CARCINOMA OF THE ALIMENTARY TRACT.

A study of two hundred and thirty cases with special reference to the results of surgical treatment.

by

HAROLD K. CORKILL, M.B., Ch.B.

Thesis for Competition for

Syme

Surgical Fellowship

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Gunning Victoria Jubilee Prize in Surgery 1925

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The Dean of the Faculty of Medicine

University of Edinburgh.

Sir,

I have the honour to submit herewith, for the consideration of the Faculty, a Thesis in competition for the award of the Syme Surgical Fellowship, 1925, or alternatively the Gunning Prize for Surgery, 1925.

The subject is "Carcinoma of the Alimentary Tract, a Study of Two hundred and thirty cases, with special reference to the results of Surgical Treatment".

The Essay is based on the review of the cases of this condition admitted under the care of Professor Sir Harold Stiles, during the past five years, in Wards 7 & 8 of the Royal Infirmary.

I have personally investigated the condition of patients resident in Edinburgh, and have secured follow up reports in connection with cases from outlying districts, and have reviewed the Pathological material obtained at operation from the various cases.

Owing to the short period of time available, it has not been possible to do justice to the enormous literature on the subject, but as many authorities have been consulted as practicable, in confirmation

or otherwise of various points elicited during the study of these cases.

I have to thank Professor Sir Harold Stiles and Professor Wilkie for permission to utilise their cases, for this study.

My date of graduation was July 1922.

I am, Sir,

Yours faithfully,

[redacted] M.B. Ch.B.

This thesis is based on a review of the cases of carcinoma of the alimentary tract treated in Wards 7 and 8, Royal Infirmary, Edinburgh, during the 5 years October 1919 - January 1925 under Professor Sir Harold Stiles.

The importance of these conditions may be gauged from the following figures.

Out of a total admission of 4200 individual cases, 400 have been cases of malignant disease, 370 being of a carcinomatous nature.

In other words 9% of the admissions to a general surgical service have been carcinomas.

This may be compared with the rate for appendicitis acute and chronic, which was 17% of all admissions.

This paper is concerned with a study of those carcinomas affecting the alimentary tract - a total number of 232.

These are grouped according to situation

Mouth,/

Mouth, Tongue and Lips	54
Oesophagus . . .	16
Stomach	50
Small Intestine . .	1
Appendix	3
Large Intestine . .	61
Rectum and Anus . .	47
	232

It is proposed to deal in turn with each of the above groups, with special reference to etiological factors, pathological varieties, operative measures employed and results of treatment.

CARCINOMA OF MOUTH, TONGUE AND LIPS.

54 cases. Male 48. Female 4.

Average age 56 years. Youngest case 32 years

Oldest case 85 "

Epithelioma of the Lip. 13 cases all males.

Epithelioma of the lip is one of the conditions most amenable to surgical treatment, chiefly because diagnosis should be possible while the disease is at an early stage and confined to the superficial tissues of the part.

Situation of lesion.

Upper lip	1
Lower lip, angle	3
middle	9

Etiological Factors.

Smoking (clay pipe) .	4
" (ordinary pipe) .	1
Trauma (scratching pimple)	2
Fissure after cold .	1
Tar	1
Jagged tooth . . .	1

In no situation is the chronic irritation factor so well exemplified as in the lip.

Heavy smoking, especially with a clay pipe, and tooth irritation, are examples.

One case was of particular etiological interest.

E 113. Male, aet 67.

He had been employed for years as a Quarryman and had repeatedly sustained abrasions of the face and lips from flying pieces of stone.

During some labour trouble he was transferred to the road gang and employed with a tar-sprayer.

As a result he was constantly spattered with tar, and he volunteered the information that the cracks on his/

his lips, which previously had healed quickly, now refused to heal.

Here we have an interesting combination of initial trauma and superimposed irritation on the same lines as so much of the recent experimental work in cancer research laboratories.

Pathology.

Macroscopic.

The papillomatous type of growth, characterized by overgrowth from the surface, and little extension downwards, was noted in 5 cases.

The ulcerative type with erosion of the deeper tissues was found in the remaining 8.

The distinction between the two types has some bearing on the prognosis, as will be shown later.

Microscopic.

(12 cases only)

Squamous epithelioma was present in 11 cases, Rodent ulcer in the remaining case, the ulcer of the upper lip.

Treatment./

Treatment.

One case came with an advanced condition and an inoperable mass of cervical glands.
The remaining 12 were submitted to operation.

'V' excision 4 cases, one with gland dissection.
Block excision 8 cases, 5 with dissection of submental and submaxillary glands.

The indications for the limited 'V' operation were

(a) small papillomatous growths with no deep invasion.
(b) advanced age of patient.

The 'Block' excision with plastic repair is the operation of choice, as it ensures removal of a considerable amount of tissue that may have become permeated by the disease.

Palpable glands had been noted in 2 cases, but dissection of the submaxillary and submental triangles was performed in 4 other cases where histological examination of the tumour showed deep infiltration.

Results.

Total number of cases . . .	13
Operated	12
Deaths in Hospital . . .	0
Of these there died subsequently	2

There/

There are living under 1 year		5
Between 1 - 2 years		1
" 2 - 3 "		1
" 3 - 4 "		1
" 4 - 5 "		1
Not traced . .		1

There is definite evidence that the prognosis as regards malignancy may be gauged from the type of gross tumour, the papillomatous types having a low malignancy and the ulcerative types a higher one.

Papillomatous Type. 5 cases.

Living	4 years 3 months	1	(with gland dissection)
	3 years 8 months	1	
	under 1 year	3	

Ulcerative Type. 8 cases.

Not operated upon		1	
Living	2 years	1	(with gland dissection)
	18 months	1	(with gland dissection)
	under 1 year	2	(one with gland dissection)
Died within 2 years		2	(with gland dissection)
Not traced		1	

Epithelioma of Tongue and Floor of Mouth.

41 cases. Male 37. Female 4.

In 5 cases no operation was carried out either on surgeon's advice or from patient's refusal.

Etiology.

Special etiological factors were deduced in about half the cases as under.-

Syphilis . . .	10
Jagged Teeth . .	4
Ill-fitting tooth plate	3
Smoking . . .	2

The association of epithelioma of the tongue and syphilis raises certain interesting points.
In the first place two distinct types of case are recognised.

(a) The definite leukoplakic patch, or chronic superficial glossitis, upon which an epithelioma has developed.

(b) The case with a malignant ulcer of the tongue without leukoplakia but with a positive Wassermann reaction.
In this group the ulcer may have been primarily syphilitic but in most cases the syphilis is probably a coincident condition.

Five cases belonging to this latter group were studied, and it cannot be said that the presence of the syphilitic infection modified the malignancy of the tongue condition one way or the other.

When one considers the cases of epithelioma implanted on a pre-existing leukoplakic patch, however, there seems to be some evidence that the degree of malignancy is low.

One case of epithelioma of the dorsum of the tongue has been specially watched in this connection.

C 609. M., aet 58.

Wassermann + + + .

White patches on dorsum of tongue 8 months.

Ulceration of tongue with bleeding 4 months.

There was an ulcer on the dorsum of the tongue surrounded by leukoplakic patches.

There was no very deep infiltration of the substance of the tongue; and no palpable glandular enlargement.

The anterior two-thirds of the tongue was removed by Whitehead's method in January 1923.

Patient lives near hospital, and has kept reporting at short intervals throughout. It is now 2 years and 3 months since operation, but there has been no sign of recurrence either locally or in the neck.

Microscopically/

Microscopically the specimen is an undoubted squamous epithelioma with cell nests and epithelial pearls and invasion of the growth.

Why then should this epithelioma not have metastasized to the regional lymph glands? It is possible that the fibrosis consequent on the syphilitic process has blocked up the lymphatic channels, forming a barrier to the advance of the disease.

One would have liked to obtain further information on this point by study of other cases, but the remaining cases of leukoplakia with implanted epithelioma are all less than 1 year after operation, and though no glandular involvement has been noted, so far it is too early to obtain information of value.

Situation of the lesion.

The lesions of the tongue and floor of mouth were situated as follows:-

Tongue only

Anterior half	5
Lateral border	13
Posterior half	4

Floor of mouth only or floor of mouth and tongue.

Anterior	5
Lateral	7
Posterior	2

INFLUENCE OF GLANDULAR INVOLVEMENT ON PROGNOSIS.

