hysterectomies. Judgment should be displayed in each case. I have not as yet lost a case of extrauterine pregnancy, and I have operated on every one from above. When the patient was in profound shock, I would resort to saline infusion the moment the anesthetic was started, and I have a *nil* mortality in extrauterine cases. Some of the histories of these cases are almost beyond belief. I have operated when the patient was pulseless, temperature as low as 94.5. Saline infusion was started the moment the operation began, the abdomen was opened rapidly, without waiting to clear away clots, but I put on the clamp, and when the operation was completed the patient was taken off the table with a pulse. You must individualize your cases, and sometimes you will do an occasional vaginal operation, but in the majority of cases your operation will be abdominal.

POST-OPERATIVE INTESTINAL PARESIS.*

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The convalescence of a person at the present time on whom an intra-abdominal operation has been performed is usually so peaceful a period that it is often hard to realize the grave dangers which surround the patient and which are liable suddenly to obtrude themselves and change the scene into a stormy and anxious one. Hence, the post-operative responsibility of the physician is great, for the safety of the patient depends on his ability to quickly recognize and successfully treat these complicating conditions as they arise. Of these complications the most frequent and probably the one least often recognized in its initial stage, when it is readily controlled and a fatal outcome avoided, is that form of intestinal obstruction due to failure of the muscular fibers of the intestines to contract, giving rise to an accumulation of the bowel contents in the paralyzed portions of the gut.

ETIOLOGY.

The trouble usually arises from injury of the intestinal nerve supply in the course of an intra-abdominal operation, and is especially liable to occur if the operation is prolonged and rendered difficult by reason of the distention of the bowel with gas. It is probable that the rapid and excessive development of gas which often follows laparotomy is due to defective or deranged innervation, as has been pointed out by Mr. J. W. Malcolm of London, rather than to fermentative and putrefactive processes, although these may be important factors in the production of the trouble. Adenot says that in a certain number of these cases the chief difficulty is due to pressure upon the left subcostal angle of the colon by the distended coils of small intestines; peritonitis and enteritis-thrombosis and embolism of branches of the mesenteric arteries or veins may also give rise to it.

SYMPTOMATOLOGY.

When the trouble is due to trauma of the intestinal nerves it first manifests itself by the continuance of the nausea which usually follows the administration of the anesthetic, therefore, if no morphia has been administered to the patient following the operation, and eighteen hours have elapsed since its conclusion, and she is more or less nauseated, having no desire for nourishment, or is regurgitating a quantity of straw-colored liquid from time to time, has passed no gas from the anus, is slightly tympanitic, the pulse rate weak and increasing in frequency, the bodily temperature slightly elevated while the respirations are normal, there is good reason for believing that the patient is suffering from intestinal paresis. If the course of the disease is not interfered with, the vomiting becomes more frequent, the amount of liquid ejected larger in quantity, its color gradually darkening till it finally becomes black, its odor seldom, however, becoming fecal in character; meanwhile the intestinal distention continues to increase, the pulse rate to rise and to lose in force, the body temperature slowly rising, while the respirations slightly increase in frequency. The course of the disease is rapid, a fatal termination usually being reached within forty-eight hours of the onset.

DIAGNOSIS.

From peritonitis the disorder may be differentiated by its earlier onset, by the character of the pulse, the

* Read at the Fifty-third Annual Meeting of the American Medical Association, in the Section on Obstetrics and Diseases of Women, and approved for publication by the Executive Committee: Drs. A. H. Cordier, W. E. B. Davis and Henry P. Newman.

frequency of the respiration and by the absence of pain and rigidity of the abdominal muscles. From intestinal obstruction due to adhesions or bands by its earlier onset, less urgent symptoms, the absence of pain and of peristalsis of the bowels above the site of the obstruction. When the disorder is due to a mesenteric thrombus or embolus, the symptoms are more acute in character and there is a history of feeble health and diseased arteries.

TREATMENT.

The occurrence of post-operative intestinal paresis can be usually prevented by the careful preparation of the patient for the operation when the condition for which it is to be undertaken is more or less chronic in character, by the regulation of the patient's diet, the proper use of cathartic medicines and the flushing out of the colon with saline solution. In those cases that are acute in character and where there is no time for this preparatory treatment, much can be done to lessen the danger of the occurrence of the trouble by washing out the patient's stomach directly after the performance of the operation before consciousness is recovered, and leaving in the organ four or five ounces of saturated solution of magnesium sulphate. The passing of a short rubber tube into the rectum at intervals of six hours, followed, after a little time has elapsed to allow of the escape of gas, by the injection into the bowel of a pint of hot saline solution, also tends to prevent the occurrence of the disorder under consideration, as it diminishes the danger of the accumulation of gas in the intestinal tract.

