Remarks ON PAINLESS PELVIC SURGERY.

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ALTHOUGH the title "Painless Pelvic Surgery" is employed to express an ideal, yet my object is to show that by appropriate care pain and discomfort after pelvic operations may be so minimized that it is justifiable to speak of a "painless operation." The mortality of pelvic operations has been reduced, but post-operative morbidity has not been diminished in proportion to the low mortality rate. An acute or even a chronic painful illness may follow the operation. It is true that this illness may be short and sharp as measured by duration and intensity, but it is none the less difficult to bear; indeed, the mental impression may long remain, and accentuate the "fear of the knife" for all time, besides exerting a subtle effect on the nervous system which may continue for months or years. Vomiting after an anaesthetic is so common that the suffering of the patients is apt to be ignored or forgotten, yet to them its duration may seem interminable and all the while they are racked with pain.

Even this suffering may be dwarfed by the agony endured in consequence of intestinal distension. To be told that "you must bear the pain," or that "every patient has it," is poor comfort when you feel tearing, grinding, and gnawing in your inside. It should be the aim of the surgeon to do his utmost to prevent post-operative pain so that a painless operation may be followed by a painless convalescence. In the mind of the patient the dread of pain after an operation is greater than the dread of the anaesthetic. To prevent pain and discomfort it is essential that certain precautions should be taken before, during, and after these operations.

PRECAUTIONS BEFORE AN OPERATION. *Abdominal Operations.*

It is true that the less a woman is disturbed physically or mentally before an operation the better she will be able to face this trying ordeal. Unless the complaint from which she suffers is urgent she should be admitted into the hospital or nursing home at least forty-eight hours before the proposed operation, and in certain cases a longer interval is required. The practice of admitting a patient in the evening and operating on her the following morning, unless in emergency cases, should be condemned.

If an abdominal operation is to be performed the patient should be kept in bed and should be provided with a suitable diet. A dose of castor oil should be given, if she is constipated, but otherwise the intestinal canal should not be disturbed. To give a purgative the previous night to a woman about to undergo an abdominal operation, and to awaken her at 5 a.m. for an enema and a cup of tea when the operation is to be performed at 8.30 or 9 a.m., is a form of "scientific cruelty" which should be abolished. The employment of enemata before or after pelvic operations is a practice I have never favoured. In certain circumstances it may become necessary to administer enemata, but as a routine they should be avoided. Unless skilfully given an enema may cause considerable shock and distress to the patient, whilst after pelvic operations the proximity of the rectum to the wounded area is an additional reason against their use. No one except her nurse or doctor should see the patient on the day of the operation.

When a bed-pan is used for the first time after an operation there is not merely the difficulty in its use which is due to the operation, but in addition nervousness and apprehension may increase the difficulty. For this reason it is essential that the patient should learn to use a bed-pan for micturition and defaecation during the days preceding her operation. This simple precaution will prevent much pain and discomfort and will often obviate the use of a catheter. A sleeping draught is in the

majority of women unnecessary; sodium bromide, 10 or 15 grains in a tumblerful of water, is useful if required.

The time at which an operation should be performed is made to depend on various circumstances, but if it be considered entirely from the point of view of the patient I believe 2 or 3 p.m. to be the best time. The last mentioned hour, however, has the disadvantage of the failing light in the winter, necessitating the use of artificial light should the operation be of long duration. The afternoon operation has the advantage that the first night passes more quickly, whereas if the operation be performed in the morning a long day is succeeded by a still longer night. Moreover, the patient should be permitted to rest undisturbed and not worried in the early hours of the morning by the crude methods of preparation so commonly used. Although individual variations must be taken into account, yet for most women the afternoon is to be preferred. A light breakfast of tea and toast is given at 8.30 and a similar meal at 11 a.m., after which no food is permitted.

The arrangements for dealing with patients about to undergo operations are not satisfactory in most hospitals and nursing homes. The difficulty is not only one of inadequate accommodation, but also of inadequate nursing facilities. To overcome these difficulties the hospital or nursing home must be specially constructed or arranged to facilitate the rapid transference of the patient from her bed to the operating theatre. In a small private hospital for gentlewomen to which I am visiting surgeon the conditions are almost ideal, and a brief description of them may not be out of place.