A.
18 cases had no palpable glandular involvement when first examined.

B.
18 cases had palpable glandular involvement of varying degrees at the time of operation.

(a)	Submaxillary and submental only	9
(b)	Upper deep cervical alone	2
(c)	Submaxillary and upper deep cervical	4
(d)	Submaxillary, upper and lower deep cervical	3

B.
In comparing the results of the two groups of cases one must bear in mind that the cases with glandular involvement, especially of the deep cervical glands, are much poorer surgical risks than the uncomplicated cases.

2 cases were considered not fit to stand operation on the glands, though the primary lesion in the mouth was removed as a palliative measure.

1 case refused to return for removal of glands, the only instance in the whole series where this has occurred.

6 cases died in hospital

3 after excision of the primary growth and before the glands had been touched.

3 after a one stage operation for removal of growth and submaxillary glands.

The remaining 9 cases show results as follows:-

Died under 1 year	2
between 1 - 2 years	2
Still living under 1 year	1
between 2 - 3 years	1
" 3 - 4 years	1
" 4 - 5 years	1
Not traced	1

A.

In the group of cases with no palpable glandular involvement, 10 were subsequently submitted to a neck dissection either as a second stage safety procedure or when recurrence had been noted.

Died in hospital	2	Before neck dissection.
Died under 1 year	2	One without recurrence.
Between 1-2 yrs.	1	
2-3 "	1	

Alive under 1 year	4
Between 1 - 2 years	2

Between/

Between	2 - 3 years	1
"	3 - 4 "	1
"	4 - 5 "	2
"	5 - 6 "	1
Not traced	. .	1

It is not so much the extent of the local disease in the mouth as the glandular involvement that influences the prognosis.

Many of the cases presenting large ulcers of the tongue and floor of mouth have responded to energetic treatment with no recurrence, while small apparently early growths have been followed by rapid glandular involvement and death.

Local recurrence may be said to be the exception under modern methods of treatment. Excision of a block of tissue well wide of the gross disease is of course essential, and should be performed without regard to accurate closure of the defect in the mucous membrane of the mouth.

Local recurrence has been observed in one case only of this series, an epithelioma of the posterior part of the tongue extending back to the anterior pillar of the fauces. Removal of the disease and block dissection of the same side of the neck was followed in 6 months by a recurrence in the soft palate and no cervical involvement.

Recurrence is thus practically always in the glands of the neck, and may be very late in appearing.

One case, E 408 Male aet 35, had excision of an epithelioma of uvula, anterior pillar of the fauces and posterior part of the tongue in May 1920. No cervical dissection was performed. He reported at intervals, and suddenly in December 1924 there was a glandular recurrence in the deep cervical glands of the opposite side - 4 years 7 months after the original operation.

This fact of the recurrence being so frequently glandular argues strongly for radical dissection of the neck in all cases.

The practice of waiting for glands to appear is often risky.

Two examples serve to illustrate this:-

1. A 226 Male 63.

Ulcer on under surface right half of tongue.

No palpable glands.

(a) Excision of Right half of tongue and floor of mouth.

(b) Dissection of right submaxillary triangle.

Glands removed showed no malignancy.

Patient alive and well 5 years after.

2. A 404. Male 59.

Warty growth on side of tongue.

No palpable glands.

Hemisection of tongue.

No neck dissection.

Patient seen after four months apparently well.

Seen again two months later with an inoperable recurrence.

Glandular involvement in itself does not preclude successful surgical treatment.

V.P. Blair[2] in an analysis of Butlin's results, found that of 22 cases with no palpable glands where the mouth alone was treated, 45% died of glandular recurrence.

In 70 cases with palpable glands treated energetically and radically there was only 27% recurrence.

These figures exclude the immediate mortality which is probably higher in the advanced cases.

The following case illustrates the value of radical measures:-

C 759. Male 46.

Ulcer, floor of mouth, anterior.

Enlarged submaxillary glands both sides.

Treatment./

Treatment. (1) Excision of floor of mouth and part of tongue.

(2) Block dissection, right side.

(3) Dissection submaxillary and upper deep cervical glands left side.

One year later there was recurrence on the left side which one notes was the less completely dissected side.

(3) A block dissection entailing sacrifice of the left vagus nerve and sympathetic trunk was carried out.

Patient reports in February 1925 with no recurrence, 2 years and 3 months from last operation, and 3 years and 3 months from original operation.

In block dissection down to the clavicle lies the surest means of combating the disease, but this dissection, to attain its object, should be performed early, and valuable time should not be lost by carrying out less radical dissections. It is not sufficient to keep merely one stage ahead of the disease.

The benefit of early block dissection is shown by the following table.

Block dissections performed as a second stage within a short period of removal of primary growth.

Case	Glands Involved.	Dissection.	Result.
A 961	Submaxillary L.	Block L.	Quite well 4 years 5 months.
B 809	Submaxillary both	Block L. R.	Quite well 2½ years.
C 759	Submaxillary both.	Block R.	Quite well 3 years.
		Block L.	Block L was not completed till 1 year after.
D 439	Submaxillary R.	Block R.	Recurrence R. supra clavicular,
		Block L.	and death 18 months.
D 962	Nil	Block R.	Local recurrence palate 6 months.
E 176	Nil	Block L.	Quite well 7 months.

In 3 other cases, block dissections were performed after recurrence following less radical dissections.

No.	Original dissection.	Date of Recurrence.	Result of Block dissection.
D 435	To omohyoid	2½ years.	Died after 2 months.
E 408	Nil	4½ years	Recent operation.
E 433	To omohyoid	1 year	Recent operation.

Sequence of Operations.

All the cases in this series illustrate the principle of dealing first with the condition in the mouth and then later with the glands in the neck.

In 2 cases with advanced glandular mischief, the treatment was deliberately limited to removal of the ulcerated area from the mouth with improvement in patients condition though the prognosis was recognized to be hopeless.

In 8 cases, the situation of the primary focus, demanded approach from below, and in consequence dissection of the submaxillary lymphatic area accompanied removal of the growth.

Such one stage operations possess the undeniable disadvantage of opening the neck to risk of infection from the septic oral cavity.

The mortality was high - 3 of the 8 cases - and one was definitely due to septic absorption.

The procedure in the majority of cases has therefore been:-

(1) Removal of the primary condition in the mouth with access if needed by splitting cheek or symphysis menti.

(2) Dissection of the lymphatic area after an interval of 3 weeks or longer.

Such a sequence has certain advantages:-

1. Early removal of the foul ulcerated focus with consequent improvement in general condition.

2. Subsequent neck dissection often aided by inflammatory enlargement of regional glands.

3. Risk of sepsis minimised as mouth is clean and healed before neck is touched.

4. If neck is done first the lymphatics from the tongue must go on discharging into the neck till the primary growth is at last removed. (Blair)[2].

In one case only has there been a refusal to submit to the second operation.

If the position is explained to the patient, co-operation can be practically assured.

Anaesthesia.

Intra-tracheal anaesthesia was employed in all these cases except one or two where difficulty was experienced in introduction, and tracheotomy was performed.

The low incidence of septic broncho pneumonia (3 cases out of 36 operations on tongue and mouth) is/

is due largely to this method of anaesthesia.

One of these 3 was a tracheotomy case.

Operative Mortality.

Deaths from all causes while in hospital - 8 out of 36 = 23%.

Analysis of Results in Epithelioma of Tongue and Mouth.

Total number of cases		41
Not operated upon		5
Deaths in hospital		8
	under 1 year	5
	1 - 2 years	4
	2 - 3 years	2
Living	under 1 year	5
	1 - 2 years	1
	2 - 3 "	2
	3 - 4 "	2
	4 - 5 "	3
	5 - 6 "	1

Analysis of Cases of Carcinoma of Tongue and Mouth living more than 2 years after operation.

