THE RADICAL ABDOMINAL OPERATION FOR CARCINOMA OF THE CERVIX UTERI:

RESULT OF ONE HUNDRED CASES RECKONED ON AN
ABSOLUTE CURE BASIS.

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BETWEEN April, 1907, and September, 1911, we operated upon 100 cases of carcinoma of the cervix uteri by the radical abdominal method.

The time has therefore come when we can review our results from the point of view of absolute cure, or five years' freedom from recurrence, for it is agreed that patients who have survived this period without return of the growth may be regarded as cured.

The Character of the Operation.

The operation we perform is a very thorough one, and consists in the removal of the uterus with its cervix contained in a bag formed of the upper half or two thirds of the vagina, closed by a clamp we designed for the purpose. Together with the uterus and upper portion of the vagina are removed the ovaries, Fallopian tubes, and broad ligaments, the parametric and paravaginal tissue down to the upper surface of the levator ani, and the glands and cellular tissue occupying the obturator fossae and investing the external and internal iliac arteries and veins.

To effect this wide clearance the ureters are entirely isolated throughout the anterior two-thirds of their pelvic course. In certain cases part of one ureter has been deliberately resected, and the upper end implanted in the bladder. Similarly we have on occasion excised a portion of the bladder, where separation of that viscus from the cervix was impossible by reason of advanced growth.

In cases in which the glands about the external iliac artery and vein are obviously carcinomatous we extend our dissection up to the bifurcation of the aorta.

This drastic procedure we have carried out in all the cases, whether the growth was early or advanced, believing that the lesser immediate risk of a partial operation is ill compensated for by the diminished chance of permanent cure.

The Cases Operated Upon.

We operated upon every case in which there appeared to be any possibility of removing the growth, and among our patients have been many who have been dismissed from other hospitals as inoperable; some, indeed, had been sent away from two or three different institutions as hopelessly incurable.

Keeping in Touch with the Recovered Cases.

The task of keeping in touch with the recovered cases has not always been easy, for though each patient is begged to visit us periodically, and to keep us informed of her whereabouts so that we may write to her once a year, yet it not infrequently happens that after a while she becomes forgetful, and fails to present herself or let us know of her change of address. In such cases we have got in touch with the patient either by personally calling at her address or through the medical man who originally sent her, or through the postal authorities, or even through the police.

On the whole we have been successful, only seven of the cases having been lost sight of.

The Result of 100 Cases.

The results obtained are shown in the following table:

Died of the operation	...	...	...	20
Died of recurrent growth	...	...	...	32
Died of other disease	...	...	...	2
Lost sight of	...	...	...	7
Cured	...	...	...	39
				100

The Operative Mortality.

Under this head is included every case of death due to the operation, whether occurring within the first few days or after an interval of several weeks. The mortality of the operation for carcinoma of the cervix is very much what the surgeon chooses to make it. That is to say, that if he contents himself with a relatively partial extirpation of the tissues environing the carcinoma, and refuses to operate on extensive growths and still more on those advanced to the borderline of operability, his operative mortality will be low. If, on the other hand, he performs a truly radical extirpation and undertakes all cases up to the borderline of operability, his mortality will always be considerable, though increasing experience and dexterity lowers it to a degree. We have pursued the latter practice, believing it to be the right one.

Cases with Glandular Involvement.

In every case the regional glands removed at the operation were microscopically examined, and in 35 were found to be malignant.

As might be expected, these 35 cases show a much higher operative mortality and a much greater percentage of recurrences than do the 65 cases in which the regional glands were not malignant, but nevertheless a certain proportion of them are cured, as the following table shows:

Table of Cases in which the Regional Glands were and were not Carcinomatous.

	Glands Carcinomatous.	Glands not Carcinomatous.
Died of the operation	9	11
Died of recurrent growth	16	16
Died of other disease	1	1
Lost sight of	2	5
Cured	7	32
	35	65

That we are able to include amongst our cured patients no fewer than seven in whom the regional glands at the time of the operation were already carcinomatous justifies the value of the operation even when applied to very advanced cases.

Recurrence.

Death from recurrence occurred in 32 cases, as follows:

Table showing Rates of Recurrence.

	Cases.
Under a year	4
Between 1 and 1½ years	11
1½ and 2 years	5
2 and 2½ years	5
2½ and 3 years	0
3 and 3½ years	1
3½ and 4 years	5
4 and 4½ years	1
	32

In those patients in whom the growth returned early the seat of recurrence was usually the vagina. Late recurrences were situated in the pelvis above the vagina or along the iliac vessels or aorta.

