Both tumours were found on examination to be typical examples of dermoid growth, containing abundance of fatty material and hair. In both instances the elongated pedicle, including the Fallopian tube and ovarian ligament, was purposely tied and divided as far as possible from its uterine extremity, in the hope of avoiding subsequent miscarriage. On the third day after operation, however, uterine haemorrhage began, and after persisting for forty-eight hours culminated in the expulsion of a vesicular mole. The patient's convalescence was somewhat retarded by a well-marked attack of influenza, but was otherwise uneventful.

After-history.

In the following April (1902) I saw this lady in excellent health shortly after her return from the Riviera. She then informed me that in January and February she had noticed a coloured "show" lasting on each occasion for forty-eight hours, and that in March, after travelling through from Nice to London, she had seen a normal "period" of four days' duration. On pelvic examination I found the uterus perfectly natural as to size, position, and mobility; the sound passed readily $2\frac{1}{2}$ in., and caused no bleeding. No trace of any pelvic deposit or thickening could be detected.

During the next eleven months—from the beginning of April, 1902, until the end of February, 1903—menstruation continued regular with but two exceptions in the course of the summer and autumn of 1902. On each of these occasions the flow recurred somewhat profusely the following month, but did not exceed the usual five days' duration.

Pregnancy.

In 1903 the February period ended on March 1st and failed to reappear towards the end of that month, when she began to be troubled with nausea, which persisted for the next twelve weeks. No return of menstruation occurred in April, May, June, or July, and towards the end of this latter month she began to feel movements at intervals. In the end of August she slipped and fell on a hard wood floor, an accident immediately followed by severe pain and haemorrhage, which in the course of a few hours resulted in the birth of a well-developed fetus at about the fifth month. She made a perfectly smooth recovery from this mishap under the care of her usual medical attendant. Menstruation recurred two months later in October, 1903, and has since then continued regular.

In 1902 Mr. Alban Doran¹ read before the Obstetrical Society an interesting paper founded upon a case which had been under his own care. The patient in question, having had her left ovary removed for cystoma by Dr. Robert Barnes in 1880, developed a cystic tumour of her right ovary some thirteen years later, which was taken away in 1894 by Mr. Doran, who noted at the time the absence of any remaining trace of the left ovary. This second operation was followed by a recurrence of normal menstruation, and two years later by the birth of a child. The tumour removed by Mr. Doran is described as a true multilocular ovarian cyst, of which the base burrowed to some extent between the layers of the right broad ligament. The author concluded that some detached area of ovarian tissue must have escaped removal during the enucleation of the deeply-seated base of the growth, a view which offers a sufficient explanation of the subsequent history of the case. Some doubt existed in his mind as to the inclusion of the right Fallopian tube in the ligatures applied to the main vessels at the base of the cyst; but this question does not materially affect the possibility of conception, as proved by the well-known fact of pregnancy following the attempted sterilization by ligature of both tubes after Caesarean section.

In my own case, the re-establishment of menstruation, followed by pregnancy, is of course to be explained only by the theory that some portion of ovarian tissue capable of maturing follicles was left untouched by the operation, and, further, that the patency of one or other Fallopian tube was subsequently restored. The possibility of this latter occurrence has been fully established, and need not, therefore, be discussed. On the other hand, the question of the probable site of the oöphoritic tissue which escaped removal requires some brief consideration.

The supposition that some portion of one or other ovary was accidentally left behind at the operation, as may well happen during the removal of small adherent ovaries or of a sessile or burrowing cyst, may, I think, be entirely discarded in the present instance. Both tumours, as already stated, were connected with the uterus by long and exceptionally well-defined pedicles, which, although purposely secured at some distance from their uterine extremity, afforded ample space on the distal side of the ligatures for the avoidance during division of any interference with the base of the tumours.

The possible existence of a third ovary has been often conjectured, and the occurrence of such an abnormality has been actually recorded in German literature²; but in every such instance the presence of a third Fallopian tube would appear to have been also noted—a condition in accord with what

might be expected under such circumstances. Now, although one might well overlook the presence of an accessory ovary in the course of an operation, it is unlikely that a third Fallopian tube would escape notice, and I feel certain that no such abnormality existed in the case under consideration.

The only alternative supposition is that the ovarian tissue in question consisted of an outlying portion in connexion with the uterine extremity of one or other ovarian ligament. Such a condition—originally noted by Dr. Lockyer, and referred to by Mr. Doran in his Harveian Lectures³ as having been discovered in a specimen of uterine tumour removed, with both appendages attached, by abdominal hysterectomy, would fully account for the return of menstruation followed by pregnancy in the case of my patient; and this I believe to be the true explanation of it.*

A point of considerable importance to be here noted is the general advisability of a guarded prognosis as to the possibility of pregnancy after double ovariectomy. Until recently the consideration of such a possible sequence to the operation in question had been practically set aside; but this can no longer be the rule, as recorded cases, although few in number, are sufficient to establish the fact of its occasional occurrence under favourable circumstances.