No.	Age.	Situation.	Glands Involved	Neck Dissection.	Results and remarks.
A 226	63	Floor R. side	-	Submax. R.	Living 5 years.
A 474	60	Tongue R. side	-	-	Living $4\frac{3}{4}$ years. Definite ulcerated growth.
E 408	35	Soft palate R Tongue posterior	-	-	Recurrence left side neck $4\frac{2}{3}$ years. Operated.
A 961	49	Tongue L. side	Submax. L.	Block L.	Living $4\frac{1}{2}$ years.
B 453	58	Floor R. side	-	Submax. R.	Living $3\frac{1}{2}$ years.
C 759	46	Floor anterior	Submax. both sides	(1) Block R. (2) Submax, Carotid L. (3) Block L.	Living $3\frac{1}{4}$ years. 2 years since last operation.
B 809	62	Floor R. side	Submax. R.	(1) Block L. (2) Block R.	Living $2\frac{1}{2}$ years.
C 609	58	Tongue R. side	-	-	Living $2\frac{1}{4}$ years. Leukoplakia.

CARCINOMA OF THE OESOPHAGUS.

This section of the alimentary tract is still one of great disappointment to the surgeon.

This series comprises 16 cases, in none of which was the growth situated in the accessible cervical portion.

In no case was any attempt at extirpation attempted.

One has seen two cases of thoracic oesophagectomy performed by American surgeons with one immediate death.

The operation is one of considerable magnitude and much work has yet to be done before it is established.

As it stands at present, the condition offers little prospect of surgical cure.

Number of cases 16

Males 10

Females 6

Youngest 35, Oldest 65, Average age 55.

Situation of lesion.

Middle portion 5 (At or about the crossing) of the left bronchus.

Lower portion 9

Not located 2

Diagnosis of the condition was made by:-

History

Exclusion of Syphilis

Bismuth meal

Passage of bougies

and in 6 cases by passage of the oesophagoscope and removal of a portion of the growth for examination.

It is probably this last named method of examination which will prove of greatest value in securing cases early enough to justify heroic surgical measures.

The palliative treatment of the condition is far from satisfactory.

It consists in the main of,

(1) Gastrostomy

(2) Dilatation by tubes (Symonds) or bougies.

Whereas/

Whereas palliation, in some other forms of alimentary carcinoma, as gastro-enterostomy for irremovable cancer of the stomach or colostomy for rectal cancer, affords a considerable measure of relief, the same cannot be said of gastrostomy which is the most frequently adopted measure in oesophageal carcinoma.

Patients appear to tolerate unnatural evacuation, as in colostomy, much more readily than unnatural feeding, even when the digestion is assisted and the palate appeased by chewing the food before introduction by the tube. Recognizing the unsatisfactory position of gastrostomy in this condition, it has been the practice in all the cases of this series, to defer the operation till the latest possible date, reserving it for the time when the patient is no longer able to swallow liquids with ease.

The patients were by that time rather debilitated and in many cases showed marked cachexia.

The mortality, 4 cases or 25% is not surprising therefore, nor the fact that 4 other cases died within a month of leaving hospital.

Because of the poor prospect held out by gastrostomy, some surgeons prefer forcible dilatation of the stricture with bougies, and a very recent paper by Vinson and Moersch[21.] of the Mayo Clinic, records the adoption of this practice. The danger of rupture of the oesophagus appears to be great but the condition is a hopeless one and the maintenance of the natural channel for feeding is highly desirable.

CARCINOMA OF THE STOMACH.

This section consists of 50 cases and forms on the whole one of the most disappointing of all.

The proportion of cases of gastric carcinoma is small, - 50 cases out of 370 cancer admissions or 14%, but this is explained by the relatively large number of cases of carcinoma of the mouth and of the large intestine attracted to this particular department.

According to most authorities, carcinoma of the stomach is the most frequent manifestation of malignant disease, comprising about 30% of all cancers (Ewing).[6.]

Age and Sex Incidence.

Males 35

Females 15

Average age 56 years.

Youngest 28 years. Oldest 76 years.

Distribution of cases according to age.

Decade.	Number of Cases.	Percentage.
20 - 30	1	2
30 - 40	1	2
40 - 50	11	22
50 - 60	15	30
60 - 70	18	36
70 - 80	4	8

These figures agree in the main with those in the huge statistical tables collected by Ewing[6.] from various sources.

The chief point of interest is the rarity of the condition below the age of 40, which is the common ulcer age, and the large proportion of cases after 50 years of age.

TABLE./

Duration of Symptoms - Gastric Carcinoma.

50 cases.

Time.	Number	Percent.	
Months 2	4	8	84% within a year
3	9	18	
4	9	18	
6	5	10	
8	6	12	
10	5	10	
12	4	8	
Years 1 - 2	5	10	Definite preceding ulcer.
5	1	2	
12	1	2	
13	1	2	

In 84% of the cases, no history of symptoms of a longer duration than one year could be elicited.

These cases cannot therefore be held to support the theory of gastric carcinoma commencing as a rule in chronic ulcer. That such a transformation may and does occur cannot be disputed, but it is the proportion of cases which have their beginnings in chronic ulcer that is debated.

At/

At one end of the scale is the opinion of McCarty[15] and others at the Mayo Clinic who report 71% of gastric carcinomas associated with ulcer.

Others are more moderate in their estimate.

Mayo Robson[16] 59.1%

Finsterer[7] 25%.

The number of cases in this series that can be held to have had origin in ulcer is very small even if all cases of longer than 1 year history are included as such. One case was known definitely to possess an ulcer, as she had been explored 4 years previously.

The most striking feature of the table of duration of symptoms is that 54% of the cases had histories of 6 months or less.

As will be seen later when the operability is discussed, this short history is not accounted for by early diagnosis, the majority of cases being in fact too advanced for successful removal.

We must therefore regard carcinoma of the stomach either as a most insidious form of disease or a very rapidly developing one.

Symptomatology.

A feeling of discomfort often amounting to actual pain was the most common symptom and present in all but one of the cases.

This feeling may be merely a sense of undue fullness but is often a heavy ache.

Vomiting or at least eructations comes next in frequency.

Unfortunately these two symptoms are the most characteristic ones and sometimes the only ones.

They may appear early, but patients frequently neglect to seek advice for a considerable period, too often assuming that a degree of indigestion is a natural occurrence at their time of life.

Haemetemesis.

Haemetemesis was not observed in more than 6 of the cases.

Where the bleeding is slight in amount and there is much vomiting of fermented stomach contents it may easily pass unnoticed, but in such cases the type of vomitus itself is almost diagnostic.

No other single symptom occurred with sufficient frequency to warrant its special mention, except loss of weight which is present in gastric carcinoma perhaps more frequently than in carcinoma of other regions because of the disturbance of nutrition.

Additional aids in diagnosis.

Radiography is of the utmost value in arriving at a diagnosis.

In cases of pyloric carcinoma, the important points are retention after six hours, deformity of pyloric antrum and altered motility. In carcinoma of the lesser curvature a definite filling defect may be observed. Unfortunately however these radiographic findings are often present only when the disease is far advanced.

Examination of Stomach contents, particularly after a night's fast is frequently of great value, but here again it is the advanced case with considerable pyloric obstruction that presents the striking features described in text books of clinical methods.

Value of Free HCl estimations.

The estimation of free hydrochloric acid content in the cases of this series gave information of doubtful value.

In many of the cases the test was not performed.

Of the cases examined and later demonstrated at operation to have gastric carcinoma, 40% had free HCl in amounts varying from slight to considerably

above/

above normal.

The test is probably of most value in cases of pyloric carcinoma where obstruction and stagnation take place early and the chemical content of the stomach is most disturbed.

Most of the cases in which free HCl had been noted were found to have carcinoma of the lesser curvature or posterior wall, not involving the pylorus.

The opinions of various authors differ considerably in regard to the value of the hydrochloric acid estimation, but there is a tendency among many recent writers to discredit it.

Emerson[5] in his "Clinical Methods" asserts that there is absence of free HCl in all cases of gastric carcinoma.

Paterson[18] in "Surgery of the Stomach" states that absence is the rule. He had noted it present in two cases only, both being carcinoma of the cardiac end of the stomach.

Hartmann[10] of the Mayo Clinic, in 1922 reported a large series of estimations with the following results.

Achlorhydria/

Achlorhydria	53.7%
Hypo-acidity	15.7%
Normal	17.4%
Hyper-acidity	4.5%
No test	9.5%

One must therefore clearly recognize that the presence of free hydrochloric acid does not exclude gastric carcinoma, and valuable time should not be lost by temporizing because achlorhydria is not reported.

Reviewing the symptomatology as a whole, it is apparent that there are no characteristic outstanding symptoms that enable one to proceed to an early and accurate diagnosis.