Early recurrence in the vagina suggests that at the operation sufficient of that canal was not removed.

Deaths from other Disease.

Two patients died of disease other than carcinoma. The first had pulmonary tuberculosis at the time she was operated upon, which proved fatal a year afterwards. The second died of acute urinary sepsis following an operation to close a vesical fistula a year after the radical extirpation of which it was the sequel. Neither of these patients had any sign of recurrent growth.

Cases Lost Sight of.

Seven patients were lost sight of. Letters sent to them were returned marked "Gone away," and all inquiries through other channels failed. The frequency with which patients belonging to the labouring classes change their lodgings or the town in which they live constitutes the chief difficulty of keeping in touch with them. Some of our lost-sight-of cases may, of course, have died of recurrent growth, but we obtained no information suggesting it.

Table showing the Extent of Knowledge about the Seven Patients lost sight of.

Known to be well 1 year after operation	...	...	1
" " 2 years after operation	...	...	3
" " 3 years after operation	...	...	2
" " 3½ years after operation	...	...	1
			7

Cured Cases.

Thirty-nine patients were cured. All of them are known to be well at the present time.

Table showing the Dates of the Operations of the Cured Cases and the State of the Regional Glands.

Initial.	Date of Operation.	Condition of the Regional Glands.	Initial.	Date of Operation.	Condition of the Regional Glands.
M. ...	Nov., 1907	Not carcinomatous.	H. ...	Jan., 1910	Carcinomatous.
S. ...	Mar., 1908	" "	N. ...	Apr., "	Not carcinomatous.
S. ...	April, "	" "	B. ...	Apr., "	" "
P. ...	May, "	" "	C. ...	May, "	" "
A. ...	June, "	Carcinomatous.	H. ...	May, "	" "
S. ...	July, "	Not carcinomatous.	K. ...	June, "	" "
P. ...	Sept., "	" "	B. ...	Jan., 1911	" "
B. ...	Sept., "	" "	R. ...	Feb., "	Carcinomatous.
M. ...	Sept., "	" "	B. ...	Mar., "	Not carcinomatous.
C. ...	Nov., "	" "	G. ...	Apr., "	" "
K. ...	Nov., "	" "	M. ...	May, "	" "
L. ...	Jan., 1909	" "	B. ...	May, "	Carcinomatous.
R. ...	Feb., "	" "	L. ...	June, "	" "
B. ...	Apr., "	" "	R. ...	June, "	Not carcinomatous.
M. ...	Apr., "	" "	S. ...	June, "	" "
S. ...	June, "	" "	O. ...	June, "	" "
M. ...	Sept., "	" "	P. ...	July, "	" "
S. ...	Oct., "	" "	B. ...	Sept., "	Carcinomatous.
W. ...	Nov., "	Carcinomatous.	D. ...	Sept., "	Not carcinomatous.
H. ...	Jan., 1910	Not carcinomatous.			

Operability-Rate and Actual Achievement.

To correctly appraise the results actually achieved by a series of radical operations for carcinoma of the cervix uteri it is absolutely necessary to know the surgeon's *operability-rate*—that is, the number of patients he has operated upon out of every 100 that presented themselves to him for advice, either privately or in his wards, or to his colleague in charge of the out-patient department that serves his wards; for it is obvious that no comparison of results founded on the mere enumeration of operative deaths, recurrences, and cures can be made between the performance of one surgeon who practises a restricted operation on carefully selected early growths and another who carries out a drastic procedure on every case in which there is a possibility of removal.

Up to September, 1910, at which time we had performed 70 cases, we were able to determine accurately our operability-rate by simply enumerating all the cases of carcinoma of the cervix presenting themselves to us in our out-patient and in-patient departments and in the course of our private practice, and comparing this number with the number of operations we performed. Thus, our first 70 cases were drawn from 112 cases presenting themselves, and our operability-rate was 62.5 per cent.

When, however, in the year 1911, the Middlesex Hospital became identified with the radium treatment of cancer, we began to get a steadily increasing number of extremely advanced cases sent up from various institutions and other sources for the purpose of radium treatment. The average state of advancement, therefore, of the cervical growths seen at our Middlesex Hospital clinics has become greatly increased, and the patients as a whole are no longer representative of the unselected cases of carcinoma of the cervix uteri attending a hospital not specially associated with radium treatment.