The patient about to undergo an operation occupies a bedroom on the same floor as the operating theatre. Half or three-quarters of an hour before the operation she is given a hypodermic injection of morphine 1/6 grain and atropine 1/150 grain, her bedroom is darkened, and no one is permitted to see her or speak to her until the anaesthetist arrives to give her the anaesthetic. She is anaesthetized in bed, after which she is placed upon the trolley. The trolley is then wheeled into the operating theatre, a distance of a few yards, and she is carefully lifted on to the operating table. The operating table has the shoulder-pieces padded and a folded blanket is fixed over the central portion of the table by broad webbing laterally and longitudinally, and covered by waterproof sheeting, and pillows are provided for the head.

Much of what may be termed "aseptic discomfort"—uncovered metal tables and trolleys, concrete floors, and so forth—could and should be improved, with great benefit to the patients as suffering human beings and without detriment to the surgical results, immediate or remote. I can only assert that the results which have been obtained in this small hospital have encouraged me in the conviction that all these minor details are of paramount importance, and, thanks to the benevolent lady who presides over this hospital, every detail which would promote the well-being of the patient has been faithfully carried out. These precautions have had a marked effect in diminishing or counteracting post-operative shock and post-operative pulmonary complications.

To employ such a system in a hospital it would be necessary to have several single rooms on the same floor as the operating theatre, for the present method of bringing a patient some distance to an anaesthetizing room, and after operation taking her back again, implies considerable disturbance and exposure to the air of cold and often draughty passages. Yet something should be done to prevent those all too frequent pulmonary complications which in many instances are contracted during this perilous journey. Unless a nursing home is specially constructed such a system is wellnigh impossible, and yet many struggle on even without the assistance of a passenger lift.

Again, the heating of the operating theatre calls for careful supervision. It is difficult to obtain that happy medium between cold and excessive heat, for the latter is not merely trying to the patient but to all those present. A patient, sweating profusely after an operation, who is wheeled out into a cold and draughty passage, is fortunate if she does not develop some pulmonary complication. A cradle covered with a blanket over her head, or other

suitable device, should be employed to retard the ingress of cold air, and a sufficient number of warm blankets should envelop her body.

Vaginal Operations.

Women suffering from genital prolapse require a longer period of rest in bed before operation. The prolapsed uterus and vaginal walls should, as far as possible, be replaced, thus permitting congestion to diminish; at the same time any uterine or vaginal discharge should be treated, as well as any ulcerated or abraded surface.

For the treatment of a vaginal discharge irritating injections should not be used, and the injections should not be too hot. For ordinary routine use an injection of salt solution, 2 drachms to the pint, comfortably warm, is most useful. Hot irritating injections tend to cause oedema of the vaginal walls and delay in healing, with consequent discomfort to the patient.

The present fashion is to shave the vulvar hairs completely before a vaginal operation, and I have known this done even before the removal of a urethral caruncle, whilst it is the common practice before curettage. In the unclean the shaving of the vulvar hairs may be a necessity, but in those of cleanly habit it is not only unnecessary, but too often leads to local discomfort after the operation. Moreover, the vulvar hairs are an important protection, and can be rendered clean and kept clean. Lister did not advise shaving the head in the treatment of scalp wounds; on the contrary, he disinfected the hairs and made use of them as a further protection to the wounded surface. For these reasons I have never favoured routine shaving of the vulva, which is, moreover, distasteful to the great majority of female patients. My results fully justify me in adhering to this opinion.

PRECAUTIONS DURING AN OPERATION.

Abdominal Operations.

I do not believe it is sufficiently realized how much can be done during an operation to prevent post-operative pain and discomfort. If the art of surgery is to develop as it ought, and if it is to become one of the fine arts, then the "tearers" and the "bruisers" must give place to a race of surgeons who will be respecters of human tissues, causing the minimum amount of traumatism, and who will accomplish their task with that refinement of execution known only to the highly skilled artist.