The initial symptoms of intestinal paresis having been recognized a seidlitz powder administered in the following manner will often end the difficulty and start the patient on the road to recovery: The contents of the blue paper having been dissolved in a tumbler nearly full of water, the contents of the white paper is dropped upon the surface of the solution at the time the patient is ready to drink it, a warning having first been given of the importance of retaining the liquid. The advantage gained by the administration of the powder in the above described manner is that the acid dissolves slowly, maintaining its agreeable taste till it is swallowed, and also that some of the gas being generated in the stomach exerts a counter pressure on the intestinal contents and thus helps to overcome the existing reversed peristaltic current and to start it once more away from the stomach and towards the anus.

The physician should personally superintend the administration of the remedy and remain with the patient until the bowels act, for the time is a critical one, and in a few hours the patient will either pass safely out of the threatened danger or be beyond hope of recovery. If the saline is retained by the patient an hour and a half later a tumbler full of hot peptonized milk will often cause the bowels to act freely, and when this occurs all danger is usually over and the patient ceases to regurgitate the stomach contents, passes gas by the bowel, and in a few hours is ready to take eight ounces of peptonized milk every three hours. Should the patient reject the saline, the writer has found it advantageous to administer a second powder within fifteen minutes, or while the patient is somewhat exhausted by the act of rejecting the first, the importance of retaining the solution being explained again to the patient, who often must be ordered in rather an imperative manner to endeavor to retain it. The second effort is usually successful, provided the condition has been promptly recognized and treatment instituted. When

more time has elapsed and the tympanitic distention is greater, the patient being unable to retain any liquid in the stomach, the writer has still been able to rescue patients from their perilous condition by passing a tube into the stomach, emptying it of its contents and, after allowing as much gas to escape as would, to wash out the viscus with normal salt solution, and to place in it before withdrawing the tube four or five ounces of saturated solution of magnesium sulphate. While the treatment herein described is being carried out, strychnia in 1/30 gr. doses may advantageously be administered hypodermatically from time to time, provided it has not been previously employed in too large doses. Hypodermatic injection of atropin in 1/60 to 1/20 gr. doses have also been found useful, and C. von Noorden has used physostigmin in doses of 1/2 to 3/4 of a milligram with good results in overcoming the tympanities in the same condition.

Since the writer has learned to correctly interpret the meaning of the early symptoms accompanying post-operative intestinal paresis, and to appreciate their importance, there has been little difficulty in arresting the progress of the disorder by means of the treatment just outlined and of lowering a mortality rate following the performance of intra-abdominal operations in chronic cases from 10 per cent. to less than 1 per cent.

PROPHYLAXIS.

The important points for the physician to bear in mind who is called on to care for a patient who has undergone an intra-abdominal operation, if he would carry his patient safely through the convalescent period, is to abstain from using morphia, and, if the patient is restless and a narcotic drug seems necessary, to use atropia; to remember to watch the patient carefully during the first twenty-four hours, and that when she regurgitates liquid or is nauseated or even disinclined to take nourishment eighteen hours after operation, is slightly tympanitic and has passed no gas or fecal matter from the bowel, he must at once institute active measures for the sufferer's relief, and that if his diagnosis is correct his efforts will be promptly crowned with success, and in a few hours the patient will be out of all danger of an untimely end.

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DISCUSSION.

DR. HENRY O. MARCY, Boston—I rise to emphasize this paper with my distinct approval. I have practiced its teachings satisfactorily for many years, and am glad the Doctor has brought this subject up for our consideration.

DR. DANIEL T. NELSON, Chicago—I have stood over these patients a number of times and appreciate the anxiety of the surgeon. I have practiced this treatment in a modified way, using the sulphate of magnesia in bulk instead of as described Dr. Wiggin. I have been in the habit for many years of using calomel first or along with it, in divided or full doses. I began with five or ten grains in a single dose, and if the patient vomited this I repeated it. I believe now that I get just as much effect from one grain given in five or ten doses as one grain given five times or in one dose. I follow the calomel with the saline. As to the general treatment of the patient, I only wish to emphasize what he has said. I believe strychnin is our sheet anchor, which he has advocated so well.

