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Bulletin of the
University of Minnesota Hospitals
and
Minnesota Medical Foundation



Superficial Carcinoma
of the Stomach

BULLETIN OF THE
UNIVERSITY OF MINNESOTA HOSPITALS
and
MINNESOTA MEDICAL FOUNDATION

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I. SUPERFICIAL CARCINOMA OF THE STOMACH

Robert Hebbel

Most resected gastric carcinomas are advanced lesions which extend deeply into, if not through the gastric wall and in the majority of instances there are demonstrable metastases in the regional lymph nodes. Carcinomas which are confined to the mucosa and submucosa are infrequently seen and those confined to the mucosa alone are rare. There are few references to gastric carcinomas which are confined to these limits. The tumors described as "diffuse superficial carcinoma" by Ewing¹, "superficial spreading carcinoma" by Stout², "le cancer gastrique, mucoserosif, a marche lente" by Gutmann, Bertrand and Peristiany³, "carcinoma in situ" by Mallory⁴, and the mucosal carcinomas described by Konjetzny⁵ may be included in this category.

The tumors referred to are similar in that they are confined to the superficial layers of the gastric wall but they vary within this area as to size and gross and microscopic appearance. Some cover broad expanses of the mucosa and sometimes submucosa and show more or less erosion and large areas of shallow ulceration. Others more closely resemble benign penetrating ulcer. Some present a central, shallow to deep ulcer surrounded by a zone of thin mucosa which appears roughened or eroded. Bertrand's^{3,6} erosive mucosal cancers are of this type. Still less common are small plaque-like thickenings of the mucosa such as Versé⁷ described.

Our material includes tumors which fit all of the above groups. The carcinomas which are confined to the mucosa are, however, of the more particular interest. We have encountered a small number of such tumors and this presentation deals primarily with them. Some of them afford an opportunity to observe the beginnings of gastric carcinoma. They perhaps offer some clue as to the time required for the evolution of the usual carcinomas. They include lesions which, both clinically and

pathologically, are separated from benign ulcer with the greatest difficulty. In some instances they have a bearing on the old question of carcinoma secondary to ulcer -- "ulcer-cancer". In comparison with the more usual forms of gastric cancer they are of interest as regards prognosis.

Presentation of cases

The summaries of 11 arbitrarily selected cases follow. Most of the tumors are small and without demonstrable extension below the muscularis mucosa. Several cases which show minor degrees of such extension are included to emphasize the lack of a sharp dividing line between these and the more commonly observed specimens of gastric carcinoma. Some of the findings, including available follow-up are further summarized in Table I below.

Case 1

A man, age 55, was admitted to the hospital because of an acute diarrhea. He had consulted his physician some 6 months previously because of a loss of 7 pounds in weight during the preceding year. X-ray examination of the stomach at that time is said to have shown mild retention. X-ray examination now showed considerable retention but no definite lesion was visualized. Gastroscopy showed a 5 mm. superficial ulcer on the lesser curvature of the antrum distal to the angle. Free acid after histamine totalled 22 degrees. A gastric resection was performed. On the posterior wall of the antrum, centered in a thin, depressed area 1 cm. in diameter at a point 2.5 cm. above the pylorus was a poorly outlined patch of irregularly roughened mucosa about 3 cm. in overall diameter.

Microscopic sections show varying degrees of carcinomatous change throughout the grossly abnormal zone. The depressed area has a thin, focally eroded mucosa throughout which most of the surface epithelium and that of most of the shallow, irregular gland tubes is carcinomatous. There are focal patches

of stromal infiltration by masses of carcinoma cells. In the center there is a small superficial scar which interrupts the muscularis mucosa and involves only the superficial part of the submucosa. There is no change in the muscularis and there are no vascular changes. In more distant portions of the abnormal zone of mucosa there are multiple patches of superficial carcinomatous change irregularly involving the surface epithelium and crypts.

