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VAGINAL OR ABDOMINAL HYSTERECTOMY?

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Those who seek a comparative study of operative results studded with statistical data, will be disappointed with the following article, as its author wishes only to establish as definitely as possible the indications for each method for the removal of part or all of the uterus and its appendages. It is taken for granted, of course, that the surgeon possesses an equal skill in abdominal and vaginal operations, thus making it impossible that he would choose one method in preference to the other merely because he is more familiar with the respective technique.

As will be shown later, there are absolute and relative indications for both routes, the latter meaning that in certain cases laparotomy or vaginal operation will be preferable after taking into consideration certain factors, such as the patient's general condition, age, obesity, etc.

A. *Indications for Hysterectomy in General.*

1. Neoplastic diseases, benignant and malignant.
2. Prolapsed uterus (in non-childbearing age).
3. Intractable uterine bleeding in women past the menopause. Sometimes middle-aged women who have ceased to menstruate two to four years previously, will suddenly begin to have a bloody vaginal discharge. Meticulous pelvic examination will not reveal any gross pathology. Diagnostic curettage will not produce any endometrium to speak of, and the surgeon will have the sensation that he is scraping cartilage. In these cases, hysterectomy is preferable to irradiation, partly because there can always be some doubt in one's mind as to the reliability of bi-manual examination and even of the diagnostic curettage, partly because radiation therapy often gives only a temporary improvement. If in these cases hysterectomy is performed, the pathologist will invariably report the presence of extensive fibrosis in the corpus, and hyalinisation of the arterial walls.
4. Adenomyosis. In women in or near the menopause, one frequently finds a large heavy, boggy uterus. This type of organ usually shows the presence of extensive

glandular elements in the myometrium, a condition called adenomyosis.

5. As an adjunct to bi-lateral salpingo-oophorectomy.
6. Severe infections of the uterus, which do not respond to conservative treatment, and cause persistent malodorous discharge.

B. *Indications for Abdominal Hysterectomy (Absolute).*

1. Large myomata.
2. Pelvic pathology, mostly of inflammatory origin, with extensive adhesions.
3. Where exploration of the upper abdomen is desirable.
4. Where appendectomy is also necessary.
5. Where previous operations have been performed, involving uterus (suspension operations).

C. *Requirements for Abdominal Hysterectomy.*

1. Patient's age and general condition should permit laparotomy.

D. *Indications for Vaginal Hysterectomy.*

1. Malignant disease of the cervix with extensive ulceration, where cautery cannot safely destroy broken-down tissues. Delivery of a soiled organ through coeliotomy could cause severe infection.
2. Malignant disease of the fundus with foul, infectious uterine discharge, where laceration of the cervix makes it technically difficult to close the cervical canal.
3. Elderly, debilitated patients.
4. Patients suffering with diabetes mellitus, severely damaged urinary or cardiovascular organs.
5. Pyogenic infection of the skin of the abdomen.
6. Uterine prolapse (in patients past the child-bearing age) where hysterectomy must be combined with vaginal plastic operations for cystocele, rectocele, or for extensive laceration of the perineum.
7. Patients suffering from spastic colitis, which would be aggravated by any laparotomy.

E. *Requirements for Vaginal Hysterectomy.*

1. Uterus should be freely movable, not bound down by adhesions.
2. Uterus should not be unduly enlarged by the presence of tumour or tumours. If,

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however, on account of other conditions vaginal hysterectomy must be the operation of choice, even large tumours can be removed by morcellation.

3. No such pelvic operations must have been performed previously as might fix the uterus by adhesions and prevent its delivery.

For brevity's sake two kinds of hysterectomies will be distinguished: total (or complete), where the entire corpus, together with the cervix, is removed; and sub-total (or supracervical or supra-vaginal), where the uterus is amputated at the level of the internal os. Whether total or sub-total hysterectomy should be performed as a routine procedure is a matter of controversy among surgeons at the present time. Dr. R. W. Telinde and Dr. G. A. Galvin claim that where biopsies were taken from the cervix of every patient in the Out-patient Department and in the Operating Room, within two years 16 cases were found in which epithelial changes occurred which could be recognised as early carcinoma. In another series the same investigators found that in the cervix of 300 specimens removed by complete hysterectomy 4 cases of developed but unsuspected carcinoma were found. Since the purpose of this paper is rather to establish the different indications for vaginal and abdominal hysterectomy respectively, to settle the matter briefly, in the author's opinion a macroscopically intact cervix should be left alone, but in cases where there is erosion or laceration present the total hysterectomy is preferable.