So far, the majority of instances would appear to have followed upon the removal of chronically inflamed appendages where some small portion of one or other ovary has been accidentally left behind, presumably on the proximal side of the ligature; and it should be borne in mind that this same thing may occur during the removal by enucleation of any sessile or intraligamentous growth.

The so-called conservative treatment of diseased ovaries, originally advocated with the view of avoiding interference with the menstrual function and the consequent disadvantages of a premature menopause, has recently been practised on the Continent and elsewhere with the further object of avoiding subsequent sterility, and with occasional success.⁴ That the general adoption of such treatment is invariably judicious admits, I think, of considerable doubt, since it may well expose a patient to a recurrence of disease in the remaining portion of ovary without necessarily affording her a prospect of motherhood. At the same time, however, I am inclined to believe that in young women suffering from double ovarian cystic disease of a simple type, one is justified in purposely leaving a portion of normal ovarian tissue connected with the pedicle when possible to do so. On the other hand, in cases of rapidly growing adenomatous tumours, of colloid or papillomatous cysts, and of dermoid growths, no such attempt should be made, as the risk of recurrence in these conditions far outweighs any possible benefits to be derived from such treatment.

Finally, bearing in mind the occasional existence of follicular elements in connexion with the ovarian ligament, it is advisable, I think, in any case involving removal of both ovaries for cystoma of a non-malignant type to aim at transfixing the pedicles at a point sufficiently remote from the uterus to ensure non-interference with the root of the ligament, since by so doing one may afford the patient a possible chance of subsequent maternity, as was unwittingly done in the case here related.

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NOTES OF EXPERIMENTS TO DETERMINE THE RELATIVE EFFICIENCY OF SOME SURGICAL DRESSING MATERIALS.

BY

A. N. M'GREGOR, M.D., and R. RAMSEY, M.B., Ch.B.,
Assistant Surgeon. Late Senior House-Surgeon,
Glasgow Royal Infirmary.

THE experiments were undertaken for the purpose of determining the relative absorptive power of the commoner surgical dressing materials. The need for some such experiments was suggested by the unsuitability, in practical clinical work, of the materials for drainage purposes in general use. The earlier experiments showed that a wide

* A similar abnormally situated mass of ovarian tissue, in close relation to the base of the ovarian ligament, has been described by Dr. Baldwin,⁴ who discovered it during a second operation undertaken for the relief of persistent menorrhagia in a patient, both of whose ovaries he had previously removed.

range of materials and a variety of tests were essential. It soon became evident that dressings must be examined, first, to discover their absorptive—perhaps better called hygroscopic—powers; secondly, their powers of conveying fluid to a distance by capillary attraction; and, thirdly, the spreading or dispersive properties—presumably a combination of the previous two—by which fluids are conveyed from the point of contact and spread over a larger area.

The inception of these tests was due to the observation that on the withdrawal of a gauze drain from a discharging cavity a gush of fluid frequently followed the gauze. The gauze in these cases had acted as a cork and had bottled up the discharge instead of conducting the fluid to the surface dressing. It became necessary to find out, if possible, the cause or causes of the cessation of action of the drainage materials. It is a common experience that many conditions exist in which a cavity containing pus, blood, or other fluid has to be drained in such a way that gravitation is of no assistance—that is, where an opening cannot be made at the most dependent part. Where tubes alone are used in these cases only the overflow discharge reaches the dressing. Under these circumstances the general practice nowadays seems to resolve itself into the use of iodoform or other gauze drains with or without a rubber or glass drainage tube for the purpose of conveying the contents of the cavity to the covering dressing. It may be noted here that we do not refer to cavities of small size which are filled with packing material for other purposes than drainage.

A preliminary investigation by the simple means of dropping scraps of dressing materials on to the surface of a basin of water elicited the fact that some samples of iodoform gauze failed to absorb water to any appreciable extent while other samples became saturated quickly. There were decided variations in many of the other materials.

Experiment 1.

The first experiment had for its object the determination of the amount of water that each material was able to hold in suspension when saturated and when compressed "dry."

A quantity, 20 gr. by weight, of each variety of the commoner surgical dressings was dropped into a basin containing a large quantity of water. On complete saturation each piece was picked out separately with artery forceps and allowed to drip until the drops ceased. The pieces were then weighed and it was found that the absorbent wool had increased to 473 gr., wood wool wadding to 443 gr., cellulose wadding (Tillman's paper dressing) to 290 gr., plain gauze to 176 gr., boracic lint to 150 gr. They were squeezed dry, and again weighed to show the amount of retained moisture. A full list of results is shown on Table I.