Vision is too often fogged by a display of mortality statistics, and although the day when operations will have no mortality may be not far distant, let us see to it that they will also have no morbidity. The surgeon of the future should be able to assure the patient about to undergo an operation that it is devoid of risk, and that the convalescence will be free from pain and discomfort.

Iodine is probably more frequently used in different parts of the world in the preparation of the skin of the abdominal wall than any other medicament. I have abandoned its use for some years because it tends to cause local irritation, and as a cleansing agent is not so good as methylated spirit and acetone. These agents can be recommended as effective cleansers of the skin which do not cause irritation, provided that the methylated spirit be of good quality.

To avoid the leg-aches, the knee-aches, and the shoulder-aches, it is essential that the patient should be securely fixed when the operating table is elevated into the so-called Trendelenburg position. Few operating tables are capable of affording a correct position, the fault being that they are not provided with leg-pieces. In some the patient, when elevated, hangs by the knees without shoulder supports; in others with shoulder supports the ankles are fixed by a bandage; or again, the legs are elevated and the whole weight of the body is sustained by the shoulder supports. It is thus easy to comprehend why patients so fixed complain of what is called "rheumatism" during convalescence.

The operating table should therefore be provided with leg-pieces as well as shoulder supports. The patient should be so fixed on the operating table when elevated into the Trendelenburg position that the knees are flexed, the thighs slightly flexed and abducted, and the shoulders supported.

In this position there is a more equable distribution of strain, and it is surprising how much better the abdominal wall is relaxed. Moreover, ready access is obtained to the vagina should any combined procedure be required, and there is no "rheumatism" during convalescence.

The operating table should be elevated before the surgeon begins the operation, and he should be able to tell by the contour of the abdominal wall if the intestines have descended towards the diaphragm. The patient should be deeply anaesthetized before the incision is made, and if kept under the anaesthetic it will be found, on opening the abdomen, that the intestines have fallen back and a large abdominal sponge can be inserted and spread out so as to retain the intestines in their position. Too often, owing to incomplete anaesthesia and straining, there is a battle between the protruding intestines and the surgeon, ending in the defeat of the former after much handling and exposure, and it is doubtful if as good retraction is ever obtained under these conditions.

The ability to use a knife is one of the greatest achievements of the accomplished surgeon. If the tissues of the abdominal wall be cut cleanly with a sharp knife they heal better, they are easier to coapt by stitches, and subsequent pain is diminished. When the abdomen is opened the abdominal incision should not have the appearance as if it had been eaten by rats. A sharp knife should also be used for the separation of adhesions, and not scissors, or, worse still, a gauze sponge.

Both the skin and the divided abdominal wall should be protected. After a trial of various materials I have come to the conclusion that the best protector of the divided abdominal wall is the peritoneum. For this purpose sterilized cloths are fixed by toothed forceps to the parietal peritoneum. The abdominal wall and skin being protected, and the intestines completely covered, the contents of the pelvis are exposed to view. The large abdominal "sponge" (made of lint) is steeped in hot normal saline solution, and no irritant fluid is used within the abdominal cavity. Large abdominal retractors of the self-retaining pattern are best avoided on account of the injury they do to the parietal peritoneum by pressure. Indeed, the less the abdominal wall is retracted by instruments the better for the future comfort of the patient.

In a paper entitled "Suggestions for the prevention of post-operative embolism and thrombosis" I have already indicated many points in technique which not only prevent embolism but also prevent post-operation pain. Amongst the foremost of these are: (1) the avoidance of transfixion and puncturing of blood vessels; (2) accurate haemostasis; and (3) the avoidance of mass ligatures.

It is a good rule in surgery "never to transfix a vascular area," and the reasons why this rule should be observed are fully set out in this paper.

Accurate haemostasis is one of the most important means of preventing pain, for blood effused into the peritoneal cavity probably causes more pain than any other fluid, even more than that produced by the gastric or intestinal contents. Blood effused under the peritoneum—as, for example, after the operation of supravaginal hysterectomy where the haemostasis has been incomplete—probably causes pain by tension and stretching of the peritoneum should the sutures effectually prevent the blood escaping into the peritoneal cavity.