Pre-Operative Preparation

Patients who are otherwise in good physical condition are admitted to the hospital in the afternoon before the day of operation, when they are subjected to the routine laboratory examinations, including blood count, haemoglobin determination, and blood typing. Urine analysis is made on their morning specimen prior to the operation. Exceptions are, of course, where the patient is either dehydrated or exsanguinated, or is suspected to be suffering with diabetes mellitus or cardio-renal disturbances. In these cases ample time is taken to balance the electrolytes, to restore the blood volume and quality, to rid her of her hyperglycaemia, to digitalise her, and to eliminate oedema by the administration of diuretics and salt-free diet.

It must be borne in mind, however, that with patients who are continuously bleeding either from a cancerous lesion or from a submucous myoma, not too much time should be wasted by waiting for the bleeding to cease. An attempt can be

made by the use of some form of radiation therapy, but should that fail it is more advisable to proceed with the operation, especially if the vaginal route has been selected.

Patients whose blood Wasserman test has proved to be positive receive either some arsenicals or a bismuth prepate, to be followed up at regular intervals later on.

Generally speaking, those patients who will be subjected to vaginal hysterectomy need less pre-operative preparation than those on whom laparotomy will be performed.

After the operative area is shaved, and the bladder and bowels emptied (the latter by the means of a soapsuds enema only, without the use of cathartics), the patient is taken once more into the examining room where a final thorough check-up is made. It is then that the anaesthetist has a good opportunity to decide about the most suitable form of anaesthesia.

At their last meal the patients receive a house-tray and just before they are ready to sleep, three grains of sodium amytal are given by mouth. Elderly people stand bromides better, as the barbiturates are liable to cause restlessness in them instead of the desired sedation. Two hours prior to the operation the sodium amytal is repeated, and an hour later a third capsule is given them, at which time they also receive $\frac{1}{4}$ grain of Pantopon and $\frac{1}{150}$ grain atropine sulphate hypodermically. Lately extensive use has been made of Demerol (a synthetic product related to morphine and atropine), especially in elderly women, or in so-called "poor risk" patients, as the drug does not have any depressing effect on the respiratory centre.

Anaesthesia

Unless there is definite contra-indication to its use, spinal anaesthesia is the method of choice, especially if it is combined with some form of intravenous anaesthetic solution, such as evipal soluble, pentothal sodium, etc. The spinal anaesthesia gives complete relaxation, the latter relieves the patient from apprehension. In several cases, especially in debilitated patients suffering with partial or complete prolapse, vaginal hysterectomy can easily be performed under local anaesthesia.

Operative Technique

Before this is discussed in detail, a few salient points in the anatomy of the female genital organs should be mentioned.

In both the vaginal and abdominal routes the most vulnerable structures are the ureters and the urinary bladder. The former are less easily

injured during vaginal hysterectomy, while the latter is in a safer position during laparotomies. Exceptions are those cases in which a previous operation (especially ventrosuspension) has already been performed with considerable adhesions attaching the anterior aspect of the uterus to the bladder wall. Here the dissection should not be started in the midline, but rather laterally, where, under the round ligaments, a small free space can usually be located. After finding the cleavage line, dissection can be carried out without causing any injury to the bladder. In vaginal hysterectomy the bladder can simply be pushed up unless, again, previous plastic operations have attached the bladder to the vaginal wall. In this case, sharp dissection has to be used with the greatest care taken to cut toward the cervix rather than toward the bladder. The latter can always be recognised because of its dilated veins, which run irregularly, and it is customary for some surgeons to instill indigo blue into the bladder so that injuries can immediately be recognised and remedied. Where the uterus has prolapsed or even descended, or the patient has had several deliveries, the bladder may

reach as low as only half an inch above the external os, therefore the incision has to be placed as near the portio as possible.

