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Carcinoma of the right colon : a follow-up study of 29 cases

Mark Frederick Blum
University of Nebraska Medical Center

CARCINOMA OF THE RIGHT COLON

A FOLLOW-UP STUDY OF 29 CASES

Mark Frederick Blum

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INTRODUCTION

About 12.76% of cancers of the colon occur proximal to the transverse colon. These are the most difficult of the colon carcinomas to diagnose and are the object of study in this paper.

My purpose is to compare the histories, operative results and follow up of 29 cases of right colon carcinoma taken from the Nebraska Methodist Hospital records. The relationship of metastasic spread and extent of local lesion to the survival are emphasized. All patients had microscopically diagnosed adenocarcinoma and were operated on between 1946 and mid 1960.

ANATOMICAL CONSIDERATIONS

The arbitrary separation of the right colon at the hepatic flexure might be disputed by some, but the peritoneal reflections, circulation, lymphatics, and physiological action of the colon proximal to this point are relatively constant. Variations of metastatic routes between patients occurs if the right colon is arbitrarily terminated by the right colic artery, mid-transverse colon, or point of change in physiology, The right colic artery is the most inconsistant of the colic arteries, the point of physiological change cannot be determined precisely and the mid-transverse colon as a division, neglects the variability of circulation and physiology (Rankin, 1939).

The validity of the hepatic flexure as the dividing point is established by; 1) constancy of lymphatic flow along ileo-

colic and right colic arteries, 2)relative constant physiological action proximal to the hepatic flexure, 3) beginning of greater omentum, and 4) relative constant vascularity.

Though the lymphatic flow is consistant it can be altered by tumor or inflammation causing a retrograde flow. Water absorption and the semifluid feces in the right colon significantly affect symptomatology in contrast to the less liquid feces in the transverse colon. The retroperitoneal position of the colon proximal to the hepatic flexure affords more complications from direct extension than in the transverse colon. Variations of the major arteries do not alter the circulation to the right colon with division at the hepatic flexure. These relationships allow a comparison of more value between patients than other arbitrary divisions of the colon.

SEX AND AGE

Sixteen of the 29 patients were male and 13 were female. All cases except one were over 40 with the peak incidence between 50 and 80. There was no variation in the three decades and the age extremes were 24 to 86.

The age and sex incidence compares favorably with the 125 males and 117 females in a series described by Colcock (1952).

Table I

Age	No.	%
20-29	1	3
30-39	0	0
40-49	2	6.5
50-59	8	28
60-69	8	28
70-79	8	28
80-89	2	6.5

Age Incidence

SYMPTOMATOLOGY

An accurate record of the symptomatology was kept in all cases but one. Of the 28 cases, 22 or 76%, complained of abdominal pain in the right lower quadrant, right upper quadrant, or mid-epigastrium. Of those, 13, or 45% entered with pain as the chief complaint and as the symptom first noticed. Pain in the right lower or right upper quadrant was well localized, but epigastric pain was vague and more diffuse. Achange in bowel habits consisting of either constipation, diarrhea, bloody or tarry stools was the second most common group of symptoms with four persons giving one of these as the chief complaint. These symptoms were present in 18 patients. The 6 patients with constipation had lesions from 2-8 cm. in diameter with no difference in structure or location from the cases with other bowel changes.

The third most common chief complaint was a 10-40 pound weight loss present in 10 cases and associated with some loss of appetite in 6 of them. The appetite loss as well as nausea and vomiting in 4 of these patients possibly accounted for part of their weight loss.

Sixteen patients had an anemia on admission and 2 entered with it as their chief complaint. This is a commonly overlooked presenting symptom usually associated with weakness and fatigue, and is often treated only as a symptom of aging. Three of these patients received vitamin B_{12} for anemia over several months prior to admission. The anemia was severe when the pain and weight loss were marked or when a mass was felt. Not enough information was obtained to determine which anemias were macrocytic or microcytic or to establish a relationship with bloody stools. Other less common chief complaints are listed in table II. The symptoms in table II, compare favorably with the complaints of 100 patients studied by Swinton and Gillespe (1946).

The duration of symptoms varied from a few weeks to 16 months. Carcinoma of the right colon was suspected in 17 out of 29 or 59% of cases. The other tentative diagnoses are shown in table III.