The onset of the disease is very insidious and one is guided chiefly by

(1) Age.

(2) Onset of gastric discomfort in a previously healthy person.

(3) Vomiting or eructations.

Patients presenting such symptoms should not be kept for long on medical treatment. If improvement is not immediate under medical measures laparotomy is indicated.

It/

It may be regarded as a confession of failure to advocate laparotomy on such apparently slender evidence of disease, but the answer is found in the results of the cases brought to the surgeon to-day.

The low operability rate of these cases is one of the greatest disappointments of abdominal surgery, and failing better methods of early diagnosis, laparotomy on suspicion affords the only hope of success. Herbert Paterson[18] discusses this question and comes to the conclusion that:

> "Exploration is indicated as soon as there is a probability of gastric carcinoma, probability being established when a patient in the middle period of life suffers from gastric trouble which is progressive and unrelieved by treatment."

Moynihan[17] is of similar opinion, and while deprecating the adoption of the exploratory incision, says that "no other method than this offers the slenderest hope", adding that, "an inspection of the parts and that alone can give us the information on which a probable diagnosis can be made."

Gastric symptoms, of however mild a degree, in a previously healthy person of middle life should be regarded with gravity, and considered as potentially malignant unless there is good reason for the contrary.

Position of Growth.

The relative frequency of occurrence in different parts of the stomach was found to correspond with the figures reported in the literature.

Site.	Percentage in this series.	Paterson, Welch and others.
Pylorus	55	60
Lesser Curvature	16	12
Cardia	8	8
Whole stomach	4	4
Body	10	

Operability.

Of the 50 cases that form the subject for this study, only 9 were operable. The contrast in the operability rate of gastric carcinoma and carcinoma of the large intestine, (to be referred to later) is very marked.

Stomach	18%	operability
Large Intestine	40%	"
Rectum	45%	"

This low operability rate for gastric carcinoma would appear to be general.

C.H. Mayo[15] reports 223 operable out of 1529, a ratio of 14%.

Several factors are probably responsible for this.

The most important is the early lymphatic dissemination to the liver and central glands. In this respect the stomach is anatomically comparable to the Transverse Colon, which it appears, is the least favourable area of the large intestine as regards ultimate prognosis, though the removal of the primary growth is often so simple.

The number of cases in which glandular involvement was noted is very large.

No/

No glands noted	5
Glands involved	43
Information lacking	2

The question of operability is directly dependent on the amount of glandular and metastatic involvement, and it is therefore not surprising in face of the findings just tabled, that the operability of this series of cases was so low.

The presence of a palpable tumour in the abdomen would seem to be almost indicative of an inoperable condition.

In 25 of these cases that came to operation, a palpable tumour had been noted. Not one of these was really operable, though a resection was performed in one of them despite the presence of pelvic deposits.

Of 20 cases that did not have any palpable lump, resection was possible in 8, the involvement of glands and liver in the remaining 12 precluding radical treatment.

It is therefore of the utmost importance that cases suspected of possible gastric carcinoma should not be temporised with till a lump appears and diagnosis is more certain.

Analysis of treatment adopted in 50 cases of Gastric Carcinoma.

Not operated upon	6	Deaths	1
Laparotomy	8	"	1
Resection	9	"	5
Palliation	27	"	4
	50		11

Resections 9 cases.

Method	Cases.	Deaths in Hospital.
Billroth II	4	2
Balfour	2	1
C.H. Mayo	1	1
Total Gastrectomy	1	-
Sleeve resection	1	1
	9	5

Resections/

Resections of Stomach for Carcinoma.

N.	Sex.	Age.	Position of growth.	Glands.	Operation.	Result.
X 500	M	47	Pylorus and Lesser Curvature.	-	Billroth II	Death.
A 518	F	52	Pylorus and Pelvic Peritoneum.	+	Billroth II	Lived one year.
A 744	F	63	Lesser Curvature.	+	C.H. Mayo	Death.
C 553	M	56	Lesser Curvature.	-	Billroth II	Lived two years.
B 274	M	50	Pylorus and Greater Curvature.	-	Billroth II	Death.
C 380	M	61	Pylorus	Few.	Balfour	Perfectly well $2\frac{1}{2}$ years.
C 996	F	67	Pylorus	-	Sleeve.	Death.
D 271	M	69	Leather Bottle	-	Complete	Lived two months. Died of pneumonia.

The foregoing table gives the end results of the 9 resection cases.

It will be observed that one case only is still alive, a man of 28, operated upon 2½ years ago, incidentally the youngest patient in the whole gastric series.

He had a history of discomfort and vomiting of twelve months standing, and at operation presented a small tumour localised to the pylorus. Microscopically it was a typical adeno-carcinoma but the few glands that were enlarged were non-malignant though they showed evidences of old tuberculosis.

Palliative treatment employed. 27 cases.

This consisted of:-

Gastro-jejunostomy		
Posterior . .	15	Deaths 2
Anterior . .	3	1
Anterior retro-colic	4	-
Duodeno-jejunostomy	3	-
Gastrostomy . . .	1	-
Jejunostomy . . .	1	1
	27	4

Value./

Value of Palliative gastro-enterostomy.

There is no doubt that this procedure is exceedingly valuable and in many cases fulfils its object of rendering patients' remaining days more comfortable.

If pyloric obstruction, with its consequent distressing vomiting, is relieved by gastro-enterostomy, the patient can often get about comfortably till carried off by metastases in liver and other parts.

10 cases were followed up to ascertain the degree of relief.

The average duration of life after the operation was 7 months.

In all cases considerable relief had been gained from the operation.

Vomiting had ceased, the appetite had improved, and in 3 cases the patient had been able to resume his work for a short time.

Probably of all palliative measures in alimentary carcinoma, gastro enterostomy has the most established place.

It permits resumption of normal habits, and in cases of pyloric obstruction is often dramatic in its effect.

The type of operation must depend on circumstances, the normal posterior anastamosis being frequently impossible owing to obliteration of the lesser sac or involvement/

involvement of the posterior wall of the stomach at the proposed site of anastamosis.

In such cases anterior gastro-enterostomy, either ante-colic or retro-colic may be feasible.

Duodeno-jejunostomy is a variant of gastro-jejunostomy in cases where the third part of the duodenum is obstructed by pressure of the tumour or by glands, the pylorus being patent.
It was performed in 3 cases of carcinoma of the lesser curvature in this series.

Gastrostomy is called for in carcinoma of the cardiac end of the stomach in the same manner as in oesophageal carcinoma.

Jejunostomy may be of temporary value for administering nutriment when the whole stomach is involved in the disease.

CARCINOMA OF THE SMALL INTESTINE.

This condition is described by various writers as forming from 2 - 3% of malignant tumours of the intestine. (Ewing)[6].

One case has occurred in this series as compared with 108 of the Large Intestine and Rectum.

E 334. Female aet 38.

Patient had been operated upon one year previously for gallstones, cholecystectomy and appendectomy having been performed.

For 9 months prior to re-admission, she had suffered from pain in the umbilical region and occasional vomiting, which had become more persistent a few days before admission.

At operation there was found a "string stricture" of the jejunum 5 inches from its commencement, with dilatation of the bowel above and partial obstruction.

Resection and end to end suture was followed by uninterrupted recovery.

The microscopic examination shows the tumour to be of the scirrhus type of adeno-carcinoma causing stenosis by involvement of the muscular coats of the bowel.

There/

There are no special features which would enable a clinical diagnosis to be made, and many other causes of obstruction of the small intestine would be likely to be considered first.

CARCINOMA OF THE APPENDIX.

As this is a condition quite distinct from carcinoma of other regions, to which it bears no resemblance except histologically, it will be dealt with briefly.

3 cases occurred in a total number of 700 cases of appendicitis acute and chronic. While histological examination was not carried out on the majority of excised appendices, all had been cut into and if suspicious had been microscoped. These 3 cases therefore probably represent the total incidence of the condition, making a percentage of 0.43.

This may be compared with the statistics of the Mayo Clinic as published by Jackson,[11.] where 40 cases of carcinoma were found in 8000 appendices or 0.5%.

The chief features according to Jackson are:-

(1) Age incidence. The average age found was 30.

(2) Pre-operative diagnosis is impossible.

(3) The condition occurs chiefly in chronic appendicitis of the obliterative type.