TABLE I.—Showing the Amounts of Water, by Weight, Absorbed by the Various Materials when Saturated, and with the Excess Squeezed Out.

Material.	Dry.	Saturated.	Weight of Water in Saturation.	Proportion in Terms of Weight of Material.	Weight when Squeezed "Dry."	Weight of Water Retained.
Absorbent { B. wool } McF.	gr. 20	gr. 370	gr. 350	Times 17.50	gr. 70	gr. 50
	20	473	453	22.60	95	75
Wood-wool { McF. wadding } H.	20	443	423	21.15	80	60
	20	330	310	15.50	90	70
Cellulose—B.	20	290	270	13.50	60	40
Boracic { McF. lint } B.	20	150	130	6.50	50	30
	20	240	220	11.00	45	25
Plain { McF. gauze } B.	20	176	156	7.80	62	42
	20	240	220	11.00	50	30
Iodof. { McF. No. 1 gauze } B.	20	125	105	5.20	55	35
	20	240	220	11.00	40	20
Crimean cloth	20	170	150	7.50	67	47

Experiment 2.

The next experiment was devised to determine the rate of conveyance of water through a given length of material, of approximately the same breadth and thickness, in other words, to find the rate of capillary attraction for water.

Strips of the various materials were cut as nearly as possible of the same bulk, and their ends placed simultaneously into

a basin of acidulated water. The strips dropped perpendicularly, and free from a ledge, 3 in. above the water, at which point a piece of blue litmus paper was attached to each strip. The acid solution travelled up the 3 in. of cellulose wadding in three minutes, boracic lint in four and a-half minutes, and plain gauze in six minutes. In the absorbent wool and wood-wool wadding the water had only travelled 1 in. in fifteen minutes, showing that these latter, though very hygroscopic (see Experiment 1) were markedly deficient in capillary attraction. Though plain gauze and MacFarlane's No. 1 iodoform gauze carried up the water in six minutes, other gauzes were very much slower, and some specimens would not absorb at all. The full results are shown in Table II.

TABLE II.—Showing the Rates of Conveyance of Water and Pus through 3 in. of Various Materials of Approximately the same Breadth and Thickness.

Material.	Water.	Pus.	Time taken to Absorb 1 drachm of Pus.
Cellulose wadding...	3 minutes	5 minutes	4 hours.
Boracic lint (McF.) ...	4½ "	8½ "	1½ "
" (Baird) ...	8 "	20 "	2 "
Gauze—plain... ..	6 "	8 "	2 "
" (Baird) ...	7 "	15 "	2 "
Iodof. gauze (McF. No. 1) ...	6 "	8 "	2 "
Crimean cloth ...	8 "	8½ "	2½ "
Lint ...	10 "	20 "	7 "
Cyanide gauze ...	18 "	not tested	not tested.
Sal alembroth gauze ...	18 "	"	"
Linton's moist iodof. gauze ...	22 "	23 minutes	4½ hours.
Gauze with dry iodof. crystals..	23 "	24 "	4 "
Ribbon iodof. gauze ...	23 "	24 "	4 "
Absorbent wool ...	approx. 1 hr.	nil.	not tested.
Wood-wool wadding ...	1 hr.	"	"
Iodof. gauze (Baird) ...	1 hr.	practically none	6 hours.
Iodof. gauze (McF. No. 2) ...	none	none	none.

Experiment 3.

Recognizing that in the actual conditions of surgical work the carriage of water is not the only desideratum, and that the removal of pus cells, fibrin, and debris is also necessary, the third experiment was carried out on the following lines:

An acid pus with a specific gravity of 1.010 was used to test the capillary attraction of dressings for a fluid containing solids in suspension; 2 drachms of this pus were put into each of a number of urine glasses, and strips of the various materials loosely packed down narrow glass tubes were simultaneously lowered, one into each urine glass. Three inches above the surface of the pus was placed, as before, a piece of blue litmus paper. The acid pus travelled up the 3 in. of cellulose wadding in five minutes, plain gauze in eight to fifteen minutes, boracic lint in eight and a-half to twenty minutes. The cellulose wadding absorbed 1 drachm of pus in four hours, then stopped; when it was transferred to a glass containing water it did not absorb any of that fluid. The plain gauze absorbed 1½ drachm of pus in four hours, after which it absorbed neither pus nor water. The boracic lint absorbed 2 drachms of pus in four hours, and though it would absorb no more pus it absorbed 2 drachms of water when transferred. In the latter half of this experiment the tops of the drains were covered with cotton-wool.