ANALYSIS OF SYMPTOMS

The nature of right colon lesions and the physiology of the region account for the absence of changes in bowel habits. Feces in the right colon are fluid and not prone to cause constipation,

TABLE II

Symptom	Chief complaint	Present
Pain	13	22
Wt. Loss	3	10
Anemia	2	17
N& V.	1	4
Diarrhea	1	3
Constipation	1	6
Tarry stools	1	4
Bloody stools	2	5
Fatigue	4	5
Anorexia	0	6
Weakness	2	6

SYMPTOMS AND CHIEF COMPLAINTS

TABLE III

C.A. of colon	17
Obstruction	3
G. B.	3
Irritable colon	2
Nutrition & anemia	2
Flu	3
Gastric neoplasm	1
Ulcer	1
Appendicitis	1
Splenic flexure synd.	1

Diagnosis of Cases After H. & P.

or bleeding by abrasion of the lesions as occurs in the left colon. Lesions of the right colon commonly develop as fungating, as ulcerating, or as polypoid lesions and thus do not cause obstruction like the constricting lesions of the left colon until they become very large. The lumen of the right colon is larger than the left and therefore obstruction occurs less readily. As a result of the lack of symptoms, the tumors become more voluminous than left colon cancers and probably accounts for the fact that pain is the most common chief complaint. Pain occurs in the cancers involving the surrounding structures, or when the lesions become ulcerated and infected.

The anemia associated with carcinoma of the colon is not considered to be due to chronic blood loss alone. There is evidence to show that part of the anemia is due to the production of a substance which shortens the red blood cell life span. (Wintrobe, 1956).

It was demonstrated that the 4 common early symptoms are vague and general. These symptoms are;

1. Unexplained abdominal and right sided pain.
2. Change in bowel habits- a. comstipation
   b. diarrhea
   c. increased frequency
   d. tarry or bloody stools
3. Weight loss and weakness.
4. Unexplained anemia.

PHYSICAL EXAMINATION

In 8 patients, or 28%, there was a palpable mass in the region of the tumor, 5 of which were non-tender and three which were tender. Eleven patients demonstrated tenderness in the right quadrants of the abdomen.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis should include regional enteritis, volvulus, diverticulitis, and ulcerative colitis. These can usually be ruled out by barium enema or an upper G. I. series. Hovever, one must be aware of the increased incidence of carcinoma associated with ulcerative colitis and diverticulitis, which can be quite difficult to detect by barium enema. The differentiation between carcinoma and of sarcoma, T. B., non-specific granuloma, benign tumors, and ameboma, is difficult if not impossible by x-ray examination. Since the other conditions are rare compared to carcinoma, an exploratoy operation is necessary to determine the nature of a mass in the right colon.

X-RAY EXAMINATION

The reports of barium enemas on 20 patients were present and indicated the diagnosis of carcinoma of the colon in 13, or 65%. Obstruction was diagnosed in 5 of the cases, intussuseption in one and 2 people were reported as showing no evidence of colonic disease.

The obstructions were caused by large ulcerating masses in 4 cases and polyps in the fifth, all of which were carcinoma. Three of the obstructions were in the hepatic flexure and 2 were just above the ileocecal valve. The one case which was diagnosed as intussusception, had a constricting lesion in the hepatic flexure due to the carcinoma.

Of the 6 people with obstruction or apparent intussusception, 3 died of carcinoma within the year, and one died postoperatively. This is a 50% mortality from carcinoma and an overall mortality of 66%. This is higher by 21% than the mortality for all cases.

The 2 people who had negative barium enemas were found to have lesions of 4 cm. and 6 cm. in diameter. One of the lesions was a cauliflower type in the cecum and the other an annular constriction 6 cm. below the hepatic flexure. These cases emphasized that a barium enema can be misleading and should be repeated in 6 to 8 weeks if it is negative in a suspicious case.

OPERATIVE PROCEDURES

All patients in this series had exploratory operations. Two patients had extensive disease and were treated by an ileo-transverse colostomy. The rest had right hemicolectomies.

A mass plus enlarged mesentaric nodes was noted in all cases. Six cases showed extension beyond the pericolonic fat and serosa at operation and 3 showed liver matastasis.

Ten cases, or 34%, had associated polyps, 7 of which were

adenocarcinoma. This is an incidence of 24% of cases which had proven multiple malignancies.

GROSS PATHOLOGY

The gross specimens were typical of tumors in this region consisting of ulcerating, fungating lesions. Annular constriction was present in only 5 cases. The size varied from 1.5 cm. to 14 cm. in greatest diameter with 76% between 4 and 8 cm. The lesions were located as shown in table IV with the highest percentage being in the lower third of the colon immediately above the cecum. The ascending colon was divided into 3 sections. The percentage of cases in each of the 3 sections is comparable to the percentage in the 3 divisions used by Swinton and Gillespie (1949)and Rankin and Graham (1939). There were few relationships between the location of the lesions and the nature of the symptoms. Pain, tenderness or a mass in the area of the lesion was sometimes felt. Patients complaining of epigastric pain had lesions as frequently in the cecum or proximal colon as they did in the hepatic flexure.