Case 2

A man, age 45, had experienced periods of epigastric distress for many years. Fifteen years ago a duodenal ulcer had been demonstrated by x-ray. Symptoms had now been continuous for 2 years. The maximum free acid after histamine was 132 degrees. X-ray examination showed an ulcer on the anterior wall margin of the lesser curvature in the distal body of the stomach as well as a duodenal deformity. Sub-total gastric resection was performed. The resected specimen presented a sharply defined, shallow ulcer 1 cm. in diameter on the anterior wall adjacent to the lesser curvature at a point 5 cm. above the pylorus.

Microscopic sections show an active ulcer which encroaches on but does not interrupt the muscularis. The floor of the ulcer is covered by necrotic exudate beneath which, in order, are zones of fibrinoid necrosis, granulation tissue and proliferating fibrous tissue. The muscularis and muscularis mucosa are not fused and there are no vascular changes. The floor of the ulcer is free of tumor. For distances up to about 1 cm. beyond the ulcer the mucosa presents atypical glands and infiltrating masses of partly mucin-filled tumor cells. In part the surface epithelium is intact and in some areas there are clusters of uninvolved glands. The tumor has extended to the superficial submucosa in several isolated foci and there are clumps of tumor cells in several submucosal lymphatics.

Case 3

A man, age 66, had epigastric distress for 3 years. Dietary management had afforded little relief. An x-ray

examination after 2 years of symptoms showed an ulcer on the lesser curvature proximal to the angle. Free acid after histamine was 52 degrees. Subtotal gastric resection was performed. The specimen presented a sharply defined ulcer 1.5 cm. in diameter at a point 3.5 cm. above the pylorus on the lesser curvature. For a short distance beyond the ulcer the mucosa appeared thinner than elsewhere.

Microscopic sections show an active ulcer. The floor shows the usual zones. The muscularis is interrupted and there are some obliterative vascular changes. For distances up to 1 cm. in all quadrants the mucosa bordering the ulcer is involved by carcinoma. In part the whole thickness of the mucosa is occupied by nests and cords of tumor cells as well as tumor glands. In some areas tumor cells are confined to the outer segments of otherwise normal glands. The surface epithelium is partly intact and in one area layer of newly formed epithelium extends onto the floor of the ulcer.

Case 4

A man, age 60, was first seen about a month following the onset of epigastric distress after meals. Free acid totalled 58 degrees. A 0.5 cm. ulcer was demonstrated on the lesser curvature by x-ray. Ulcer management afforded relief for about a year. Subsequently there were periods of distress and two years after the initial examination he was again seen following a three-week period of constant dull pain. Gastric resection was performed. On the posterior wall adjacent to the lesser curvature and 8 cm. above the pylorus there was a thin depressed zone of mucosa about 2 cm. in diameter with a central shallow ulcer 1 cm. in diameter.

Microscopic sections show an active ulcer with the usual zones in its floor and interruption of the muscularis. The tumor is confined to the mucosa in the thin area. Here, variably replacing the usual glands are atypical, darkly staining glands and, in isolated areas, infiltrating clusters and cords of cells.

Case 5

A man, age 63, was admitted to the hospital with symptoms of prostatism. There had been vague abdominal distress for several weeks. There was no free acid after histamine. X-ray and gastroscopic examinations showed an ulcer on the lesser curvature proximal to the angle. Gastric resection was performed. There were two ulcers in the resected specimen. One (that demonstrated by x-ray) was 1 cm. in diameter, 0.8 cm. deep and was located at the angle on the lesser curvature. A second shallow ulcer in the mid-anterior wall of the antrum was 1 cm. in diameter and was surrounded by a zone of thin mucosa.

Microscopic sections show the ulcer of the lesser curvature to be benign. The second ulcer is active, interrupts the muscularis and its floor is free of tumor. The surrounding mucosa for distances up to 1 cm. shows irregularly anastomosing darkly staining tumor glands and infiltrating cords of similar cells.