Effusion of blood into the abdominal wall from incomplete haemostasis is a common cause of pain. This effusion causes tension, and is evidenced at a later stage by the formation of a haematoma. For this reason it is wise to tie or twist bleeding points in the abdominal wall, especially at its lower end, and to make sure that all haemorrhage is arrested. It is a good plan to place a gauze sponge, held in long forceps, at the bottom of the pelvis before the operating table is lowered from the elevated position. The object of this sponge is to soak up any blood which has collected, as well as to indicate if additional bleeding has occurred after the horizontal position is resumed. If there be any bleeding it is likely to be increased during vomiting and straining as well as from the vascular reaction which occurs after every abdominal operation of any severity. Although this amount of bleeding

may not endanger the life of the patient, yet it causes pain, and should be prevented.

I believe it to be important to lower the operating table into the horizontal position before suturing the abdominal wall, and to "arrange" the abdominal contents so that the sigmoid colon covers the pelvic cavity, and the omentum is spread over the intestines. The withdrawal of the large abdominal sponge should be delayed until the peritoneum is partly stitched, and if the sponge be pulled gently downwards towards the symphysis pubis the omentum comes down with it. Chilling and exposure of the intestines are thereby diminished.

Subcutaneous emphysema may result from neglecting to lower the elevated table, and may cause considerable discomfort for some days. Again, volvulus of the small intestine, with accompanying signs of intestinal obstruction, may result from a similar cause, whilst it is difficult to be certain that all haemorrhage has been arrested when the abdomen is closed with the pelvis elevated.

The wound in the abdominal wall is a great source of pain, and too much care cannot be taken to cut cleanly, to avoid bruising and tearing, and to arrest all bleeding. The method of suturing is all-important, and here it is not so much the material used as the manner of its use that matters.

Stitches only act as splints, and yet how often this is forgotten. It is "Nature's glue" which produces union, and without this assistance all the efforts of the surgeon would be vain. The function of a suture is to maintain the opposing surfaces in apposition, and Nature does the rest. In suturing there should be that nicety of adjustment, that apposition without constriction, which is the hall-mark of the finished craftsman. The peritoneal edges should be apposed by a suture which is not pulled too tight and by which the edges are not constricted, and thus the thinnest suture material can be employed without breaking it. Again, the type of through-and-through abdominal suture in common use causes considerable pain. It is inserted at a distance of an inch or more from the cut edges, taking up skin, fat, fascia, muscle, and sometimes peritoneum, and then is tied firmly, encompassing within its grasp a mass of tissue which writhes and struggles in vain until relief comes with removal of the suture.

To overcome this difficulty I have used for some years a figure-of-8 suture of silkworm gut. It is inserted on one side, a quarter of an inch from the skin margin, passing through skin and fat, then it is passed through fascia and muscle on the opposite side, taking a good grip of both, and again through muscle and fascia on the same side, and finally through fat and skin on the opposite side, emerging a quarter of an inch from the skin margin. A piece of fine india-rubber tubing half an inch in length is threaded over one end of the suture, which is then tied so that the skin edges are apposed—not constricted—and the small piece of rubber tubing lies flat upon the line of the incision. Sutures so inserted may remain in position for fourteen days or longer. Preliminary scratching of the skin at intervals across the position of the incision ensures accuracy in suturing.

Before the figure-of-8 sutures are tied the muscle and fascia are united by catgut, continuous or interrupted according to requirements, and the skin by Michel clips. In the application of these clips it is essential that the skin edges be apposed and not crushed. Crushing not only causes pain, but redness and sloughing. If clips be carefully applied they may be left in position for a week without even causing redness of the skin edges. Skin edges apposed and not crushed heal rapidly without pain. A dressing of double cyanide gauze fixed in position by collodion is then applied, care being taken that only the edges of the covering layer of gauze are so fixed. A pad of wool and a many-tailed bandage complete the dressing.

The practice of fixing the gauze dressing by means of the through-and-through sutures has such obvious disadvantages that it cannot be recommended.

Vaginal Operations.