The ureters, descending into the pelvis, converge until they run on each side of the cervix under the uterine arteries, "like a river under a bridge." The distance between the cervix and the ureters is about one centimetre. Large tumours completely distort the normal anatomy of the pelvic structures and in these cases it is most advisable to visualise clearly the ureters before the uterine blood vessels are clamped. This visualisation can be accomplished easily by bluntly separating the two layers of the broad ligament, where, in the parametrical loose connective tissues, the ureters can be located. Often the ureters are injured when severe haemorrhage floods the pelvis from improperly clamped uterine blood vessels, and the surgeon blindly applies a haemostat. In this case it is better to compress the hypogastric artery digitally, to wipe the pelvic cavity dry, and then to apply a haemostat to the bleeding point. Once the uterine blood vessels have been properly clamped and securely transfixed, by "teasing"

FIG. 1.—Shows the position of the ureter (1) and its proximity to the uterine artery (2), as well as the latter's ascending (3), descending (4), and vaginal (5) branches. Rectangular clamp (6) catches the ascending branch during subtotal hysterectomy. Straight clamp catches main uterine artery for complete hysterectomy.

them away from the cervix the ureters can be automatically pushed into a safe distance.

The uterine arteries possess two branches, an upper and a lower, both of which create a horizontal Y before reaching the cervix. There the upper branch ascends on the latero-anterior aspect of the uterus, and it is this branch which is encountered, along with the uterine veins, in the course of sub-total hysterectomies. The lower branch descends to the vagina, and if not properly clamped it may cause troublesome haemorrhage when total hysterectomy is performed.

Whether complete or sub-total hysterectomy is performed, it is advisable to clean the vagina with "Zephiran" or other non-irritating germicidal solution, because once the abdomen is opened the surgeon may change his plan. The patient is catheterised; if complete hysterectomy is planned a self-retaining catheter is left in the bladder and the external os closed with several silk sutures, lest spilling of the uterine contents should occur. Should ulceration of the portio be present it is destroyed with the actual cautery. The catheter is to be removed at the completion of the operation after the instillation of one ounce of 0.5 per cent mercurochrome solution. If only sub-total hysterectomy is to be performed, at the end of the catheterisation the mercurochrome can be instilled in the bladder before the incision is made. This solution, outside of being a mild urinary antiseptic, has been found to induce patients to urinate voluntarily, and since it has been in use not more than 5 per cent of the patients has had to be catheterised post-operatively.

The incision can be transverse or vertical. After the abdomen is opened the stomach, gall bladder, liver, and the hepatic and splenic flexures of the colon should be palpated, the motility of the kidneys tested, and the appendix removed, providing the size of the tumour does not prohibit the introduction of the surgeon's hand. It has not been found necessary to place the patients in Trendelenburg position, because if the anaesthesia offers complete relaxation the intestines can easily be packed into the upper abdomen with large sponges soaked in hot saline solution. At the same time, they will not then act as a heavy weight on the diaphragm, handicapping the patient's respiratory movements. The use of womb-holders, or uterine screws, has been abandoned lately because most of them cause an annoying oozing from the corpus. It is better to apply two straight hard clamps on each side of and near to the uterus, including the round and broad ligaments and tubes. By placing these clamps on each side of the uterus, it is possible to deliver the latter from the abdomen, thus stretching the vesico-uterine fold, where the peritoneum can be

opened and the opening enlarged as far as the lateral inguinal rings. The bladder is gently pushed down below the level of the cervix. If this is slowly and gently carried out, there is very little oozing from the superficial veins.

With the left index finger a hole is bored through the leaves of the broad ligaments, above which they can be tied at the same time with catgut. This catgut ligature will include the ovarian blood vessels and will keep the operative field dry. The ligaments are divided between the respective clamps and the catgut ligatures. This simple manoeuvre clearly exposes the uterine blood vessels. With the use of the "wiper" these structures should be clearly visualised. They can be transfixed without being clamped, and then divided. It is a satisfaction to see the open lumens of these blood vessels, which assure the surgeon that he has controlled one of the most important points of the operation. In sub-total hysterectomy the uterus is amputated at this level, which corresponds with the level of the internal os. There will be some oozing from the cervical stump, but if the amputation has been carried out in a cone shape, the anterior and posterior lips of the stump can be brought together and attached to the stumps of the round ligaments, thus giving a firm support to the cervix. If removal of the adnexa is included in the operation, the transfixing catgut suture includes the infundibulo-pelvic ligaments near the pelvic wall. The stumps of these ligaments are not to be attached to the cervical stump because they do not support it at all, and only cause a distressing sensation to the patient afterward. The entire field can be comfortably covered with the peritoneum, re-attaching the bladder to the original site.