Case 6

A man, age 66, had epistatic distress of 15 months duration. Maximum acidity after histamine was 62 degrees. X-ray and gastroscopic examinations showed a crater on the lesser curvature. During the subsequent 18 months under medical therapy the ulcer slowly healed. Gastroscopy showed only an eroded area and x-ray showed no ulcer. Sub-total gastric resection was then performed. At a point 5 cm. above the pylorus on the lesser curvature there was an irregular, thin, depressed patch of mucosa 2.5 x 2 cm. in the center of which was a further depressed fixed area.

Microscopic sections from the abnormal area reveal a central tiny scar where the muscularis is interrupted, several vessels show obliterative changes and there is fusion of the muscularis and muscularis mucosa on one margin. Everywhere the area shows a thin mucosa covered with an intact to focally eroded surface epithelium. Glands are absent in some areas, exist only as crypts in others and in still others there are clusters of

quite normal glands. In scattered discontinuous foci there are patches of infiltrating, darkly-staining or mucin-filled tumor cells confined entirely to the mucosa.

Case 7

A man had a gastroenterostomy at age 26 for ulcer symptoms of several years duration. There was complete relief for the next 11 years following which intermittent distress was present for another 11 years. He was then seen and followed quite regularly for the subsequent 4 years. During this period repeated gastroscopic and x-ray studies showed evidence of a stomal ulcer. The duodenal cap was deformed but no crater was visualized. No lesion was seen in the distal stomach until, at a time three months after the last previous x-ray examination, there was now x-ray evidence of a small pre-pyloric ulcer. The maximum value for free acid was 76 degrees on a fasting sample. Subtotal gastric resection was performed 1 week after demonstration of the pyloric ulcer. The resected specimen included a segment of jejunum in which, opposite the stoma, were two 3 mm. ulcers and a linear scar. The gastric mucosa was grossly intact except for a shallow, rounded, sharply demarcated ulcer 0.5 cm. in diameter on the lesser curvature immediately adjacent to the pylorus.

Microscopic sections show an active ulcer extending into the submucosa. Its floor shows the usual zones. The muscularis is not involved and there are no vascular changes. For distances up to 3 mm. the mucosa bordering the defect is everywhere infiltrated by tumor cells which are in part mucin-filled and in some areas form ill-defined glands. In part the entire thickness of the mucosa is involved; in part the tumor spreads out between existing glands. Everywhere the surface epithelium is intact and on one margin a layer of newly formed epithelium extends for a short distance onto the ulcer floor. On proximal, distal and one of the lateral margins of the ulcer there are patches of submucosal infiltration by tumor cells which, in these areas, completely lack arrangement.

Case 8

A man, age 43, who had always been subject to temporary gastro-intestinal "upsets" had, for 2½ years, experienced more constant symptoms of pain beginning 2 hours after meals. X-ray examination at the onset of this period is said to have shown an ulcer. X-ray study now showed a large ulcer at the angle on the lesser curvature. Free acid after histamine reached 70 degrees. Subtotal gastrectomy was performed. Evidence of an old duodenal ulcer was noted at operation. The specimen presented a sharply-defined ulcer 2 x 1.5 cm. on the lesser curvature 5 cm. above the pylorus.

Microscopic sections show an ulcer with the usual zones, complete interruption of the muscularis and newly formed scar tissue within which some of the vessels show obliterative changes. The ulcer floor is free of tumor. The mucosa within 1 mm. of the ulcer is, in all quadrants, infiltrated with cords and nests of tumor cells which are chiefly in the depths of the mucosa and at one point extend into the muscularis mucosa.

Case 9

A man, age 56, had had severe epigastric distress over a period of 7 months. Subsequently repeated x-ray examinations over a period of three months showed a persistent ulcer high on the lesser curvature. The maximum value for free acid was 47 degrees after histamine. Subtotal gastric resection was performed. There was a sharply demarcated ulcer 7 cm. in diameter occupying the lesser curvature and part of the posterior wall. Its lower margin reached a point 7 cm. above the pylorus. The floor was firm, thick and presented a central defect where it had been dissected away from the pancreas.