As already mentioned, it is important to use non-irritating antiseptic solutions and to see that they are not too hot, in order to prevent oedema of the tissues and subsequent dis-

comfort. After thorough cleansing of the vulva it is disinfected with acetone followed by mercury biniodide solution 1 in 2,000. The vagina is swabbed out with the mercury biniodide solution and then thoroughly dried with gauze sponges. I believe many vaginal operations fail through neglecting this simple precaution, for moisture in this region favours septic infection.

Haemostasis is of paramount importance in vulvar and vaginal operations. Bleeding points should be caught and tied, not left to chance. Secondary haemorrhage is far too common after these operations, many of which are regarded as minor operations, and sufficient trouble is not taken to see that all bleeding is stopped. There may be troublesome vaginal haemorrhage after the operation of colpoperineorrhaphy, or the effused blood may form a haematoma in the perineal tissues, causing local pain and discomfort. Such results may be due to septic infection or the neglect to tie or crush bleeding vessels, especially veins. After the operation of colpoperineorrhaphy the bleeding usually comes from two small arteries at the apex of the triangular flap, excised from the posterior vaginal wall. The patient complains of pain, she is restless and somewhat blanched, often unable to urinate, and yet her vagina may be distended with clotted blood, although the amount of external blood loss is small.

Secondary haemorrhage is still more frequent after operations on the cervix uteri. Cervical tissue heals slowly and its blood vessels have a tendency to retract within its substance, thus favouring secondary haemorrhage. From a study of the writings of the older authors secondary haemorrhage does not appear to have been a common complication of operations on the cervix uteri because a non-absorbable suture, most frequently silver wire, was used which was allowed to remain until healing was complete. The modern use of catgut is responsible for much secondary haemorrhage, because too often the catgut melts before Nature has glued the apposing surfaces together. If catgut be employed it must be forty-day chromic catgut, but who can guarantee that it will hold? I have obtained the most uniformly successful results in operations on the cervix by the use of silkworm gut, but unfortunately such sutures require to be removed, whereas catgut becomes slowly absorbed and does not require removal. If the catgut employed will remain for the requisite time secondary haemorrhage will not occur, but who can tell when it is reliable? The announcement that the catgut will last forty days is a pious opinion; it is not always a statement of fact.

For the major vaginal operations of hysterectomy and colpotomy accurate haemostasis is one of the secrets of success. "Get it dry and keep it dry" should be the guiding principle in vaginal surgery.

Women appear to dread perineal operations more than any other. They seem to have heard of the pain following the operation, of the pain when the stitches are removed. Their fears are certainly justified unless the surgeon takes special precautions to prevent pain. A perineorrhaphy may be, and often is, one of the most painful operations in surgery, yet with care the pain can be prevented. The perineum should be stitched in the same manner as the abdominal wall. To constrict tightly a mass of perineal tissue within the grasp of a suture is to cause not pain but agony—agony which is accentuated by the oedema of the tissues which supervenes.

The through-and-through sutures, which should be of silkworm gut, should be inserted, and should emerge a quarter of an inch from the margin of the incision, and after the superficial skin sutures of catgut have been inserted and tied the silkworm gut is tied, one end being threaded through rubber tubing as in the abdominal wall. The common error is to constrict an unnecessarily large amount of skin within the grasp of the suture and to pull it too tight. The sutures must be tied with that nicety of adjustment which comes with practice and experience.

It may be urged that by the use of catgut only pain is prevented. This is true—if the catgut were always reliable; but even if it were, infection may defeat the efforts of the surgeon. I consider it essential in these operations to use a non-absorbable suture, which not only acts as an efficient splint but also as a second line of defence to the catgut sutures.

The nicety of adjustment to be achieved in suturing the perineum is most important in the recent tears following childbirth, where a certain amount of oedema is constantly present. I have often been told by practitioners that they have abandoned silkworm gut because it "cuts out." The real explanation, however, is that the suture has been pulled too tight, and that the oedema which follows has made it tighter, and it cuts the tissues, meanwhile causing unnecessary suffering to the patient. Interrupted catgut sutures fortified by silkworm gut yield the best and most certain results in this department of surgery.