Where complete hysterectomy is indicated, after the transfixation of the uterine blood vessels they are gently teased away from the cervix, because this way the ureters are pushed to a greater distance and are placed out of danger. In complicated cases, especially where the size of the tumour or some old inflammatory condition has caused marked distortion, it is best to visualise the ureters as mentioned above. Two straight haemostaths are applied along the cervix to the parametrium. These structures are divided and transfixed. These sutures will take care of the previously mentioned descending branch of the uterine arteries, which supply the vagina. Palpation will demonstrate the length of the cervix. At this point, preferably in the posterior aspect, the vaginal wall is opened and the lower part of the vagina grasped with long haemostaths. The utero-sacral ligaments are clamped and divided. They seldom need transfixing. Then the vaginal wall is circumcised preferably in a straight line, and

clamped with rectangular forceps as the circumcision proceeds. It has not been found necessary to drain the vagina, therefore it is closed with a continuous suture and attached to the stumps of the round ligaments in the same way as the cervical stump was attached to them at the termination of sub-total hysterectomy. Again the entire field can be covered with peritoneum and the posterior cul-de-sac is wiped dry.

After the gauze packs are removed the omentum is brought down and the abdomen closed in the following manner: continuous catgut suture O closes the peritoneum. The recti muscles are attached to each other with fine catgut sutures. Then three silk sutures are used, penetrating the skin, and rectus sheath on each side, and emerging through the skin. These sutures are not tied until interrupted catgut sutures close the anterior rectus sheath. The latter sutures must be inserted with meticulous care, since the anterior rectus sheath has not been split in the direction of its fibres which run transversely from one side to the other. The skin is closed with Michell clips, whereupon the silk sutures are tied.

If the tissues have been handled carefully the patient will have very little post-operative discomfort. The administration of $\frac{1}{3}$ grain of Pantopon and $\frac{1}{150}$ grain of atropine sulphate hypodermically two or three times within the first twenty-four hours usually suffices to keep the

patient comfortable. After that one grain of codeine is given as required. Beginning the first post-operative morning the patient is encouraged to turn from side to side and to do exercises with her legs and arms. She is given small sips of water and if she retains it she receives a cup of warm tea and later orange juice. On the third post-operative morning the patient receives a soapsuds enema which usually relieves her abdominal distention. If the temperature is normal by that time, she is permitted to get out of bed and sit in an armchair. On the fourth morning the patient is encouraged to walk to the bathroom with the nurse's help. Dressings are changed after the first enema has been given, sutures and clips are removed on the seventh morning, and on the eighth post-operative day she is usually permitted to go home.

Allowing the patients to get out of bed early

FIG. 2.—Shows the broad ligament stretched by Allis forceps to permit location of an avascular area in the broad ligament (2) which can be pierced by the operator's index finger.

FIG. 3.—Shows from above how the avascular area is bored through with the finger while an assistant holds the catgut in readiness in the tip of a curved clamp, prepared to slip it through the hole in the broad ligament.

serves several purposes: i. Post-operative embolism has been reduced to a minimum. ii. Patients feel more able to leave the bed after only three days of bed-rest than they do when they have been bed-ridden for eight or ten days. iii. Finally, it is much easier on the nursing staff, which factor under the present conditions must be taken into consideration. No wound disruption has occurred in a long series of patients who have been permitted to get out of bed on the third or fourth post-operative day, and follow-up visits at the clinic showed no incisional hernias.

Vaginal Hysterectomy

Anaesthesia and pre-operative preparation are the same as for abdominal hysterectomy.

At the beginning of the operation the labia are sutured to the skin, facilitating the exposure of the introitus and relieving an assistant's hands. If the vaginal outlet is small and rigid a preliminary lateral episiotomy is performed. The

cervix is grasped and pulled down. In case there is any uterine discharge the external os should be closed with several strong silk sutures, which can be left long and their ends caught in a haemostat, taking the place of the tenaculum forceps. Broken-down tissues or ulcerations on the cervix should be destroyed with the actual cautery. A circular incision is made on the cervix just above the external os and below the lower border of the bladder. When the vaginal wall is incised there is usually considerable oozing present. Some surgeons prefer to inject one ampoule of obstetrical pituitrin into the cervix, causing contractions of the uterine musculature, and thus acting as a local vasoconstrictor. However, if one finds the proper line of cleavage the oozing is not alarming and does not handicap the operation in the least.