Microscopic sections show an ulcer floor with the usual exudative, "fibrinoid", granulating and fibrous zones. The muscularis is completely interrupted and there is an abundance of fresh scar tissue. Large vessels show obliterative changes. There is fusion of the muscularis with the muscularis mucosa at

several points. In all quadrants, though absent in some sections, the mucosa shows carcinomatous changes for distances up to 7 mm. In part there are infiltrating clusters of mucin-filled tumor cells as well as irregular tumor glands. In part, carcinoma cells line normally arranged glands. In one area there is a patch of submucosal extension of the tumor.

Case 10

A man, age 58, was admitted with pernicious anemia in severe relapse. Nine years previously a diagnosis of duodenal ulcer was made following an acute episode of gastric distress and hematemesis. X-ray examination showed a duodenal deformity and there was no free acid. Examination on the present admission showed no free acid after histamine. There were no gastric symptoms. X-ray examination showed a small polyp on the greater curvature of the body of the stomach. Gastroscopy showed a "dome shaped" polyp 1 cm. in diameter. Gastroscopy after one month showed no change but after 5 months there appeared to be some irregularity in the polyp. Gastric-resection was performed. On the mid-greater curvature there was a smoothly surfaced, dome-shaped 3 mm. elevation of the mucosa 1.2 cm. in diameter.

Microscopic sections through the elevated area show sharply demarcated, irregular patches in which the surface epithelium and that of the crypts is replaced by neoplastic cells from which in turn foci of infiltration into the stroma have occurred. There is no increase in the number or size of the non-neoplastic glands themselves which are here pseudopyloric in type. There is considerable edema of both the mucosa and submucosa in this area.

Case 11

A man, age 55, was without symptoms. Achlorhydria (without histamine) was noted during the course of an examination in the Cancer Detection Center. X-ray examination revealed a small polypoid mass on the lesser curvature of the

Table I
SUPERFICIAL GASTRIC CARCINOMAS

Case No.	Age & Sex	Duration of Symptoms	Free Acids	X-ray Findings	Location of Carcinoma	Gross Character of Lesion	Ext. to Submucosa	Follow-Up
1	M 55	1 yr (?)	22	Retention	Post.wall antrum	Thin to irregular area 3x3 cm with central superficial scar	0	Well after 1 yr.
2	M 45	2 yr.	132	Ulcer L.C. Duod.deformity	5 cm. above pylorus on L.C.	1 cm. shallow ulcer	/	Well for 2½ yrs. not seen thereafter
3	M 66	3 yr.	52	Ulcer L.C.	3.5 cm. above pylorus on LC	1.5 cm. ulcer with adjacent thin mucosa	0	Well after 4 yrs.
4	M 60	2 yr.	58	Small ulcer L.C.	8 cm. above pylorus on post. wall adj.L.C.	1 cm. ulcer with adj. thin mucosa	0	Well after 9 yrs.
5	M 63	?	0	Ulcer L.C.	Mid-ant.wall antrum	1 cm. ulcer with adj. thin mucosa	0	Well 4 months
6	M 66	2½ yr.	62	Ulcer L.C. observed to heal	5 cm. above pylorus on L.C.	Thin patch mucosa 2.5x2 cm. with small central scar	0	Well after 9 yrs.
7	M 52	?	76	1. Duod.deformity 2. Stomal ulcer 3. Prepyloric ulcer	Adjacent pylorus on L.C.	0.5 cm. ulcer	/	Died - Post-op. coronary thrombosis
8	M 43	2½ yr.	70	Large ulcer at angle	5 cm. above pylorus on L.C.	Ulcer 2x1.5 cm.	0	Not followed
9	M 56	7 mo.	47	Ulcer high on L.C.	7 cm. above pylorus on L.C.	7 cm. ulcer	/	Well after 2 yrs.
10	M 58	0	0	Polyp G.C. of body	Mid G.C.	Dome-shaped thickening 1.2 cm. diameter	0	Well after 2 yrs.
11	M 55	0	0	Small polypoid mass L.C. of antrum	1 cm. above pylorus on L.C.	Thick patch mucosa 9 x 6 mm.	0	Well after 1½ yrs.

antrum. Gastric resection was performed. On the lesser curvature at a point 1 cm. above the pylorus there was a raised, irregular patch of mucosa 9 x 6 mm.