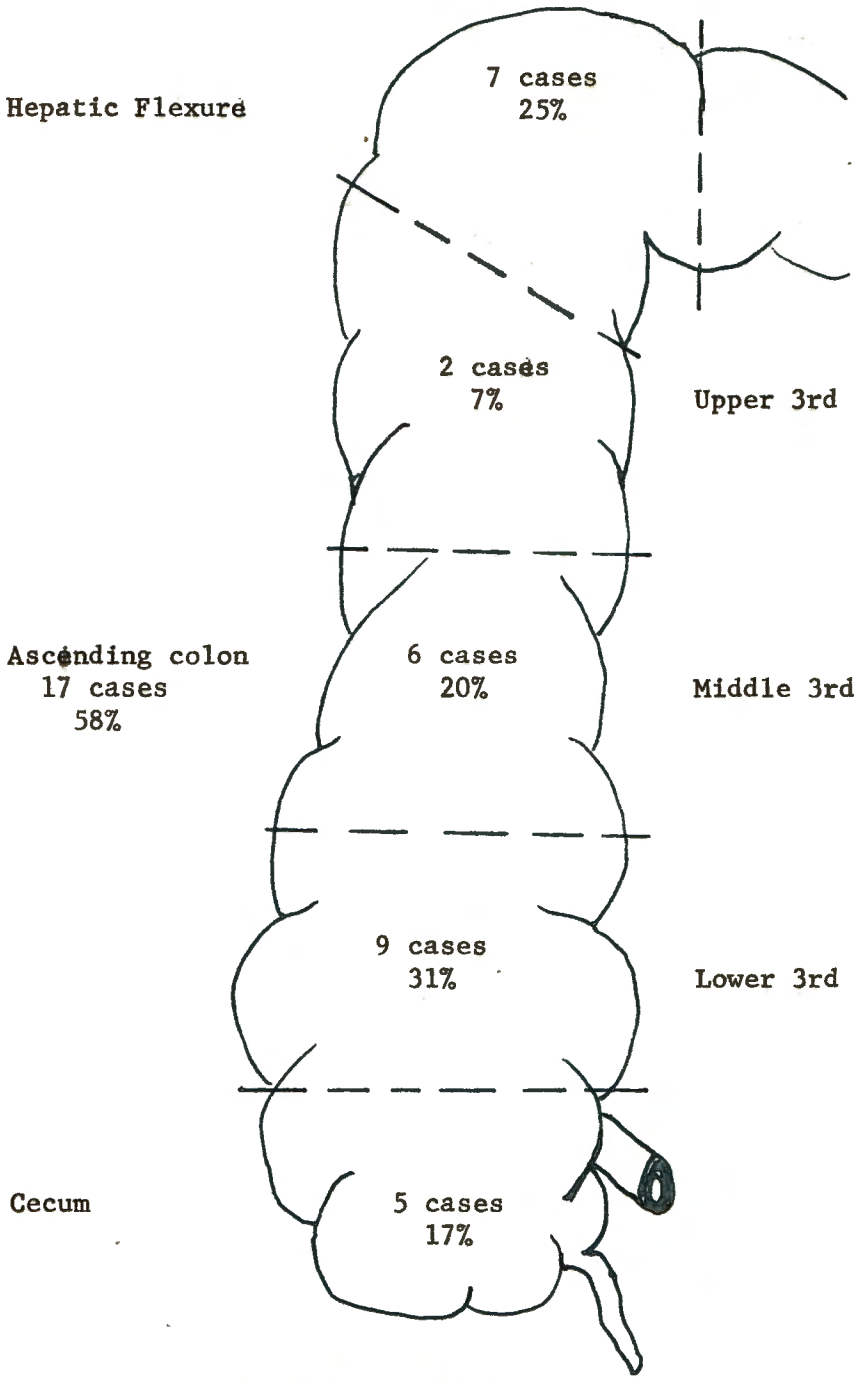
MICROSCOPIC EXAMINATION

Microscopic diagnosis of adenocarcinoma was made in all cases. No other types of malignancies were involved.

Three stages of involvement were recognized and are shown in table V. They are;

Group I. Those which showed microscopic extension into the muscular layers of the colon but did not show

TABLE IV



LOCATION OF LESIONS

extension to the serosa or into pericolonic fat and had no microscopic metastases.

Group II. Those cases which showed invasion through the muscle coat, involvement of serosa, or involvement of pericolonic fat where serosa was absent and without further evidence of gross or microscopic extension. No nodal metastases were present.