After the vaginal wall is incised the closed blades of a pair of double blunt scissors are inserted; then by opening and closing the blades the vaginal wall is easily and bluntly separated from the bladder to a point about three-quarters of an inch

FIG. 4.—Shows the initial incision made through the anterior vaginal wall, prior to vaginal hysterectomy. Horizontal incision goes all the way around cervix. When incision is completed the closed blades of double-blunt scissors are inserted through same incision and by opening and closing blades the anterior vaginal wall is separated from the bladder. Once the tip of the scissors has reached a point about one inch below the external orifice of the urethra the vaginal wall is split along the vertical line.

below the external orifice of the urethra. Difficulties are encountered during this manoeuvre only if an anterior colporrhaphy has been previously performed, and it is at this point that extreme care should be taken in finding the line of cleavage, lest the bladder should be injured. If a previous plastic operation has been performed the dissection must be carried out sharply with the scalpel. If during this manoeuvre the bladder wall is torn it should be sutured immediately, and after the operation a permanent catheter should be left in the bladder. If the injury is located in

FIG. 5.—Shows how the uterus is delivered after the bladder has been fully separated and pushed upward, and the peritoneum incised. Sharp retractors pull the corpus down step-by-step, while tenaculum forceps push the cervix back toward the abdominal cavity in the direction of the lower arrow, thus causing the uterus to make a complete somersault.

time, urinary fistulas seldom develop. Only the neglected or overlooked tears develop into fistulas.

As soon as the anterior wall is separated from the bladder, it is vertically incised and the bladder wall exposed. The flaps are detached laterally by placing a gauze sponge over one's index finger and proceeding very slowly. Several large veins are torn during this manoeuvre, which must all be clamped and tied. It is also advisable not to leave a great many haemostats hanging on the vessels, but rather to tie them immediately, not only because they are cumbersome, but also because these vessels tear very easily and a troublesome haemorrhage may result. When the vaginal flaps are well separated on each side, the bladder is pushed up gently until the vesicouterine fold of the peritoneum is reached. The bladder is held back with an S-shaped retractor, the cervix held taut, and the peritoneum incised with a nick of the scissors. The opening is enlarged bluntly with the fingers until the smooth uterine wall becomes

visible. To the upper edge of the peritoneum a silk suture is inserted as a guide. The previously mentioned S-shaped retractor now includes this peritoneal edge, too, with its blade entering the abdominal cavity, and the patient is either placed in a slight Trendelenburg position, or the intestines are held back by a long soft sponge.

The delivery of the uterus may be extremely simple, or may be difficult. The most simple way to deliver it is accomplished with the use of two small sharp retractors or rakes, one of which is hooked into the anterior wall of the uterus and gently pulled down. As soon as more of the uterus becomes visible, the other retractor is hooked in above the first one. The first retractor is then released and just like walking up a step-ladder, one retractor is used after the other, always grasping the uterus a quarter to a half inch higher, until the fundus appears. Then, instead of pulling the tenaculum forceps, this is pushed up toward the sacrum together with the cervix back into the vagina. It is interesting to note how easily the entire uterus appears after the cervix is pushed upward, because the broad ligaments are used as an axis around which the uterus practically makes a complete somersault.

Once the fundus has been delivered the broad

and round ligaments are clamped on each side with straight clamps. They are also divided, but not yet transfixed. The uterine blood vessels are also clamped, divided, and transfixed. These last sutures should be cut short lest they should slip off the blood vessels. Then the peritoneum in the posterior cul-de-sac is incised, along with the remnants of the vaginal wall. This removes the entire uterus. If any of the adnexa have to be removed, they can also be brought down into the operative field by gentle traction on the broad ligament. This, however, requires considerable skill and practice in vaginal operations.