In microscopic sections the thickened patch has about twice the thickness of the surrounding mucosa. The changes within the area vary. Neoplastic epithelium partly lines pre-existing glands and covers the surface in some areas.

Prognosis

Regional metastases were not found in any of the specimens described above. For the follow-up periods shown in Table I there have been no recurrences. Metastases have rarely been demonstrated in association with mucosal carcinomas. Konjetzny⁷ found a metastasis in but one of 18 superficial carcinomas and Bertrand⁸ found none in six. We have one case in which there was no more submucosal infiltration than that exhibited by similar cases included here in which the nodes were involved and there was subsequent evidence of recurrence. Stout⁹ reported that 39% of a small group of "superficial spreading carcinomas" showed metastases as contrasted with the usual 75%. Based on the then available survival rates he estimated a 5 year "cure-rate" of 50%. His cases included more extensive tumors than those considered here. In our comparable material the incidence of metastases rises sharply. For the usual forms of gastric cancer the presence or absence of metastases is the most important factor in determining prognosis.⁹ It appears that tumors confined to the mucosa are unlikely to have metastasized and should offer an excellent prognosis.

Summary of Pathologic Findings

The lesions described above have many features in common. Except for two specimens (Cases 10 and 11) all show evidence of active or healed ulceration. The ulcers or scars vary widely in size and range in depth from the superficial submucosa to complete interruption of the muscular wall. The features presented by the active ulcers are those common to benign ulcer and consist

of the usually described zones in the floor -- necrotic exudate and debris, fibrinoid necrosis, granulation tissue and scar (in that order from within outward). In several instances there are also fusion of the muscularis with the muscularis mucosa and obliterative vascular changes of variable degree. In some of the specimens there was a more or less well-defined zone of somewhat irregular outline about the actual ulcer where the mucosa, particularly after fixation, appeared thinner than that in more distant areas and perhaps slightly roughened or eroded. In other specimens such a zone was not recognized. The floors of the ulcers are free of tumor. Neoplastic elements are confined, except for minor degrees of submucosal infiltration in several specimens (Cases 2, 7 and 9), to the mucosa around the ulcers. Here, over areas corresponding to the sometimes recognized thin zones there are carcinomatous changes varying in form and degree. Similar changes are present in the non-ulcerated specimens. In some specimens there is evidence of multicentric origin within these areas which show more or less replacement by ill-defined glands composed of darkly staining epithelium as well as patches of stromal infiltration by masses of similar cells. In some foci the changes are confined to the surface epithelium and the crypts where an abrupt change from uninvolved to neoplastic epithelium may be seen. There may be patches of normal surface epithelium over tumor glands and such epithelium may be proliferating to cover erosions and ulcer. In some areas there are masses of mucin-filled tumor cells which may have overrun and obliterated the pre-existing glands or may be confined to either the superficial or deep stroma. The small ulcers are completely ringed by mucosal carcinoma. In the case of the largest ulcer (Case 9) there are discontinuous patches of mucosal tumor which, though present in all quadrants, are absent in some sections.

Comment

Though the group of tumors presented above are quite similar with respect to their superficial character it cannot be

assumed that they are all similar with respect to rate of growth and the character of the tumor which would have followed were the course not interrupted. Localization to the mucosa may in some instances be, in part, a measure of the effectiveness of advancing ulceration. Minor degrees of submucosal infiltration by the tumor were noted in 3 cases (Cases 2, 7, 9). But little more extensive ulceration would have destroyed the evidence. Perhaps other specimens may have previously exhibited similar or even more extensive submucosal infiltration. Perhaps ulceration occurred while the tumor was confined to the mucosa. Perhaps some foci of infiltration may have been missed in the sampling process. It seems possible that a tumor such as that in Case 7, in which an ulcer was present for probably not more than three months, might have in a short time deeply infiltrated the pylorus to produce the usual scirrhus cancer. On the other hand, in several of the cases in which mucosal evolution of the tumor is demonstrable there are recorded histories of relatively long duration accompanied by x-ray evidence of the presence of an ulcer in the same area for the same period.