(4) The prognosis is more favourable than for malignant disease in any other situation.

J.M. Graham[9.] states that the spheroidal celled type of growth constitutes 73.8% of cases.

The/

The 3 cases in this series do not differ in any important respect from those described in the literature, but it is interesting to note that all three were operated upon for acute appendicitis and not the chronic condition.

The ages were respectively 22, 23 and 25 years and all three were males.

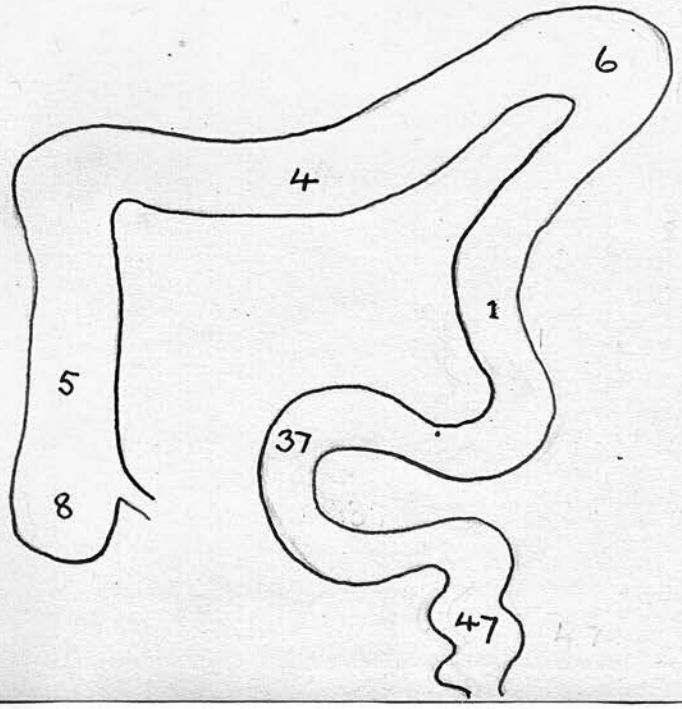
The spheroidal celled type of growth was noted in all three cases.

CARCINOMA OF LARGE INTESTINE AND RECTUM.

This is one of the most important groups of cases, and one of the most satisfactory as regards the results of treatment.

108 cases came under observation, with distribution as under, the figures being compared with those of Kaufmann (quoted by Ewing[6.]) and of Carson,[3.] which are percentages.

Situation.	Cases.	Carson %	Kauffmann %
Caecum	8	3	30
Asc. Colon	5	5	
Trans. Colon	4	4	
Splenic Flex.	6	1	
Desc. Colon	1	3	
Pelvic Colon	37	28	23
Rectum	47	56	42



The distribution is important.

Why should 70% of cases of malignant disease of the colon and rectum occur in the terminal portion?

Anatomically there is no very great difference between the proximal and distal halves of the colon, both having certain fixed and certain movable parts and constrictions at valves and flexures.

The physiological condition is however quite distinct.

Whereas the material passing through the proximal colon is fluid or semi solid at most, the content of the distal colon is more commonly solid.

The constipated habit of so many of the race must subject the lower bowel to a degree of chronic irritation and repeated trauma to which it is not intended by nature, and the irritation factor in etiology, so well marked in carcinoma about the mouth may well be considered here.

Against this however one notes that only 37 of the cases occurred in females, as compared with 71 in males.

One cannot but feel however that the retention of abnormally hardened contents, constituting, as it does, an abuse of the natural reservoir accommodation, is a factor of some importance.

Age/

Age Incidence.

Large Intestine.

Youngest 25. Oldest 76. Average age 56.

Between	20 - 30	2	
	30 - 40	5	
	40 - 50	12	
	50 - 60	15	
	60 - 70	20	= 33%
	70 - 80	7	
		62	

Rectum.

Youngest 27. Oldest 76. Average age 60.

Between	20 - 30	1	
	30 - 40	3	
	40 - 50	4	
	50 - 60	15	
	60 - 70	17	= 35%
	70 - 80	7	

The age incidence is thus only slightly higher than in carcinoma of the stomach and the number of cases occurring between 50 - 70 years of age, 65%, is practically the same in the two groups.

Carcinoma of the Rectum occurred at a slightly greater age than that of the large intestine.

LARGE INTESTINE.

Incidence of Obstruction.

Complete obstruction was observed in 19 out of the 61 cases of carcinoma of the large intestine or 31%.

9 of these cases were able later to have secondary resection of the tumour. 47%.

Site of obstruction.

Pelvic Colon	15	out	of	a	total of 37	cases
Splenic Flexure	2	"	"	"	6	"
Transverse Colon	1	"	"	"	4	"
Ascending Colon	1	"	"	"	5	"

It is not unnatural that the majority of the cases of obstruction occurred in the distal colon, where the bowel contents are solid and more readily impeded.

Two distinct factors are concerned in the production of obstruction depending on the character of the growth itself.

In the proliferative or papilliferous type of tumour, obstruction if present, is caused by the size of the tumour itself encroaching upon the lumen of the bowel to such an extent that the contents are unable to pass. Viewed from the external, surface there may be little abnormality except the hypertrophy and dilatation/

dilatation which generally occurs above a stricture.

In the scirrhus type of growth the obstruction is not due to the actual size of the tumour but to the narrowing of the lumen consequent upon the fibrosis in the muscular coats of the bowel.

This may occur quite early in the course of the disease, and it is important to recognize that the presence of obstruction does not necessarily indicate an advanced and irremovable growth.

As far as the experience of these few cases teaches, the operability in obstructed cases is as high or higher than in non-obstructed cases.

It is perhaps significant that of the 9 tumours subsequently resected, 6 were of the scirrhus string stricture type, and only 3 were the proliferative type.

It has not been possible to obtain accurate information as to the type of growth present in the unresected cases, but as inoperability was largely determined by the presence of fixation to surrounding structures it may be assumed that few of these cases were fibrous scirrhus tumours.

Treatment/

TREATMENT OF COMPLETE OBSTRUCTION OF THE LARGE INTESTINE.

The practice adopted in all these cases was to confine attention in the first place to relief of the obstruction, doing as little as possible to disturb the patient, or increase shock, and avoiding prolonged exploration.

Local anaesthesia was frequently employed.

This relief of obstruction is best effected by the performance of caecostomy which was the operation of choice and carried out in 16 cases.

In 2 cases where the primary growth was known to be in the lower part of the pelvic colon and was considered inoperable, pelvic colostomy was employed.

The remaining case was moribund on admission, and no operation was carried out.

The operative mortality was 3 cases or 15%, one of these having shown at operation perforation of stercoral ulcers of the caecum with general peritonitis, and another having been completely obstructed for 10 days when admitted.

Caecostomy has certain advantages over pelvic or transverse colostomy in relief of large intestine obstruction.

(1) It is a simple operation and can generally be performed under local anaesthesia.

(2)/

(2) One is certain of establishing drainage well above the site of obstruction.

(3) The caecum is the point on which pressure of accumulated gas tells most, as is evidenced by the incidence of stercoral perforation at that area. It should therefore be drained efficiently.

(4) The contents at the level of the caecum are fluid and drain readily.

(5) It facilitates secondary resection by being situated well away from the area of a resection incision.

The introduction of the hand for exploration of the primary tumour, though useful from point of view of information given, is a dangerous practice for two reasons:-

(1) Additional shock entailed

(2) Danger of rupture of a distended thin walled caecum.

In most of the cases in this series it was therefore the practice to defer attempts at localisation of the primary growth till the patient had completely recovered from the obstruction.

Of most value in localisation are

(1) Sigmoidoscopy

(2) Barium enema.

The value of the sigmoidoscope is limited however to the lower pelvic colon, the barium enema being the most useful means of diagnosis, the result of the injection per rectum being if necessary checked by a second injection from the caecostomy downwards.

TREATMENT AFTER RECOVERY FROM OBSTRUCTION.

Secondary operation where indicated is carried out 2 or 3 weeks after caecostomy.

In 13 cases where secondary operation was performed it consisted of:-

Resection of the Tumour	9
Short circuit	1
Transverse Colostomy	2
Pelvic Colostomy	1

If the tumour is irremovable as in 4 of these cases and a permanent palliative colostomy is necessary, it is better to perform this in either the pelvic or the transverse colon. Permanent caecostomy, is, by reason of the fluid content and lack of control, not so well tolerated as an opening in the lower part of the colon.