Curettage is an operation which should not be followed by pain if care be taken. Pain may be produced through the character of the cervical dilatation, the vigorous use of the curette, or the application of irritants to the interior of the uterus.

1. *The Character of the Cervical Dilatation.*—The tissues of the cervix should be slowly stretched by the cervical dilators; this stretching is only possible up to a certain size of the dilator employed, and this size varies according to the dilatibility of the cervix. Large dilators do not dilate—they lacerate; and not only haemorrhage, but pain, follows this accident—pain which may persist in consequence of cicatricial tissue forming in the cervical wall and parametrium. The preliminary use of a glycerin ovule, pushed up against the cervix, aids materially in softening cervical tissues whose consistence, as detected by a local examination, suggests interference with easy dilatation.

2. *The Vigorous Use of the Curette.*—A sharp curette may cause chronic uterine pain through the excessive removal of uterine tissue. It should not be used for the body of the uterus, but should be reserved for the cervix. The curette should be held lightly in the hand, and should be used more as a rake than a scraper; this is especially necessary in the post-abortion uterus. The possibility of perforating the uterus and of causing tubal inflammation must be borne in mind by the inexperienced.

3. *Application of Irritants to the Interior of the Uterus.*—It is difficult to understand why this useless procedure is continued in the practice of gynaecology. The only apparent result is that the patient has uterine pain for three or four days after the curetting. It is sufficient for all practical purposes to dry the interior of the uterus, or if it bleeds freely to introduce a gauze plug to arrest the bleeding. The gauze plug is removed at the end of twenty-four hours, and no further local treatment is employed.

PRECAUTIONS AFTER AN OPERATION.

Abdominal Operations.

The patient should be placed in a warm bed upon her side, with one pillow under her head, so arranged that the act of vomiting may be facilitated—that is, with the head slightly inclined forwards, resting on the edge of the pillow. To place a patient in the dorsal position and twist her neck on one side as soon as she begins to vomit is not the last word in surgical art. There may be reasons for adopting other positions, but it must always be borne in mind that the dorsal decubitus interferes with vomiting, and even in the so-called Fowler position, employed many years ago at the Samaritan Free Hospital by Sir Spencer Wells, if the patient lies on her side the act of vomiting is facilitated.

Vomiting still remains one of the most troublesome sequelae of an anaesthetic. I have made many attempts to prevent post-anaesthetic vomiting by drugs and by washing out the stomach on the operating table, but have come to the conclusion that it is best to encourage vomiting and rid the stomach of the ether-laden mucus, which seems to collect even after the stomach has been washed out. For this purpose copious draughts of sodium bicarbonate and water should be given, and ordinary water, hot or cold according to the desire of the patient, swallowed (not sipped) *ad libitum*. Moreover, when vomiting does not occur, nausea may continue for some days, accompanied by distaste for food, which is even more trying to bear.

The amount of post-operation pain when the foregoing precautions have been taken is so trifling that even an injection of morphine is rarely required. However, if there be severe pain which persists, it is wiser to administer an

anodyne and repeat it rather than to allow the patient's suffering to continue.

After the first night the amount of what may be termed "traumatic pain" is, after a carefully performed operation, comparatively trifling. Another factor, however, comes into play—to wit, intestinal pain. This is prevented by the careful covering of the intestines, thus preventing exposure with consequent drying and chilling, the avoidance of drastic purgation before the operation, and the early administration of solid food after the operation.

I think I may fairly claim to have been a pioneer in advocating the early administration of solid food after abdominal (gynaecological) operations. Solid food cleans the mouth better than any mouth-wash; it stimulates peristalsis and encourages the bowels to act naturally. Those who have seen, as I have seen, the older methods of treatment, where patients were fed for days on a liquid diet, are able to appreciate the advantages of solid food. Foul mouths, often followed by parotitis, intestinal pain and distension, obstinate constipation—all these, together with general malaise and wretchedness, combined to make the patient look and feel the victim of a severe illness. All this has been changed through the improvement in the methods of pre-operative, operative, and post-operative care, and amongst the last the early administration of solid food is of first-rate importance. In all my cases of intestinal suture, whether of the small or the large intestine, solid food has been administered after the post-anaesthetic vomiting has ceased, and with the happiest results.