We do not know how long the asymptomatic lesions of Cases 10 and 11 were present before detection. We do not know how long mucosal changes in the other cases preceded ulceration with consequent symptoms, if so caused. The symptomatic periods in some of these cases covered many months and with some there was x-ray evidence of ulceration for the same periods. One may have a quite natural reluctance to accept the idea that a tumor should remain localized to the mucosa for periods sometimes measured in years. Yet it is well known that some widely infiltrating gastric tumors progress slowly and some may still be confined to the stomach at autopsy. Patients in whom palliative surgery has left infiltrating tumor cells in the planes of resection may survive many months before the residual tumor has attained symptom-producing proportions.¹⁰ We have the record of one case in which there was survival for 10 years after a palliative gastroenterostomy for an

"inoperable" scirrhus carcinoma. Such examples serve to emphasize the fact that prolonged periods of growth may occur and certainly long periods of growth much precede the detection of at least some of the usually encountered carcinomas. Long histories are not unusual in other reported cases of superficial gastric carcinoma. That at least some gastric cancers may long be confined to the mucosa seems an entirely reasonable concept.

It is believed that each of these lesions is a primary carcinoma in which ulceration, when present, is a secondary phenomenon. Long-standing symptoms accompanied by x-ray evidence of ulceration might, in some instances, raise the question as to whether an ulcer preceded the carcinoma. A detailed review of the long-debated relationship between ulcer and cancer would contribute little. It may, however, be pertinent to summarize the viewpoints and to express a personal opinion. Most reviewers of the problem (Borrmann¹¹, Bueermann¹², Newcomb¹³, Ewing^{1,14} and others) admit the origin or probable origin of a small percentage of gastric carcinomas in relation to pre-existing ulcer. The anatomic evidence has been based largely on the demonstration of carcinoma confined to a segment of the periphery of an old chronic, inactive ulcer in an individual with symptoms of long duration. It has also been contended that ulceration in a carcinoma does not produce changes in the gastric wall comparable to those seen with benign ulcer. For example, in addition to complete interruption of the muscularis, Newcomb stressed fusion of the muscularis with the muscularis mucosa as a feature favoring pre-existing ulcer in cases in question. It is of course unlikely that ulceration into a gastric wall already altered by an infiltrating tumor would duplicate the appearance of a benign ulcer. However, as Ewing¹⁴ and others pointed out, superficial carcinomas are prone to ulceration. If such ulceration extends into a normal wall the same changes which characterize benign ulcer result. Mallory's⁴ cases of "carcinoma in situ" are illustrative. Further, the manner

in which eccentric ulceration may destroy the tumor except on one margin to leave a localized carcinoma was aptly illustrated by Bueermann.

In our own material I have encountered no example of a lesion where a diagnosis of "secondary" carcinoma seemed justified. My own prejudice, consequently, leans toward the view of those^{15,16} who have expressed doubt that an actual case of "secondary" carcinoma has been satisfactorily demonstrated. At the same time it must be admitted that there are no absolute morphologic criteria by which the diagnosis of "ulcer-cancer" can be either proven or disproven. Well-separated benign ulcer and carcinoma are occasionally found in the same stomach. Case 5 of the group reported here is an example. That a carcinoma might develop adjacent to a pre-existing ulcer is certainly possible. Such a topographic relationship, however, does not of necessity reflect a causal relationship.