Our operability-rate, calculated on the number of cases

seen in the last year covered by the present series, would therefore be misleading, and as we have found it impossible to separate the cases intentionally sent up for radium treatment from those sent up in the ordinary course, we assume that our operability-rate for our first 100 cases is the same as that which we accurately know for our first 70 cases—namely, 62.5 per cent.

We feel justified in adopting this course because our operative practice has never varied. We have always attempted every case in which there seemed any possibility of removing the growth.

Table showing the Number of Operations we Performed in each of the Years covered by the Present Series.

From April, 1907, to September, 1907...	...	2 cases.
" September, 1907, to September, 1908	...	17 "
" September, 1908, to September, 1909	...	25 "
" September, 1909, to September, 1910	...	27 "
" September, 1910, to September, 1911	...	29 "

From this table it will be seen that in the last twelve months we actually performed a larger number of operations than in any of the preceding years. Thus the 100 cases forming this series may be regarded as selected from 160 patients presenting themselves.

On the Continent various formulae have been adopted to obtain an accurate mathematical estimate of the late results and actual accomplishment of this operation. These formulae are explained in a previous paper of ours,¹ and can be applied if desired. For our present purpose, however, we think it will be simpler if we set the results down in a more explanatory manner.

Out of 100 patients operated on we have cured 39, or 39 per cent.

If from the 100 cases operated upon we subtract the 7 cases lost sight of, it is seen that we have cured 41.9 per cent. of the 93 cases operated on whose ultimate fate is known to us.

And if, in addition to the 7 cases lost sight of, we subtract from the 100 cases operated on the 2 cases that died of disease other than carcinoma, it is seen that we have cured 42.8 per cent. of the 91 cases operated on in whom the final outcome of the carcinoma is known to us.

Again, the number of patients that recovered from the operation was 80, and of these we have cured 39, or 48.7 per cent.

If we subtract from the 80 cases that recovered from the operation the 7 cases lost sight of, it is seen that we have cured 53.4 per cent. of the 73 cases that recovered from the operation and whose ultimate fate is known to us.

And if, in addition to the 7 cases lost sight of, we subtract from the 80 cases that recovered from the operation the 2 cases that died of disease other than carcinoma, it is seen that we have cured 54.9 per cent. of the 71 cases that recovered from the operation, in whom the final outcome of the carcinoma is known to us.

And, further, it will be seen that out of the 160 cases originally presenting themselves we have cured 39, or 24.3 per cent.

If from these 160 cases originally presenting themselves we subtract the 7 cases lost sight of, then it will be seen we have cured 25.4 per cent. of the 153 cases originally presenting themselves and whose ultimate fate is known to us.

And if, in addition to the 7 cases lost sight of, we subtract from the 160 cases originally presenting themselves the 2 cases that died of disease other than carcinoma, it will be seen that we have cured 25.8 per cent. of the 151 cases originally presenting themselves, and in whom the final outcome of the carcinoma is known to us.

Prolongation of Life in Patients Recovering from the Operation.

The surgeon is often asked, when advising a radical operation for carcinoma of the cervix, what are the prospects of prolongation of life, apart from the chances of actual cure if the patient recovers from the operation. It has been shown by A. Leitch, from a study of over 1,000 cases, and independently confirmed by McCormac, that, in patients not operated upon, the average duration of life, from the first symptoms to death, is one year and nine months. We have found from the large number of cases we have now dealt with that patients suitable for operation presenting themselves to the surgeon for the first time have, on an average, had symptoms for six months. The life expectation of these women is therefore on an average one year and three months.

It may therefore with confidence be stated that where a

patient survives the operation for three years or over, her life has been prolonged by the operation.

On this basis it will be seen that out of the 80 cases that recovered from the operation 49, or 61.2 per cent., had their life prolonged, namely:

Cured cases	...	...	...	39
Recurrent cases	...	...	...	7
Cases lost sight of	...	...	...	3
				49

Concluding Remarks.

This series of 100 cases of radical extirpation of carcinoma of the cervix uteri reviewed on an absolute cure basis is the first to be produced from a British source, all previous evidence as to the final value of the operation having come from the Continent. The attitude of characteristic cautiousness which distinguishes this country in taking up innovations from abroad extends to surgery, and there are not wanting those who still view the procedure askance or even with hostility.

The operation is one no surgeon can undertake lightly, for beyond the considerable mental and physical strain which accompanies its performance he may have to face the anxiety of a critical convalescence or the disheartenment of failure, and the more so the more advanced cases he ventures upon. His reward comes five years later, and, as this paper shows, is one well worth the striving for.