If the irremovable tumour is in the proximal colon, a short circuit ileo-colostomy has the great advantage of doing away with any external opening.

The/

The ultimate prognosis of resections of the colon where obstruction had been first relieved is fair, but on comparison with the results of unobstructed cases is not nearly so good.

Comparison of end results.

	Cases	Deaths		Living.
		In Hosp.	Since.	
Obstructed	9	2	4	3
Unobstructed	16	3	3	10

The difference is perhaps natural as many of the unobstructed cases were early localised tumours not completely encircling the bowel.

Two cases of resection after obstruction may be specially mentioned, one on account of age:-

A 448 Female aet 51.

2 years alternating constipation and diarrhoea.

2 days complete obstruction.

3.5.20. Caecostomy.

22.5.20. Resection of string stricture of pelvic colon with complete obliteration of lumen.

The tumour was a hard scirrhus one with little ulceration.

Microscopically. Adeno carcinoma.

Progress. Caecostomy closed spontaneously in 5 weeks.

Patient reports perfectly well 4 years and 9 months after operation.

A 281 Male aet 76.

This patient, the oldest of the series of intestinal carcinomas, was 3 days obstructed when admitted.

23.2.20. Caecostomy.

24.3.20. Resection splenic flexure ring stricture.

Lived nearly a year after operation.

Unobstructed Cases.

These numbered 42 and included the majority of the cases of carcinoma of the proximal half of the colon.

16 cases or 38% were operable, this ratio being lower than in the obstructed cases.

The reason for this, is that many cases with an ulcerating tumour pass on to the stage of advanced lymphatic dissemination without any obstruction to the passage/

passage of bowel contents.

The stenosing scirrhus stricture was rarely found in the unobstructed cases.

Comparison of Operability and Results according to site.

Region.	Cases.	Resections.	Operability.	Results.
Caecum	8	3	55%	Dead 2
Asc. Colon	5	4		Living 5
Trans. Colon	4	1	40%	All dead within
Splenic Flex.	6	3		two years.
Desc. Colon	1		40%	Dead 7
Pelvic Colon	37	14		Alive 7

A study of the cases of carcinoma of the large intestine in different situations is of interest.

CAECUM AND ASCENDING COLON.

13 cases

7 resections 54%.

1 obstruction

The low incidence of obstruction in the proximal colon has already been mentioned. Obstruction can hardly occur without a large tumour and in the one case included in this series the tumour was very extensive and had actually perforated with resultant peritonitis.

Not only is the operability of the tumours of the proximal colon higher than in the other regions, but the end results are considerably better.

The reasons for this are probably twofold.

In the first place, the anatomical arrangement permits of a very extensive removal, and the standard operation for resection of the proximal colon is a very radical one indeed, entailing the removal of relatively more tissue than in the other parts of the colon.

Secondly the pathology of the tumours of the proximal/

proximal colon differed from that in other regions in that colloid tumours formed nearly half of the number and these showed a relatively low malignancy. This will be discussed further a little later on.

The 13 cases of carcinoma of caecum or ascending colon show the following results:-

Resections 7

	Death in hospital	1
"	1 - 2 years	1
Living	under 3 years	3
"	over 3 years	2

Short circuit ileo-transverse colostomy

5 cases.

This palliative measure gave an average relief of 6 months.

In all cases considerable benefit was derived from the operation.

Caecostomy permanent for obstruction 1 case.

TRANSVERSE COLON.

4 Cases.

1 Resection.

Carcinoma of the Transverse Colon appears from the limited experience of this series to be the least favourable for successful treatment. This is very unfortunate, as apart from dealing with glandular spread, the resection is probably the easiest in the large intestine, as mobilization presents so few technical difficulties.

Unhappily however, the lymphatics have a short and easy route back to the glands about the aorta and head of the pancreas, and dissemination of the disease is early.

In 3 of these 4 cases, the liver and pancreas were so involved that radical operation was impossible and palliative short circuit only was performed.

In the remaining case, with complete obstruction, the tumour was successfully resected after caecostomy and patient was well for over a year.

He returned after 21 months, with obstruction which at operation was found to be due to a mass of glands about the head of the pancreas and pelvic deposits. There was no local recurrence whatever in the transverse colon.

SPLENIC FLEXURE.

6 cases
3 resections
3 colostomies
1 obstruction

The experience of these cases is that like the Transverse Colon, early metastasis is likely.

Actual invasion of the sheath of the pancreas was noted in 2 cases.

3 cases were operable but no case was still living after 12 months.

This may not be the general experience as Madelung, quoted by Carson[3] is of opinion, from study of 31 cases, that lymphatic involvement is not extensive.

The diagnosis of a tumour of the splenic flexure without the assistance of a barium enema, is a matter of great difficulty, and even under an anaesthetic palpation of the tumour is generally impossible.

One case was of special interest in that he came to hospital on account of a subphrenic abscess on the left side, and it was only after this had been treated that the primary cause was found to be rupture of a tumour of the splenic flexure.

PELVIC COLON.

This group comprised 37 cases or 60% of the large intestine cases.

The obstruction rate is the highest of any situation, 40%, 15 of the 19 large intestine obstructions occurring in this region.

The relative operability rate is not high - 40% - but the results of the resected cases are very favourable, probably on account of the very local involvement of lymphatic glands which persists for some time.

PERFORATION OF TUMOUR OF LARGE INTESTINE.

Perforation of the tumour with resultant peritonitis or localised abscess was noted in 4 cases as under:-

D 211	Splenic Flexure	Subphrenic abscess	Recovery
D 481	Pelvic Colon	Peritonitis	Death
D 712	Asc. Colon	Peritonitis	Recovery
D 812	Pelvic Colon	Peritonitis	Death.

Resection was impracticable in either of the recoveries.

PERFORATION OF STERCORAL ULCERS.

Perforation of stercoral ulcers was noted in two cases of obstruction, both being fatal.

In both cases the perforation occurred at the caecum, though the obstructing tumours were in pelvic colon and pelvic-rectal junction respectively.

This shows the caecum to be the area submitted to most back pressure, and is an argument for caecostomy as the most effective method of relief of large intestine obstruction.

Since this series of cases has been compiled one additional case of perforation of stercoral ulcers has/

has come under observation and is worthy of special mention.

Patient was an adult male, aged 56, and was admitted in July 1924 with acute abdominal symptoms of 24 hours standing. Peritonitis was present and was thought to be secondary to appendicitis.

When the right iliac fossa was opened, there was immediate escape of gas, fluid,and faeces, and a loop of small intestine presented showing two perforations. The loop was brought out as an enterostomy and the abdomen drained.

Patient recovered and left hospital.

He returned in March 1925 demanding closure of the faecal fistula,and was admitted for further examination.

He had gained weight since his acute illness.

Owing to prolapse of the enterostomy it could be seen that the fistula was situated just proximal to the ileo caecal junction.

A Barium enema was completely obstructed at the splenic flexure.

Laparotomy was performed on 12.3.25 and an annular stricture of the splenic flexure was resected, the tumour being an adeno-carcinoma.

It is therefore apparent that the original peritonitis was due to perforation of stercoral ulcers of the lower ileum, the ileo caecal valve having been incompetent.

OPERATIVE TREATMENT.

The treatment of cases in the stage of obstruction has already been dealt with.

The Unobstructed Case.

A. Preliminary caecostomy.

The freedom from tension on the anastomosis, consequent on the possession of a caecostomy in cases where resection had followed relief of obstruction, has been of such value (Bevan)[1], that caecostomy has been largely adopted as a preliminary or an addition to the operation of resection of the distal half of the colon. (Stiles)[20].

In resection of the proximal colon the same necessity for a safety valve does not arise and the results in this series have been uniformly good without it.

Performance of the short circuit ileo-transverse colostomy at a separate first stage is however sometimes of value in allowing the distended bowel proximal to the tumour to empty itself before the resection is carried out.

A recent paper by Scholl[19], of the Mayo Clinic, records the adoption of a temporary preliminary ileostomy in resections of the proximal colon on the same lines/

lines as caecostomy preliminary to resection of the distal colon.

There can be no doubt that the performance of caecostomy has reduced considerably the danger of resection and end to end anastomosis.