After the uterus has been removed, the opening in the peritoneum has to be closed. The anterior edge has been marked by the silk suture, so it is easy to put in the stitches. Then a 1 chromic catgut suture is used to transfix the ends of the broad and round ligaments. These sutures should be left long and not cut. They are brought together in the mid-line and tied to each other. The sutures are also pulled through under the pubic arch, thus giving a complete protection against a later cystocele. It is advisable to separate the pubo-vesical fascia from the vaginal flaps. In the mid-line this fascia is very flimsy, but if one proceeds laterally, stronger and stronger fibres become

FIG. 6.—Shows how the stumps of the broad ligaments (1) are sutured to each other with mattress sutures, after the uterus has been removed, and how the catgut (2) is left long, later to be fastened to the pubic arch, thus giving a firm support to the bladder.

FIG. 7.—Shows how the pubovesical fascia is sutured before the opening of the anterior vaginal wall is closed.

visible and they are the ones which should be united in the mid-line with interrupted catgut sutures. When this is accomplished the vaginal flaps are closed with continuous catgut sutures, removing the excess tissues as in plastic operations. It is always advisable to finish the operation with a perineorrhaphy, tightening the introitus, and especially uniting the levator muscles. A very small gauze packing is placed in the vagina, and dressing is applied.

A self-retaining catheter is inserted in the bladder and is fastened to the patient's thigh. This is used in preference to the Foley catheter, which has an inflatable bulb at its end, as the latter can injure the sphincter muscle of the bladder by exerting pressure on it. The self-retaining catheter is removed at the end of seventy-two hours, during which period the patient has received four tablets of sulfadiazine daily as a prophylactic urinary antiseptic. After the catheter has been removed and the patient has begun to void voluntarily, she is once more catheterised at the end of the third post-operative day, lest retention should occur and cause cystitis. The soapsuds enema is given also at the end of seventy hours, and on the fourth day the patient is permitted to get out of bed for a short while.

Following vaginal hysterectomy patients seldom suffer with abdominal flatulence, which is also due to the fact that they require very small amounts of opiates postoperatively, and they can usually be relieved of discomfort by the administration of codeine or Demerol.

The small strip of gauze is removed from the vagina on the second post-operative day, but no vaginal douche is given until the ninth day. It is also advisable to keep the patient in bed on the eighth day and to warn her that some slight bleeding may occur, which, however, has no significance. It is on that day that chromic catgut sutures begin to deteriorate and some oozing may start. If the patient is in bed, the oozing will stop without any serious consequences.

Post-Operative Complications

Since the post-operative complications are only such as may occur after any major operation, they will be only briefly discussed here. Nothing will be said about pulmonary complications, thrombophlebitis, or embolism, as these subjects require detailed descriptions and cannot be merely mentioned.

Shock: This is a rare occurrence, especially if spinal anaesthesia has been used and great care taken to maintain the blood pressure at the proper level. If it occurs, 5 per cent glucose in normal saline should be given intravenously. If the

patient fails to respond, 1 c.c. of 1:1,000 adrenalin can be added to the solution, but frequent blood pressure readings should be made lest the patient should develop acute hypertension. Plasma or whole blood can be given if available.

Haemorrhage: If the surgeon suspects post-operative haemorrhage, the patient should be taken into the operating room, the wound re-opened, and the bleeding vessel searched for. Too many surgeons expect miracles from the administration of blood-plasma or of blood transfusions, and they waste valuable time on these measures, instead of inspecting the field of operation without delay.

Acute dilatation of the stomach, ileus: Persistent vomiting towards the end of the first twenty-four hours is a warning of acute gastric dilatation, but should the vomiting occur about thirty-six to forty-eight hours post-operatively, paralytic or mechanical ileus should be suspected. In either case, all fluids by os should be withheld at once, and the duodenal tube with or without the stylet should be introduced through the mouth or nose respectively (Judd or Levine tubes are suitable). Continuous suction may be instituted by the use of either the Wangenstein apparatus or an electric suction unit. Paralytic ileus often responds to the judicious administration of Prostigmin in 1:2,000 or 1:4,000 solution, providing the atony has affected the colon most. Prostigmin is of very little value if the paralysis has involved the small intestines. Once the duodenal tube is in situ and drainage through it seems to be uninterrupted, abdominal distension usually begins to subside and careful auscultation of the abdomen may inform the surgeon that intestinal peristalsis is starting slowly. If, however, the distention quickly re-appears, the vomiting persists in spite of the insertion of the duodenal tube, and, in fact, the drainage becomes foecal in odour and appearance, while at the same time vigorous peristalsis is audible, mechanical ileus should be suspected. Occasionally the insertion of the Miller-Abbott tube may help by reaching the point of obstruction, which may be due to adhesions, but its introduction is time-consuming, and therefore it is often more advisable to re-open the abdomen.