Moreover, I would plead for the systematic dieting of patients who have undergone abdominal section. Briefly, their diet should be so planned that those foods which, singly or in combination, tend to the production of flatulence should be excluded. Too little attention is paid to this most important question, yet for the comfort of the patient it is essential that a suitable diet should be prescribed by the surgeon instead of leaving the task to others.

I suppose no subject has been more frequently debated than that of the administration of purgatives after abdominal section. The time at which a purgative is first administered varies in the practice of different individuals, some giving purgatives at once, others after three days, and so on. I have always advocated "leaving the bowels alone" until the patient is uncomfortable, and then she receives a dose of castor oil. My reason for so doing is that rest is the best therapeutic agent in medicine, and I decline to believe that an early movement of the bowels, with the pain, difficulty, and discomfort it entails, is in the best interests of the patient. Moreover, the disturbance in the abdomen through increased intestinal peristalsis and movement may interfere with reparative processes, whilst the employment of purgative enemata is still worse. For these reasons it is best to refrain from purging the intestine for four or five days, and then a purgative may be given if the bowels have not acted naturally. After the bowels have acted it is wise to ensure a daily action by means of a laxative, which will be found to cause little, if any, discomfort when a preliminary period of rest has been enjoined.

Yet another debated question is: When should the patient be permitted to get out of her bed after an abdominal operation? My answer is that she should be permitted to get out of her bed on the seventh day, provided always that she is having an uninterrupted convalescence. I dress the wound for the first time on the seventh day and remove the Michel clips. The patient is then permitted to leave her bed, unassisted if possible, and sit in a chair for half an hour and then return to bed. This is continued daily, the length of time being gradually increased, until the wound is again dressed on the fourteenth day, when the through-and-through sutures are removed. During the following week the patient walks about her room or in her ward, gradually increasing the amount each day, and this is continued for yet another week, when she is discharged, being then able to walk erect with confidence. I was led to adopt this method after observing the "bent up" women with unsteady gait, emerging from hospitals and nursing homes, whose prolonged rest in bed had materially affected their power of locomotion.

This "early rising," however, possesses still further advantages: it stimulates the circulation, thereby aiding in the prevention of post-operative embolism and thrombosis; it promotes the coaptation and healing of the abdominal wound; it prevents or alleviates those difficulties in micturition so commonly experienced after extensive pelvic dissections; and, by giving the patient hope and confidence, the bodily functions are improved, so that she not only sleeps better but digests and assimilates her food better.

The effect on the abdominal wound is quite remarkable, for I have seen the edges so pressed together in an obese patient that the small pieces of rubber tubing were completely hidden from view. When the dorsal position is maintained for any length of time there is a tendency for the edges of the incision to be dragged asunder, often aided by a varying amount of intestinal distension, whereas the contraction of the recti muscles brought into play in assuming and maintaining the erect posture of the trunk serves to coapt the edges. Although no apparent change may be observed in the skin, yet the subjacent fascia, and more often the muscle, may have undergone separation. This is evident long after the operation, and may be demonstrated by placing the hand over the incision with the patient in the dorsal position, and then asking her to raise herself, when it will be found that the muscles are not united and there is not infrequently a bulging produced along the line of the incision. For all these reasons I have become a strong advocate of "early rising" whenever permissible. I do not, however, believe in permitting patients to leave the hospital or nursing home too soon, for it is to their interest to be kept under observation until they are able to walk with confidence. The practice of "early getting up" and "early getting out" is not to be recommended.

As the use of a catheter, especially if not skilful, causes both pain and discomfort, every effort should be made to favour the natural action of the bladder, whilst the danger of infection is an additional reason for avoiding a catheter. The removal of the Michel clips and the through-and-through sutures should be practically painless, if properly done. The early removal of the through-and-through sutures deprives the wound of the advantages of a splint, whereas if they are not removed and the patient gets up, firmer union is obtained. It only remains to be added that the dressing of antiseptic gauze fixed in position by collodion is removed after the collodion is dissolved by acetone, thus rendering the removal painless.