The post operative course of these patients, as demonstrated again and again, is generally of the smoothest, the freedom from post operative flatulence, the most distressing complication of abdominal surgery, being specially noticeable.

With one exception the resections in this series represent the adoption of the caecostomy principle.

In the earlier cases, the caecum was brought out at the completion of the resection and was generally not actually opened till 24 or 48 hours had elapsed, and flatulence was commencing.

The majority of the cases have however had the caecostomy performed as a deliberate preliminary some 2 or 3 weeks before the resection.

This has several decided advantages:-

(1) There is no danger of peritonitis or infection of the larger incision.

(2) The hypertrophied bowel proximal to the tumour is given an opportunity to drain itself and regain its tone.

(3)/

(3) Flushing of the colon may be carried out preliminary to the resection.

In unobstructed cases the opening need not be large, as a gas vent is all that is required. None of these cases required a secondary operation to effect closure of the caecostomy, spontaneous closure occurring between 3 and 6 weeks after operation.

In obstructed cases, where a somewhat larger caecostomy has been necessary and possibly some caecal prolapse has occurred, it may be necessary to operate for closure. This was done in two cases.

The following extract from the progress notes of a case of pelvic colon resection is typical of many.

"On the 8th day after operation patient, who had not been troubled at all with flatulence, had a normal motion per anum and thereafter convalescence was uneventful.

She was discharged on the 18th day with caecostomy closed."

B./

B. The Mickulicz three stage resection has recently received much support in the United States. (C.H. Mayo, Dowd).[4]

While it has the advantage of lessening shock it does not permit of such radical resection or such perfect re-establishment of continuity as in deliberate resection after caecostomy and mobilization.

It was adopted in one case of pelvic colon carcinoma in this series, but as the patient died of hypostatic pneumonia the value of the procedure cannot be judged.

The following is an analysis of the operative procedures adopted in the 25 resections of colon.

	No.	Deaths.
Distal Colon		
Caecostomy followed by Resection and Anastomosis	12	2
Caecostomy and Resection at one stage.	5	1
Mickulicz three stage	1	1
Proximal Colon.		
Resection one stage	6	1
Resection two stage, preliminary short circuit	1	
	25	5

The/

The operative mortality was 5 cases, as under:-

1. Gangrene of Lung.
2. Oedema of Lung.
3. Cellulitis Septicaemia.
4. Hypostatic pneumonia.
5. Necrosis of stump of Trans. colon.

The results may be tabulated as follows:-

Total resections		25	
Died in Hospital		5	
" under one year		2	
" between 1-2 years		5	12 dead
Alive less than 1 year		2	
" between 1-2 years		2	
" " 2-3 "		5	
" " 3-4 "		1	
" " 4-5 "		3	13 living

No deaths have occurred after a longer period than 2 years, and one may therefore hope that the cases surviving that length of time may be permanent cures

Prognosis/

Prognosis with glandular involvement.

In 3 cases histological examination of the excised tumour revealed definite invasion of the glands in the vicinity.

One died in 12 months.

One died in 15 months.

One is still living after 4½ years.

This last case was a colloid cancer of the caecum, and will be referred to again.

The value of Palliative measures.

In discussing this, the whole series of cases of carcinoma of the large intestine and rectum will be taken together.

The methods employed are two in number and depend on the situation of the lesion.

(1) Short circuiting anastomosis

(2) Colostomy.

Out of 108 cases of rectal and large intestine carcinoma, palliative measures were adopted in 56.

Operation.	No.	Deaths in Hospital.
Short circuit	8	0
Colostomy	48	9 of which 5 were obstructions.

Short circuiting anastomosis.

The indications for this type of operation are usually limited to tumours of the proximal half of the colon and it is contra-indicated if acute obstruction is present as it entails considerable manipulation. Provided that there is sufficient free bowel below the tumour, there is no reason why it should not be adopted in cases of irremovable tumours of the distal colon.

As inoperability in these cases is gauged largely by fixation and peritoneal deposits, it follows that in most cases sufficient access is not obtainable to perform anastomosis.

From the point of view of the patients' comfort and ease of nursing it is infinitely preferable to colostomy.

The 8 short circuits and their indications were as follows:-

Ileo-Transverse Colostomy	6
Caeco-Transverse Colostomy (Tumours of caecum and transverse colon)	1
Transverse - Pelvic Colostomy (For tumour of the pelvic colon, upper end)	1

The/

The average duration of life after this procedure was 7 months.

Considerable relief was derived in all cases and the patient's condition was made much more tolerable, pending the inevitable result.

Colostomy.

For tumours of the lower part of the pelvic colon and the rectum, pelvic inguinal colostomy is preferred and was carried out in 41 cases.

The opening low down in the intestinal canal is fairly easily looked after, as evacuation is more periodic than with a fistula higher up. The contents also tend to be more solid.

If however the obstruction is higher, say in the descending colon or splenic flexure, then the mobile portion of the transverse colon must be utilized.

This entails a colostomy situated nearer the middle line and usually rather towards the umbilicus.

6 cases were treated in this way.

In one case of obstruction of the ascending colon caecostomy was the only operation performed. Permanent caecostomy is not very comfortable but when an anastomosis is impracticable as in this obstructed case, it is the only possible method.

Only a comparatively small number of the colostomy cases/

cases have been followed up, but the average duration of life was found to be 6 months.

The longest lived case was 18 months, the patient then exhibiting signs of extreme cachexia but no obstructive symptoms.

It can therefore be asserted that colostomy, though unpleasant to the patient, affords considerable relief from tenesmus, flatulence and obstructive trouble and should render the final stages somewhat less distressing.

PATHOLOGICAL VARIETIES OF TUMOURS OF LARGE INTESTINE.

The pathological varieties commonly met with in the large intestine are chiefly forms of columnar celled carcinoma.

These may be

(1) Scirrhus tumours

(2) Encephaloid tumours

(3) Colloid tumours

(4) Carcinoma associated with polyposis.

As reliable information as to the type of growth in any individual case can only be obtained by close examination of the tumour, this study will be confined to the 25 excised growths, in all of which complete information is available.

Opinions vary greatly as to the relative frequency and also the relative malignancy of the various types.

Carson[3] says "the encephaloid is the most common and least malignant, the colloid the least common and most malignant, and the scirrhus form is intermediate in both respects."

The 25 cases in this series are classified as follows:-

	Caecum and Asc. Colon	Trans. Colon and Splen. Flex.	Pelvic Colon.	Total
Scirrhus	2	4	9	15
Encephaloid	2	-	4	6
Colloid	3	-	-	3
Polyp	-	-	1	1

Scirrhus Carcinoma.

This has been found as the commonest tumour in this series and was specially frequent in the left half of the colon. It is characterized by the stenosis which it rapidly brings about by the contractile power of its fibrous elements.
It is therefore the tumour most frequently associated with acute obstruction, no fewer than 8 of the 9 obstruction resections presenting this type of growth.

Ulceration appears to be rather superficial and often slight in degree.

Recurrence in glands and liver occurred more frequently after resection of these scirrhus growths than after the other types of tumour, contrary to the view expressed by Carson.

Of 7 remote deaths after resection, 6 have been in scirrhus cases.

Encephaloid/

Encephaloid Carcinoma.

This is characterized by a cauliflower growth and usually a considerable degree of ulceration. The tumour proliferates somewhat into the lumen of the bowel and does not tend to circumscribe it as completely as does the scirrhus form.

Such tumours are often of large size but this is no index of the malignancy.

Both the encephaloid cases which are living - over two years - had presented very large tumour growths.

Colloid Carcinoma.

It is this type of growth about which there is most dispute.

Carson[3.] believes it to be the most malignant.

Macallum[13.] states that it "spreads locally but is not strikingly capable of producing metastases in other organs."

Ewing[6.] says that "lymphatic invasion is not prominent."

Parham, quoted by MacCarty,[14.] found colloid carcinoma in 22% of carcinoma of the caecum.

He recognizes two distinct histological types.

(a) A signet ring cellular arrangement which he regards as the most malignant, and

(b)/

(b) a columnar celled glandular type which is less malignant.

He comes to the conclusion that "as compared with carcinoma of the caecum in general the colloid has greater longevity."

The number of cases in this series is too small to be of real value, but they cause one to incline to agree with those who believe that colloid carcinoma is of low malignancy.