While fluids by os are withheld, 5 per cent glucose should be given in physiologic saline solution intravenously, never omitting amino-acids and Vitamin B, otherwise the carbohydrates will not be properly utilised and oedema may also develop.

Wound disruption: This is more often due to the debilitated condition of the patient and to Vitamin C deficiency than to faulty suturing, therefore before it occurs patients should receive adequate treatment to remedy their deficiencies.

However, should it really happen, the patient need not even be taken to the operating room, as through-and-through silk sutures can be inserted under novocain infiltration anaesthesia while she is still in the ward. After the skin edges are infiltrated the sutures are carefully inserted, but not tied until they have all been placed. Then with the patient encouraged to relax and breathe easily, the sutures are tied starting from both ends of the incision and progressing toward the centre, the last suture being tied in the middle of the wound.

Wound infection: After the first seventy-two hours the dressing is changed for the first time. By then signs of local irritation usually disappear, but if wound infection is starting a conspicuous red area encircles each suture. The guilty stitches should be removed and sulfanilamide powder sprinkled over their site. After the incision has been covered heat should be applied. If serum accumulates and becomes noticeable after the sutures and wound clips have been removed, it should be aspirated with a large-size needle, attached to a glass syringe.

Conclusion

While the technique outlined above has been found useful in practically all of the author's cases, it is to be assumed that every experienced surgeon will find it necessary to make certain modifications which will not materially alter the technique, nor affect the results.

Note:—I am indebted to my sister, Miss Bertha de Hellebranth, for illustrating the above article.

THE TREATMENT OF ASTHMA

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During the past century it has been demonstrated that a large number of diseases have a specific cause; typical examples are tuberculosis, syphilis, and malaria. But even in these conditions, as Ryle has pointed out, the specific cause is not the whole aetiology of the disease. "The Pneumococcus," he says, "may be essential to the development of lobar pneumonia; but seasonal and climatic conditions, poverty, and other environmental accidents, and inborn susceptibility—to mention only a few associated causes—can also play their part. Susceptibility again is often related to age, sex, physical type, and habits. Features of this kind have suffered neglect through preoccupation

with ideas relating to the microscopic organism which we accept and name as the *causa causans* of the disease."

The success which attended the search for specific causes of disease, led to a fallacious belief that all diseases must have a cause in the specific sense; so that there followed a search, which still goes on, for the "cause" of peptic ulcer, the "cause" of rheumatism, the "cause" of cancer, and so on. But it does not follow, because a certain number of diseases have a specific cause, that all are brought about in this way, and there are many disease-states which appear to be due, not to any one specific cause, but to a summation of non-specific causes, and these not necessarily the same in every case, and not necessarily the same in the same case at different times. Among the conditions which almost certainly arise in this way is the condition we call asthma.

One tends to think that the world might be divided into those who have asthma, and those who do not; but the truth may well be that everyone has an asthma threshold, a certain greater or lesser inborn susceptibility to the condition—much in the same way that everyone might be said to have a sea-sickness threshold. The individual in whom this constitutional tendency is high is the patient with clinical asthma; when this tendency is low, as it is in the majority, it is unlikely that the condition will ever occur, although such powerful irritants as phosgene suggest that nearly all are potential asthmatics. This attitude of mind has an important therapeutic implication—namely that we should regard the asthmatic, and teach him to regard himself, not as an abnormal person, but as an essentially normal person with a functional disability, within the limits of which he must learn to live his life.

The first diagnostic problem in asthma is to assess the level of this constitutional tendency. Its exact mode of production is unknown, but much of it is probably genetic, for hereditary factors are of great importance. This natural tendency is assessed firstly by enquiring for a family history of asthma and allied conditions; also by noting the age of onset and the ease with which attacks are provoked. The presence of eosinophilia, and the general tissue sensitivity as shown by skin tests, are also of some help in this connection.

It is interesting to note that this constitutional tendency waxes and wanes from time to time, sometimes to a remarkable degree. Usually, although by no means always, it tends to wane if actual attacks can be prevented. It is not unknown for asthma to return after many years of complete freedom, but in general, if the attacks can be prevented for a year or two—and this is especially true of children—lifelong freedom may follow, and