To consider any of the tumors presented here as examples of "secondary" cancer would necessitate an assumption of simultaneous cancerization of the mucosa about the entire periphery of an ulcer. There may be no theoretic objection to the occurrence of a carcinoma in a zone of mucosa already centered by an ulcer and some authors have so interpreted certain tumors.^{3,17} It seems however, an unlikely interpretation for any of the tumors reported here. These tumors, quite independent of the associated symptoms and their duration, have a comparable appearance whether the accompanying ulcer is shallow and lacks the features which typify chronic ulcer or whether the ulcer is more characteristic. The ulcers, moreover, are active and none would be classed as very old. Destruction of the central portions of the two non-ulcerated tumors would have left marginal mucosal changes like those found in the other specimens. The findings in this group of tumors are simply and logically interpreted as the result of progressive multicentric carcinomatous alteration in zones of mucosa of variable size in which erosions and ulcers of

variable extent have formed and healed, sometimes repeatedly, or have remained active and progressed.

Summary

Eleven cases of superficial gastric carcinomas found in men from 43 to 66 years of age are presented. Symptoms had existed for periods up to three years prior to operation. In one case the symptoms were of indefinite duration, in another the symptoms were probably due to or overshadowed by a stomal ulcer and in two cases there were no symptoms. Gastric analysis yielded normal or elevated free acid in 8 cases and there was achlorhydria in 3 cases. There was x-ray or gastroscopic evidence of ulcer in 9 cases and of "polyp" in 2 cases.

The tumors in the resected specimens showed active or healed ulceration in 9 instances and none of these was grossly identified as a carcinoma. Several of them showed an irregularly bordered zone of thin mucosa surrounding the ulcer. Two of the tumors were non-ulcerated and presented as elevated thickened patches of mucosa. Microscopically, except for minor degrees of submucosal infiltration in 3 cases, the tumors are confined to the mucosa. Here, often corresponding to the grossly recognized thin zones surrounding the ulcers, there is variably extensive replacement by tumor glands and infiltrating masses of tumor cells. In several specimens there is evidence of multicentric origin within the involved areas.

Metastases were not found in any case. One patient died of coronary thrombosis in the immediate post-operative period. The survivors have been followed for periods ranging from a few months to 9 years. There has been no evidence of recurrence.

Conclusions

1. Some gastric carcinomas have their origin in multicentric foci within a zone of mucosa and may remain localized to the mucosa for long per-

iods of time.

2. Ulceration in such a tumor may produce a lesion which cannot be distinguished from benign ulcer either clinically or on gross examination.
3. It is unlikely that metastases will have occurred while the tumor is confined to the mucosa and the prognosis in such cases appears to be excellent.

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Thanks are due Dr. L. J. Hay, Chief of Surgical Service, Minneapolis Veterans Hospital, for the clinical records in Cases 1 and 10, and to Dr. Fred Lott, Pathologist at Abbott Hospital, Minneapolis, for the resected specimen in Case 11.

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II. MEDICAL SCHOOL NEWS

Coming Events

Nov. 4 - Homecoming Clinic and Luncheon
 Dec. 7-9 Continuation Course in Clinical Chemistry for Physicians

* * *

Alumni and Faculty News

Dr. Charles G. Sheppard of Hutchinson, Minnesota, is the subject of an extensive article in the November issue of the Ladies' Home Journal. Charlie's life as a general physician in a smaller town is reviewed as a part of the series, "How America Lives." A graduate of the University of Minnesota in 1936, Dr. Sheppard is active in the work of the Minnesota State Medical Association, serving as speaker for the House of Delegates. He is a frequent visitor at our Medical School campus and frequently participates in continuation Center courses for physicians. All physicians should read the article since it portrays beautifully the contribution which well-trained physicians are making to their communities.

Dr. Phillip Hench, Professor of Medicine at the Mayo Foundation and Dr. Edward C. Kendall, Professor of Physical Chemistry, Mayo Foundation, were recently named as joint winners of the 1950 Nobel prize in medicine. The award was made in recognition of the contributions which these two faculty members made in the discovery and application of cortisone and ACTH in rheumatoid arthritis and other disorders.

Physiological Chemistry Picnic

The annual picnic of the Department of Physiological Chemistry was held on October 17 at Minnehaha Park in Minneapolis. Seventy academic and civil service staff members and graduate students, together with their families, joined under the leadership of Dr. Wallace D. Armstrong, Chairman of the Department, for an afternoon of softball and volleyball on a beautiful fall day.