In the first place all three resected colloid cancers of the colon are still alive and well after comparatively long periods.

1. 4½ years
2. 3 years 8 months
3. 2 years 7 months.

Furthermore, of the resection cases in which the mesenteric glands were definitely demonstrated to be invaded by malignant disease, the only one still living is a case of colloid carcinoma of the caecum.

A study of the microscopic preparations from these three cases places them in the columnar celled group of Parham, that is the group of low malignancy.

Malignant Polyp.

This condition occurred once in the series. The patient was a female, aged 39, and the specimen shows/

shows a papillomatous or polypoidal growth in the pelvic colon with a small simple polyp some distance above it. The patient is still living over 4 years since the operation.

Comparison of End results According to Pathology.

	Scirrhus.	Encephaloid.	Colloid.	Polyp.	Total.
Died in Hospital	3	2			5
" under 1 year	2				2
" between 1-2 yeare	4	1			5
Living less than 1 year	1	1			2
" between 1-2 years	2				2
" " 2-3 "	2	2	1		5
" " 3-4 "			1		1
" " 4-5 "	1		1	1	3
	15	6	3	1	25

CARCINOMA OF THE RECTUM.

47 cases comprise this series.

Sex Incidence.

Male 31. Female 16.

Age Incidence.

Youngest 27. Oldest 76. Average age 60.

Decade.	Cases.	
20 - 30	1	
30 - 40	3	
40 - 50	4	
50 - 60	15	
60 - 70	17	or 35%
70 - 80	7	

Many of the points illustrated by these cases have already been discussed in connection with tumours of the colon.

Obstruction rate. 7 cases or 13%

There are several reasons for the low obstruction rate in rectal carcinoma as compared with the pelvic colon where it was 40%.

The rectum is a firmer walled organ and has a larger normal diameter than the pelvic colon.

The/

The scirrhus stenosing carcinoma, which causes obstruction relatively early in the colon, is not so common in the rectum, where obstruction is more dependent on the size of the overgrowth of the tumour into the lumen.

For these reasons, obstruction in rectal carcinoma is rare except at the pelvi rectal junction.

Treatment of Rectal Obstruction.

The difference in the treatment of cases of obstruction of the rectum, as compared with the large intestine is, that if one is reasonably certain that the rectum is the site of the trouble, pelvic colostomy should be performed forthwith and not caecostomy.

It is true that caecostomy will probably fulfil the requirements of immediate relief of the obstruction and will secure drainage, but inguinal colostomy will be required sooner or later whether the rectum is resected or not, and might just as well be performed in the first instance.

2 of the 7 obstruction cases were able later to have excision of rectum.

Operability.

Carcinoma of the rectum should be one of the earliest diagnosed of cancers; as even an early/

early growth gives rise to some disturbance of the rectum, bleeding or discharge, and the process is often within reach of the finger or at any rate of a simple instrument for direct examination.

Unfortunately it is not diagnosed early and it must be regarded as one of the tragedies of surgery that so few of these cases come to hospital in a condition favourable for resection.

The chief reason for this, is that the patient often and persistently attributes his symptoms to "piles".

Again and again has this point been illustrated in the histories of these cases under review.

It sometimes happens that haemorrhoids are actually present, either secondarily or as an unfortunate coincidence, because the patient is led to temporize and even the medical attendant may be led astray.

The factor which is of chief importance in contra-indicating extirpation of the growth in late cases, is fixation to surrounding structures.

This is relatively more likely to occur in rectal growths than with the pelvic colon, as the former is a fixed part and is surrounded by a considerable amount of loose cellular tissue through which infiltration takes place readily.

As a result, in many relatively small rectal growths,/

growths, firm fixation to uterus, bladder, prostate or sacrum preclude any radical removal.

Various writers differ in their statistics of operability.

Lockhart Mummery[12.] gives figures as low as 17%

Carson[3.] 32%

Mayo Clinic[3.] as high as 71.8% quoted by Carson.

Gabriel[8.] (St Marks Hospital) 44%

The rate in the 47 cases reviewed is 45%
or 21 cases.

As in all other forms of malignant disease, the way towards improving the operability lies chiefly in earlier diagnosis.

In this connection, the practice in so many American Clinics of subjecting every patient, no matter what the primary complaint, to a thorough physical and sideroom examination has much to commend it.

Rectal examination is carried out on all cases and probably results in the detection of many early cases of disease.

This procedure is of course possible only in institutions with a large staff.

The fixation which contra-indicates radical removal in carcinoma of the rectum, is however not entirely/

entirely due to the extension of the malignant process.

A considerable amount of it is due to the inflammatory reaction in the surroundings of the ulcerated area.

Bearing this in mind it is possible that some cases which at first sight appear inoperable, may, if re-examined after colostomy, present a more favourable appearance.

This is suggested by the history of one patient in the series whom one had an opportunity of studying carefully during a year of residency in the Royal Infirmary.

C 699. Wm. W. aet 63.

Patient first came to the Infirmary in March 1922 with a nine months history.

A small rectal carcinoma was felt and patient was advised operation, but he refused and went home.

6 months later he returned and begged to be operated upon as his life was becoming miserable. The growth had by then enormously increased in size and was thought to be inoperable; because of its fixation.

Inguinal colostomy was performed and on account of the discharge from the ulcerated surface, irrigation of the rectum both per colostomy and per anum was carried out.

Patient/

Patient continued this regime at home for 3 months and then reported back to the Infirmary, where further examination showed considerable diminution in the size of the growth and less fixation.

Radical excision was carried out in January 1923, that is 9 months after his first refusal, and 18 months after onset of symptoms.

The specimen showed an ulcer 3" by 2" with very deep erosion.

Histologically it showed adeno carcinoma, but the glands were not invaded.

Patient is still alive and well 2 years and 2 months after operation.

One would therefore feel that cases submitted to palliative colostomy as inoperable should be kept in touch with in case the condition should at a later date become operable.

Pathological Varieties.

Of the 21 specimens resected, adeno carcinoma of the encephaloid type was present in 15 cases, and the scirrhus variety in 4.

There was 1 squamous celled epithelioma arising from the anal canal and 1 colloid carcinoma in the same situation.

Type of Operative Treatment.

Trans Coccygeal resection after colostomy	18
Abdomino perineal one stage with colostomy	1
Perineal excision without colostomy	2
	21

The two cases which did not have colostomy possessed very localised and accessible growths near the anal canal.

The value of the preliminary inguinal colostomy is undoubted.

It affords a valuable opportunity of ascertaining the presence or absence of metastases in abdominal glands and liver.

The patients general health improves, the colon empties effectively, the operation area is rested,and if required,irrigation can be carried out.

When the colostomy operation is performed as a definite preliminary stage,it is generally possible to defer the actual opening of the bowel till the peritoneum is sealed off and the risk of peritonitis is therefore negligible.

With the exception of the cases of the two very local growths before mentioned, no attempt was made to re-establish a perineal anus.

A permanent iliac colostomy is one of the penalties that the patient must pay for removal of the diseased rectum.

Enquiry as to the functioning of the colostomy has elicited the information that in practically all cases it is easily managed.

By simple regulation of diet and mode of life, natural and regular evacuation can be secured and not one of the patients who had possessed the colostomy for any length of time had any serious complaint against it.

The abdomino-perineal one stage excision, with colostomy as a part of the operation, was indicated in one case of pelvi-rectal carcinoma, but the patient died of general peritonitis in 9 days. This must always be a greater risk in the one stage resection than in the two stage operation.

Mortality.

The operative mortality in excision of the rectum was 14% or 3 cases out of 21, constituted as under:-

1. Shock on day of operation.
2. Secondary haemorrhage on 7th day.
3. General peritonitis 9th day. Abdomino perineal.

RESULTS IN EXCISION OF RECTUM.

Total number of cases	21		
Died in Hospital	3		
" under 1 year	-		
" between 1-2 years	5		
" " 3-4 years	1	Total dead	9
Living under 1 year	3		
" between 1-2 years	3		
" " 2-3 years	1		
" " 3-4 years	3		
" " 4-5 years	1	Total living	11
Not traced	1		

In conclusion I have to thank Professor Sir Harold Stiles, Professor D.P.D. Wilkie, Mr J.M. Graham and Mr J.N.J. Hartley for permission to use their cases for the purpose of this study.

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