Microscopic examination of the fluid at different levels of each material discovered pus cells and debris in the boracic lint fully ½ in. above the original level of the pus, but in the other materials these were only found in that part of the dressing which had been actually immersed in the pus. From this it would seem that a factor in the stoppage of the drainage was a blocking of the meshes of the drain by solid matter. In order to see if this was the only factor another experiment was performed.

Experiment 4.

The drains were used as in Experiment 2, but in this instance their free ends were allowed to hang over the edges of the urine glasses. It was found that as soon as the drain became saturated with water the capillary action in all cases ceased. No drops fell from the free end, thus showing that saturation of the material stops capillary action.

On consideration of the results of the foregoing experiments it was manifest that the materials most suitable for capillary action were not those of the highest hygroscopic quality, and it was also seen that when pus was used the

point of saturation in a 3-in. drain of average thickness was reached in four hours when no covering dressing was used.

Fig. 1 (Experiment 5). Photograph taken an hour after the start of an experiment. 1. Cellulose drain and cover. 2. Boracic lint drain and cover. 3. Plain gauze drain and cover. 4. Iodoform gauze drain and cover.

Experiment 5.

Inasmuch as the saturation of a drain depends on the rapidity with which the covering dressing removes the fluid from the drainage material, a number of samples of marked hygroscopic power were employed as covering materials in Experiment 5. Half an ounce of methyl blue solution was put into various urine glasses; 3-in. strips of materials were then lowered into each through glass tubes, and covered with the same or other material. The length of time taken by each combination to remove the $\frac{1}{2}$ oz. of fluid was noted, and the following are the principal results:

Cellulose wadding drain with cellulose wadding cover took half an hour.

Plain gauze drain with cellulose wadding cover took an hour and a-half.

Plain gauze drain with plain gauze cover took three hours.

Boracic lint drain and boracic lint cover took an hour and a-half.

Where absorbent cotton or wood-wool wadding was used as a covering material the whole of the $\frac{1}{2}$ oz. of fluid was not absorbed, showing that the power of the material to convey

Experiment 6.

In order to measure this quality the sixth experiment was undertaken. Pieces of the different materials were cut into squares of nearly the same size and thickness. On the centre of each square, from a height of 3 in., 10 drops of a coloured solution were allowed to fall from a pipette. The following are some of the results:

Boracic lint, plain side up, stain on proximal side 1 in. in diameter; distal $\frac{1}{2}$ in.

Boracic lint, face side up, stain on proximal side $\frac{1}{2}$ in. in diameter; distal 1 in.

Wood-wool wadding, stain on proximal side 1 in. in diameter; distal $\frac{1}{2}$ in.

Cellulose wadding (Tillman's paper), stain on proximal side 2 in. in diameter; distal $\frac{3}{4}$ in.

Plain gauze, stain on proximal side $1\frac{1}{2}$ in. in diameter; distal $1\frac{1}{2}$ in.

In the second photograph the upper row shows the stain on the proximal side; the under row shows the stain on the distal side.

CONCLUSIONS.

To recapitulate these results shortly, it has been found:

1. That the most suitable drainage material for the conveyance of fluids with solids in suspension is dry boracic lint; cellulose wadding is almost as efficient, but its friability renders it unsuitable for drainage purposes, unless enclosed in a gauze envelope.

2. That the best covering materials for the speedy removal of the discharge from the distal end of the drain are cellulose wadding and gauze.

3. That the covering material should be sufficient in amount to continue in action as long as the drain, and prevent saturation of the latter.

4. That, as the blocking of the drain takes place in four to eight hours, a more frequent dressing than usual is indicated.

It should be stated that the variations in the iodoform gauzes were probably due to the preparation of the material, and certainly not to the influence of the iodoform, as the specimens used were all 10 per cent., and some of them acted as efficiently as plain gauze.

In reviewing the conclusions of these experiments the obvious objections arise that the influences of temperature, surface evaporation, coagulation of fibrin, and drugs will all modify the results. Since it is practically impossible to test all the materials for every varied condition, and as it is likely that the modifying circumstances will give proportionately similar results, it is hoped that the above experiments will be of use in actual practice.

In the search for a suitable drainage material many substances have been tested, those noted above being only a few

Fig. 2 (Experiment 6).—1. Boracic lint, back upwards. 2. Boracic lint, face upwards. 3. Wood-wool wadding. 4. Cellulose. 5. Plain gauze.

the fluid from the point of contact with the drain is not dependent on the hygroscopic power alone. (Fig. 1 from a photograph shows four of these tests in process.) For this purpose a spreading or dispersive quality is most suitable, and this seems to be a combination of capillary attraction and hygroscopic power.

of the best. It is hoped that a more efficient drain may yet be discovered, and to this end we shall be glad to receive suggestions as to materials and references to other researches.

Our thanks are due to Messrs. Baird Brothers and others who have supplied us with samples.