Vaginal Operations.

The routine employment of douches after vaginal operations is not to be recommended. Indeed, the less that is done in the way of local treatment or manipulation the better for the patient. The use of an antiseptic "wash" after defaecation or micturition is helpful in favouring local cleanliness, and the employment of a special dusting powder favours dryness and relieves pain.

To the patient the most dreaded event is the removal of the perineal stitches, but if these are tied over small pieces of fine india-rubber tubing the removal of the stitches is painless. Where stitches have become embedded through constriction and subsequent oedema their removal may not only be very difficult, but very painful.

Both in incomplete and especially in complete perineal tears I believe it is best to leave the bowels undisturbed for four or five days in order that healing may be uninterrupted.

The other details in the after-treatment of vaginal operations should always be carried out so as to avoid pain and discomfort to the patient. A longer period of rest must be enjoined after operations for genital prolapse, in order that the newly united tissues may become thoroughly consolidated before the erect position is assumed. It is wise to keep such patients in bed for at least three weeks.

Although I must plead guilty to having dealt with what may be regarded as trivialities, yet, after all, it is the little things that matter. Too often it is forgotten that an operation is to the surgeon but a part of his daily work—to the patient it is a great adventure.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, March 9th, 1918, p. 277.

A STUDY OF THE EFFICIENCY OF STERILIZATION OF DRESSINGS.

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INTRODUCTORY NOTE

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THE honorary surgical staff of the Jessop Hospital, Sheffield, watched the experiments described in the paper by Mr. R. J. B. Hall and Mr. A. W. Chapman with great interest. They were satisfied that the observations and deductions were correct. It is valuable to have obtained corroboration of the suspicion that the permeability by steam of surgical dressings, etc., is greatly influenced by the nature of the container and the compactness of the contents. Lightly packed hessian bags are evidently much more easily sterilized than tightly packed metal drums.

However, the chief interest lies in Mr. Chapman's clever device for detecting not only the highest temperature reached, but the duration of time for which that temperature has existed. Most surgeons must have desired such a control. Here it is to hand, and it can be easily and inexpensively employed, as the tubes only cost 40s. to 50s. a gross.

At the Jessop Hospital these controls have been constantly employed for over a year and the surgical staff derive great comfort from their use. They take this opportunity of thanking Mr. Chapman and Mr. Hall for the skill and trouble displayed by them in inventing the control and in elucidating the details of its correct use.

OBJECT OF INVESTIGATION.

If a package or drum of dressings is to be sterilized efficiently the steam must penetrate to the centre of the package and raise it to a temperature sufficiently high to destroy any micro-organisms present. In addition to the occasional use of maximum thermometers, many tests have been employed to indicate the temperature in the centre of the dressings. Usually they depend on the fusion or rapid colour change of an organic compound, or, more recently, on the fusion of small pieces of standard alloys.¹

If complete security is to be attained, the materials to be sterilized must not only be raised to a sufficiently high temperature, but must be kept at that temperature for a certain length of time. All the tests previously employed suffer from the common disadvantage of recording only the maximum temperature in the dressings, without giving any indication of how long it has been maintained. A simple type of indicator has been devised, the readings of which depend both on temperature and time, and hence give a more trustworthy index of the efficiency of sterilization than one recording temperature alone.*

Indicator for Checking Sterilization.

The indicator consists of a small, stout, sealed glass tube containing a few drops of a standard solution of glucose and sulphuric acid. When heated to a sufficiently high temperature the solution slowly darkens in colour and finally chars. The concentrations of acid and glucose are so adjusted that at 212° F. the change in colour is very slow, whilst at 239° F. the solution becomes straw-coloured after five minutes, bright yellow after ten minutes, deep brown after twenty minutes, and nearly black after thirty minutes.

A series of experiments was carried out to determine whether the colour developed in the test solution was a satisfactory index of sterility under the ordinary conditions employed for dressings. A number of sterilizing drums

* The device is made and sold by Messrs. Albert Browne, Ltd., Chancery Street, J.