DR. GEORGE H. NOBLE, Atlanta, Ga.—I will add a few words only in outlining my treatment. The patient is prepared as usual and the anesthesia is begun with nitrous oxid, followed by ether. With this method there is very much less nausea, as less ether is absorbed. I frequently operate with less than a hundred-gram can of ether. I also make it an invariable rule to wash out the stomach after administering an anesthetic to remove the mucus which has been saturated with the anesthetic. They are then put to bed and given saline solutions or stimulants they need by rectum and when necessary hypodermic medication. It is very rare that my cases are troubled with nausea and, if persistent vomiting occurs, I become apprehensive of additional causes. Dilated stomach, diseased kidney and bad hearts are contributing causes and each requires special attention. The stomach should be left absolutely empty and early evacuation of bowels encouraged. An enema of alum water is a valuable remedy. In persistent nausea from almost any cause, evacuation of the lower bowel often gives relief. The alum water was introduced by Dr. Hardon of Atlanta. He said he knew it produced vomiting when given per stomach, and supposed it would act equally as well through the rectum. He gives about one ounce in a quart of water. Now it is a standing rule with me to give this enema whenever there is any gas, colicky pain or persistent sick stomach. One or two injections give relief for three to six hours; then when the stomach becomes quiet it is my custom to administer the old compound cathartic pill. So many patients have vomited themselves so nearly to death with salts that I quit using them long ago. Two of these pills should be powdered and put in a capsule. In severe cases I give four and sometimes repeat them four, six to twelve hours. They retain these pills better than calomel, and get excellent results.

The fact that stomach lavage frequently relieves nausea, vomiting and spitting-up of contents of stomach, shows that many of the supposed cases of paresis are misjudged. It is functional disturbance of the stomach, for if it were paresis of intestines the mere removal of stomach contents would produce no effect, and nothing but evacuation of the bowels would give relief. It is likely due to infection (more or less limited) and too much handling and exposure of the intestines. On the other hand, the condition of the stomach mentioned can almost always be prevented by simple but careful preparation of the patient beforehand and avoidance of meddlesomeness afterwards.

DR. H. D. INGRAHAM, Buffalo, N. Y.—I would like to ask the essayist if he has ever had any experience with paresis of the intestines due to fermentation of food and, if so, what he has done to relieve it. I have seen it occur even when every precaution was taken, both before and after operation.

DR. CHARLES L. BONIFIELD, Cincinnati—Two or three years ago I read a paper on this subject, and I have not had occasion to change my views since then. I recommended the use of physostigmin, founding my belief in its value on its well-known use by veterinary surgeons in horse colic. I have used it in a number of cases, but am not sure whether I really got any marked results from it. As to the cause of this condition, I thoroughly believe that in the majority of cases it is sepsis, to a greater or less extent. Dr. Wiggin has tried to differentiate between septic peritonitis and intestinal paresis, but I think that a certain amount of sepsis is at the bottom of most of these cases. Next to sepsis, the most frequent cause is exposure of the bowel during the operation. For this reason I think it important during abdominal operations that the intestines be well protected by warm sponges.

As to the cleansing of the intestinal tract immediately before operation, I think there is a decided disadvantage in using salines of any kind. They produce watery stools, but do not remove all the contents of the bowel, especially if the patient is inclined to be constipated, when there is an accumulation in the cecum. Salines also abstract water from the system and leave the patient in a much worse condition to stand the operative shock than if some other purgative is used. I have for years prescribed the compound extract of colocynth, combining it with atropin or hyoscyamus to prevent griping. I instruct the patient to drink freely of water for

two or three days before operation, so as to prepare her for the loss of some of her body fluid. Aside from purgatives, strychnin is the most valuable drug we have in the after-treatment of these patients. It is a stimulant to the nervous system, the heart and the muscular coat of the intestines. I have found it advisable when purgatives have failed to act after a thorough trial and when rectal injections also failed to secure a movement of the bowels, to stop all efforts in this direction and endeavor to stimulate and sustain the patient by hot liquid food by the stomach and stimulants hypodermically. I have not infrequently seen beef tea under these conditions stimulate peristalsis when purgatives have failed to do so. The stomach should be washed out before food is given.