Group III Those cases with extention through the muscle coat and beyond the serosa or pericolonic fat at the time of operation as well as those cases which showed microscopic evidence of metastases to lymph nodes.

Distribution was;

I) 8 patients or 27%

II) 9 patients or 31%

III) 12 patients or 42%

All patients with nodal metastases had serosal extension. Two patients of groupII and one of group III showed liver metastasis at operation.

Four out of 6 patients with suspected nodes at operation had microscopic metastases. Four showed metastases that were not suspected.

POSTOPERATIVE ANALYSIS

Six of the 8 patients in group I are still living. One

death was considered a postoperatve death and the other occurred 3 years postoperatively following a fractured hip with no clinical evidence of carcinoma at the time of death. No autopsy was performed on this patient.

Two out of the 10 patients in group II died postoperatively, one was lost to follow up, and 6 are still living.

In group III, 1 patient died postoperatively, 7 died of carcinoma within 1 year of the operation and 3 are still living. The 3 patients who are still living had metastases to lymph nodes but no extension into other organs. The only patient who lived more than one year and still died of carcinoma was a 24 year old male who had involvement of the ileum as well as liver and nodal metastases. He died 16 monthe after operation from metastases.

Six of the 8 patients who died of carcinoma showed extension into either the liver, gallbladder, ileopsoas muscle or the abdominal aorta and inferior vena cava. The two remaining patients that died of carcinoma had evidence of metastases to nodes but no extension to other organs at the time of operation.

Out of the 29 patients in this series, 15 are still known to be living, ane is lost to follow-up and 13 are dead. Of those 13 that died, 4 died as a result of operation, 8 as a direct result of their disease, and one died following a hip fracture. All died within the first year except for the lady who fractured her hip and one other who died from metastases

16 months after operation.

Operative mortality was 14%. Total mortality was 45%. Twenty-eight per cent of the deaths were due to carcinoma. Five year survivals are; Group I) 4 out of 6 or 66%

Group II) 3 out of 5 or 60%

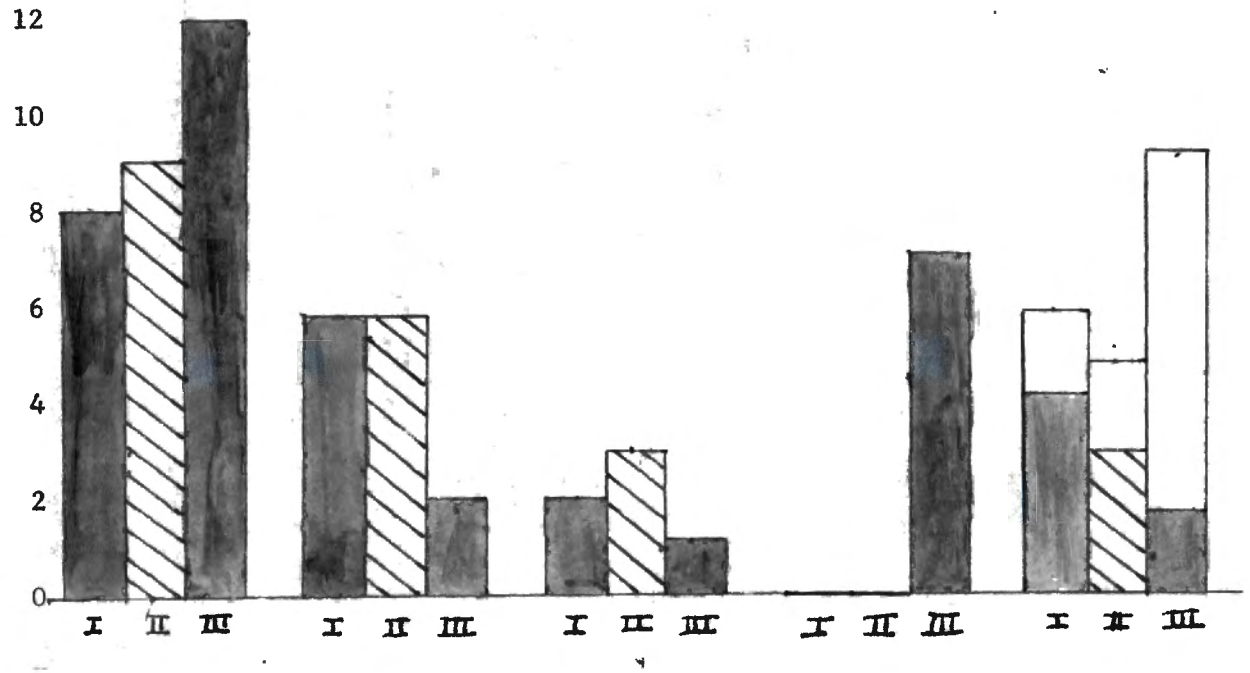
Group III) 2 out of 9 or 22%

The patient lost to follow up was considered a mortality. Total five year survival is 9 out of 20 or 45%. Ten year total survival is 4 out of 6 or 66%.