REFERENCE.

¹ *British Journal of Obstetrics and Gynaecology*, vol. xxiv, No. 3, 1913.

THE USE OF INSECTICIDES AGAINST LICE.

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THE scheme followed in the undernoted trials was to arrange the conditions on as nearly natural a basis for the insects as was consistent with their control and strictly comparative results, particular care being taken that the insects should have the opportunity of feeding during the experiments. Most of the remedies were those already in common use. The tests with cytisine were made at the suggestion of Dr. H. H. Dale, who very kindly supplied me with the preparation.

Cytisine is an alkaloid showing similar physiological properties to those of nicotine, but much less volatile. It was for this reason and the fact that, as it is extracted from the seeds of gorse and laburnum, an abundant supply of the raw material necessary for its manufacture is easily obtainable, that Dr. Dale suggested its trial as a remedy. (Dale and Laidlaw on the physiological action of cytisine, *Journ. Pharm. Exper. Ther.*, 1912, 3, 205.)

Preliminary trials carried out with naphthalene showed that the diffusion of vapours over the body surface beneath clothing is restricted to a very small area round the centre of distribution, in so far as it had any effect on lice. Presumably this depends partly on the curved surface of the body and partly

FIG. 1.—Small bags of silk gauze (motor veil chiffon) kept from collapsing by a wire gauze circle.

on the difference in temperature between it and the surrounding air.

Twenty-five grams of flake naphthalene were placed in a long tube of fine muslin (nainsook) which was worn as a belt next the skin. Lice in small bags of silk gauze (motor veil chiffon), kept from collapsing by a wire gauze circle (Fig. 1), were suspended between the skin and

clothing at various parts of the body above and below this belt—back, chest, abdomen, and hips—the greatest distance being 5 or 6 in. from the belt. One bag slipped from its fastenings and fell to within an inch of the belt. After a three hours' trial, it was found that the insects in the fallen bag alone were affected, some of the lice in it being paralysed, though none were actually dead.

In a second trial 5 grams of naphthalene were wrapped up in a small packet of motor veil, and this was put into one of the bags containing a number of lice and placed next the skin. A second bag, also stocked with lice, was placed in close proximity to the first, the edges of the two bags being separated by a space of only half an inch. In the first bag, in which the lice might actually come in contact with the naphthalene, the insects were killed within 3 hours, but in the second bag, although they were not noticed to feed after the first 2 hours, they were found on examination to be still active after 6 hours; many had relaxed their hold after 11 hours, but some were still active. This bag was removed after 11 hours from its proximity to the one containing the naphthalene. When examined next morning most of the lice had recovered; only two larvae and one adult were dead out of thirty in all stages of development.

This experiment was repeated—using three bags, one on either side of that containing the naphthalene. The quantity used was again 5 grams, and the surface area of the packet was 4 square inches. After 3 hours the great majority of the lice in the central bag were dead, but three or four larvae and nymphs about to undergo a moult were active. No effect at all had been produced in the adjoining bags. After 9 hours all were dead in the central bag, but in the bags on either side a few adults only had been affected and none were actually dead, though some were partially paralysed.

In order to test the relative effects of contact and diffusion of a number of remedies with greater accuracy a small apparatus was designed (Fig. 2), consisting of five wire gauze frames, each capable of being covered by a small gauze bag; they constituted a series of five small

FIG. 2.—Set of five wire gauze square frames, three of them covered by small gauze bags, one with cover removed, and one in the middle containing a square inch of thick lint.

cages, each 1 in. square by $\frac{3}{4}$ in. deep; they were fixed to a flexible bar with their edges in contact and so arranged that the whole could be tied firmly against the body, the gauze on one side coming in contact with the skin so that the captive lice could feed.

In the central chamber, referred to as "contact" in the experiments, was placed a 1 in. square of thick lint impregnated with the fluid or substance it was desired to test. This lint was carefully weighed before and after impregnation, so that the weight of substance in relation to area of surface was accurately determined. Lice were placed in all five chambers—their relative position being referred to as 2 left, 1 left, contact, 1 right, and 2 right, respectively.

In one case three substances were tested at once, the substances being placed as follows:

REMEDY	CONTROL	REMEDY	CONTROL	REMEDY
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The lice in the control chambers served to indicate either the action by diffusion, if any, or the fact that the substances tested were in no way interfering with each other's action on the lice.