DR. WIGGIN, in closing—I agree with Dr. Noble that the compound cathartic pill is one of the best remedies at our disposal with which to unload the intestinal tract, but I did not discuss the preparatory treatment of the patient for operation in my paper. I do not favor the excessive use of either salines or cathartics in getting the patient ready for operation; and I generally aim to have the patient under my care for at least a week before the operation, so that I can repeatedly wash out the colon with saline solution and can use cathartic pills or small repeated doses of calomel followed by a saline, and then have two or three days' interval before the operation so as to have the patient thoroughly rested and the system well charged with water.

In regard to the pathology of intestinal paresis: that the condition is not due to sepsis is conclusively shown by the fact that if the disorder is recognized in its early stages and proper treatment instituted, all the symptoms to which it gives rise disappear as soon as the patient's bowels move. My personal experience also seems to show that the cause of the trouble under discussion is due to injury of the intestinal nerve supply and not to sepsis, for the following reason, namely, many of my earlier cases of abdominal section terminated fatally from what was supposed to be at the time peritonitis; on opening the abdomen, postmortem, no evidence of sepsis or peritonitis was discovered and further, when later on in similar cases the abdomen was opened, antemortem, no evidence of sepsis or peritonitis was found. On puncturing the intestines at various points to allow the large volume of gas contained in them to escape, it failed to do so. My attention was long since gradually called to this class of cases from the opportunity which I had of watching two classes of patients upon whom laparotomies were performed. The first were acute conditions requiring immediate operation; the second was for chronic conditions which admitted of careful preparation of the patient for the operation, and the convalescence of the last-named class was so much smoother and quieter than in the first class, even though the operation was of greater severity. My attention was also attracted by these cases of intestinal paresis by the fact that at one of the hospitals to which I was attached, my assistants were changed in the regular routine of the hospital, every six weeks, and I found that when the laparotomy was performed on the patient twenty-four to thirty-six hours before this change occurred that the patient almost invariably died, while from the same class of operations at other periods of the interne service, the patient almost as surely recovered. Careful investigation of the matter revealed the fact that the patients who died at this time of change of assistants had not been carefully looked after and that when nauseated eighteen hours or so after the operation had not been given the usual treatment. Five or six years ago when I had begun to recognize the meaning of the symptoms of intestinal paresis, I had in my ward two patients suffering from the severe form of the trouble; they were both unable to retain the seidlitz powder solution although it had been repeatedly given to them, and realizing the desperate plight of the patients I felt justified in one case in pursuing the following treatment: I washed out her stomach through a tube with saline solution, a great quantity of gas escaping at the time; when the fluid came away clear and no more gas would escape, I left in the stomach four ounces of saturated solution of sulphate of magnesia. Five hours later her bowels moved and her further convalescence

was uneventful. This procedure was unfortunately not followed in the case of the other patient, who was simply stimulated and made comfortable. This patient died twelve hours later. During the time that has elapsed since these patients were treated, intestinal paresis as a factor in the mortality of the patients upon whom I have performed abdominal operations has disappeared. It is not at all difficult to differentiate between the nausea following the administration of an anesthetic and this condition. In private practice in New York we induce the anesthetic state first with nitrous oxid, following this with ether, seldom using more than three or four ounces of ether for an operation lasting one hour, and seldom exceeding six ounces when the operation lasts for two hours, with an expert anesthetist. Using a closed inhaler it seldom requires a larger quantity of ether for the time mentioned, than when no gas is used. As a rule, little or no nausea follows, but here is the point: The vomiting which follows the administration of an anesthetic is preceded by distinct distress and nausea, whereas in intestinal paresis the contents of the stomach is ejected from the mouth without force and is not preceded by nausea or colicky pain. If the operation has been difficult and prolonged and the intestines are handled considerable, there will often be found eighteen or twenty hours after the operation that the patient has no desire for liquids, and that she is spitting up or regurgitating fluid which is at first white, then yellow, and which gradually becomes darker in color until it is nearly black, the diagnosis becoming graver as the color of the ejected fluid darkens. If no treatment is instituted in six or seven hours from the beginning of the trouble—or in twenty-four hours after the operation—the patient will ordinarily be in a hopeless condition and beyond the aid of treatment. My experience in the treatment of the condition under consideration has seemed to prove that the best remedy in the early stage of the disorder is the administration of a seidlitz powder, as described in my paper; the contents of the blue paper being dissolved in a tumbler nearly full of water, and the contents of the white paper being dropped on the surface of the solution just at the moment that the patient is ready to drink it. Therefore, if eighteen or twenty hours after the operation I find my patient unwilling to take liquid nourishment or water, I at once give the seidlitz powder; if this is retained, an hour or an hour and a half later I give the patient a tumbler of hot peptonized milk, following this the bowels usually act quickly, and the following convalescence of the patient is uneventful. I have had no experience with distention of the intestines coming on ten days or so after the operation.