Total 15 year survival is 50%. One patient is known to be living. The other was living and well 11½ years post-operatively and has not been heard from since.

TABLE V

NUMBER OF PATIENTS	NUMBER LIVING AT PRESENT	POST OPERATIVE DEATHS	DEATHS DUE TO C. A.	%5 YR. SURVIVAL



Relationship of metastases to survival in the three groups.

DISCUSSION

There was no correlation between duration of symptoms, the size of lesions and the metastatic involvement but there was an ill defined correlation between the severity of symptoms and extent of metastases. Anemia, pain, or weight loss was marked in those patients with extensive disease.

The operative procedures were as well tolerated by the old as by the young.

It was noted that the individual who was 20 years of age had more marked extension and metastases than the older patients with the same size lesion. This is consistent with the observations of other people, that carcinoma of the colon in the younger person is a rapidly fatal disease and spreads early (Rankin, 1939). It has been stated that as individuals become older, fibrosis of the lymphatic system occurs, decreasing lymphatic flow and slowing metastases. I have found no explanation for the slow rate of direct extension in the older patient.

It has been observed that the lesions on the right side of the colon do not metastasize as rapidly as the lesions from the left colon. This is attributed to the fact that lesions of the right side are prone to grow into the lumen rather than through the bowel wall (Rankin, 1939). Lesions of 8 cm. (e.g. as in our patient who survived 15 years), still may not extend beyond the serosa. Because of the inflammation and adhesions around the

tumor, the surgeon may be led to believe that the tumor is more extensive than it really is. Even lesions of the same degree of malignancy, as classified by Broder, will show a higher five year survival from the right side as compared to the left. All of the reasons for this are not determined.

Examination of the cases in this study revealed that if a patient survived for one year following the operation, his prognosis was good.

Patients who had no involvement of the regional nodes or extension into surrounding organs, had a good prognosis. Those who had regional node metastases but no direct extension beyond the serosa or pericolonic fat, had a 50% chance of surviving 5 years. Those who had direct extension beyond the serosa with or without metastases to regional nodes had a 100% mortality at the end of 2 years.

In comparing the extent of metastases to survival, it was striking to note that in all groups, the people who died, did so within one year after the operation with two exceptions. Those exceptions were the 87 year old lady who died following a fractured hip, and the 24 year old who died of carcinoma 16 months following the operation. Deaths due to carcinoma occurred only in group III.

In groups I and II, there were no deaths due to carcinoma and the total mortality was very similar between the two groups.

In group III however, 8 out of 9 deaths were attributed to metastases of the carcinoma. The remaining death was post-operative. The 3 patients who are still living showed metastases to the regional nodes but had no gross evidence of direct extension beyond serosa at the time of operation. All patients who had extension through serosa and pericolonic fat with or without metastases in the regional nodes, died within 16 months.

Two cases showed development of tumor in the abdominal incision and were reoperated with no subsequent recurrance.

SUMMARY

Twenty-nine cases of carcinoma of the right colon were operated on from 6 months to 15 years ago. One was completely lost to follow-up, 15 or 52% are known to be living, and 13 or 45% are known to be dead. Seventeen per cent of the patients died of carcinoma. This is 35% of the deaths. The peak age incidence was between 40 and 80 years of age. Symptomatology was discussed and complete examination by barium enema of patients between 40 and 80 years old, for the following symptoms was emphasized:

1) Unexplained cramps and right sided pain.

2) Change in bowel habits.

3) Weight loss and weakness.

4) Unexplained anemia.

5) Tumor in the abdomen.

An incidence of 24% of multiple carcinomas was noted. The relation of pathology to prognosis was discussed. After the immediate postoperative period, prognosis was excellent for those who did not have metastases to nodes or extension beyond the serosa and pericolonic fat. Those who had nodal metastases but no extension beyond serosa and pericolonic fat had a 50% chance of being alive in 5 years. Those with extension through serosa and pericolonic fat all died within 16 months after operation. All

individuals except one who lived 1 year or more after the operation did not die of carcinoma.

I would like to sincerely thank Dr. J. R. Schenken for his help in the preparation of this paper.

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