I do not believe in over-medication, or the excessive use of cathartics. But I do believe fully in the necessity of the careful preparation of the patient for the operation whenever it is practicable, and that this preparatory treatment has much to do with the low rate of mortality—a fraction of 1 per cent., I believe—which has followed my operative work in the abdominal cavity for chronic conditions, for a number of years past.

THE INFLUENCE OF BILIARY ACIDS ON SURFACE TENSION.

A PRELIMINARY REPORT FROM THE CLINICAL LABORATORY OF THE DENVER AND GROSS COLLEGE OF MEDICINE.*

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Hippocrates noticed that when vomited matter comes in contact with marble it effervesces. It took more than twenty centuries to find the explanation of this phenomenon—namely, that marble, calcium carbonate, an alkali, dissolves with effervescence in stomach contents containing an acid.

* Read before the Thirty-second Annual Convention of the Colorado State Medical Society, at Pueblo, June 24-26, 1902.

We wonder how such an acute observation of a master mind could have lain dormant so long, and had to be rediscovered. In order to keep up our dignity we plead that we are not to blame for this oversight; forsooth, Hippocrates recorded his observations in Greek, and did not provide his works with a comprehensive index. What excuse, however, can we plead in the following case, not a hypothetical one? Here is a book written in the English language, used as a text-book in hundreds of medical colleges in England and the United States, studied by thousands of students during the last two decades, and this text-book records in clear and unmistakable terms, a remarkable observation, which nevertheless has escaped the attention of the professors, students and the medical profession at large, and which had to be brought to our cognition through the medium of the French language, only about a year ago! Let me relate this case of literary amblyopia:

Two papers appeared in the *Journal de Physiologie et de Pathologie Generale*, in 1901 (tome iii, pp. 99, 151; *ibid.*, p. 461), by Frenkel and Cluzet, and Chauffard and Gouraud respectively, in which a new test for bile acids in urine is described. The discoverer of the test is supposed to be a man named Haycraft. The test is a simple one. It consists in sprinkling flowers of sulphur on urine, and if it contains bile the sulphur will sink to the bottom. This phenomenon attracted a great deal of attention, and the question naturally arose: Who is Haycraft? It took about one year to find out that Haycraft was a myth and that the author of the observation is Matthew Hay, professor of legal medicine in Aberdeen, and furthermore, that this observation is recorded as a private communication on page 294, in the "Text-Book on Human Physiology," by Landois and Stirling, second edition published by Blakiston's Son & Co., 1886, and in a somewhat abbreviated form in all subsequent editions. Thus it will be seen that an observation made by an Englishman, and recorded in a text-book that was before the medical profession for sixteen years, had to come back to us percolated through the French language and in the form of a stunning discovery of a man named Hayseed or Haycraft. Who knows how many more valuable observations are contained in our text-books which we know not? Verily, we have eyes and see not.

From the time I learned of this test from an abstract in the *Progres Medicales*, about a year ago, I have made numerous experiments on urine, and have applied this test to the study of bile acids in feces and stomach contents. The more I study this phenomenon the more wonderful and inexplicable it appears to me. A pinch of flowers of sulphur thrown on water or bile-free urine will float for weeks on the surface. On the addition, however, of one drop of bile to a quart of water the sulphur will at once sink to the bottom. We are all so accustomed to the wonderful play of colors in our various qualitative analyses that we no longer stop to marvel at them, but this test is so different in its nature from all other known modes of analytical procedures, and its sensitiveness is so extraordinarily great, that it almost borders on the miraculous.

Permit me to present a summary of the investigation with this test. Professor Hay found:

1. The test is based on the law of surface tension.*

* The tension of a liquid by virtue of which it acts as an elastic enveloping membrane, tending always to contract to the minimum area. It is due to the fact that while molecules in the interior are attracted in all directions, and are thus in equilibrium, those on the surface have no neighbors outside to balance the attraction of those within and are consequently acted on by a