Welcome to Physicians

Attention of all physicians is called to the weekly Calendar of Events on the pages following the news page of the Bulletin. All physicians are cordially invited to attend any of the lectures, conferences, seminars, and rounds here scheduled. Unless otherwise indicated, meetings are held weekly. For further information concerning scheduled events or other meetings, phone or write to the Editor of the Bulletin.

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Continuation Course in Poliomyelitis

A continuation course in Poliomyelitis will be presented at the Center for Continuation Study on November 9 to 11. This course is intended for general physicians and for such specialists as pediatricians, physiatrists, orthopedic surgeons, and neurologists. It is given with the sponsorship and the financial support of the Elizabeth Kenny Institute. Dr. Harold A. Sofield of the Department of Bone and Joint Surgery, Northwestern University Medical School, will talk on "The Treatment of Residual Deformity and Genu Valgus and the Prevention of Recurrent Deformity" and "The Management of Poliomyelitis from the Viewpoint of the Orthopedist." Clinical and full-time members of the University of Minnesota Medical School make up the remainder of the faculty for the course.

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Community Chest

The College of Medical Sciences went over the top in meeting its quota as a part of the University's Community Chest drive for 1950. The administrative officers of the Medical School and the University express their thanks to all contributors and to the solicitors who worked so faithfully in this vital community project.

III.

UNIVERSITY OF MINNESOTA MEDICAL SCHOOL

CALENDAR OF EVENTS

Visitors Welcome

No. 305

November 5 - November 11, 1950

Sunday, November 5

- 9:00 - 10:00 Surgery Grand Rounds; Station 22, U. H.
 10:30 - Surgical Conference; Todd Amphitheater, U. H.

Monday, November 6

- 9:00 - 9:50 Roentgenology-Medicine Conference; L. G. Rigler, C. J. Watson and Staff; Todd Amphitheater, U. H.
 9:00 - G. I. Rounds; R. V. Ebert, J. A. Wilson, Norman Shrifter; Bldg. I, Veterans Hospital.
 9:00 - 10:00 Pediatric; Dr. Lowry; 5th Floor, Minneapolis General Hospital.
 9:00 - 10:50 Obstetrics and Gynecology Conference; J. L. McKelvey and Staff; M-109, U. H.
 10:00 - 12:00 Neurology Rounds; A. B. Baker and Staff; Station 50, U. H.
 11:00 - 11:50 Physical Medicine Seminar; Etiology: Relation of Lower Extremity Alignment to Spinal Alignment; Ralph E. Worden; E-101, U. H.
 11:00 - 11:50 Roentgenology-Medicine Conference; Veterans Hospital.
 11:00 - 12:00 Cancer Clinic; K. Stenstrom and A. Kremen; Eustis Amphitheater, U. H.
 11:30 - X-ray Conference; Conference Room; Bldg. I, Veterans Hospital.
 12:00 - 12:50 Physiology Seminar; Chemical Studies on Mouse Mammary Carcinoma; C. P. Barnum; 214 Millard Hall.
 12:15 - 1:20 Obstetrics and Gynecology Journal Club; Staff Dining Room, U. H.
 1:00 - Metabolic Disease Rounds; N. E. Jacobson and G. V. Loomis; Bldg. I, Veterans Hospital.
 1:00 - 2:00 Staff Meeting; Classroom, 4th Floor, Minneapolis General Hospital.
 1:30 - 2:30 Pediatric-Neurological Rounds; R. Jensen, A. B. Baker and Staff; U. H.
 2:00 - 3:00 Journal Club; Classroom, Station I, Minneapolis General Hospital.
 4:00 - 5:00 Pediatric Seminar; Pulmonary Hypertension in Infants and Children; F. H. Adams; 6th Floor West, U. H.
 4:00 - Public Health Seminar; 113 Medical Sciences.
 4:00 - Research Conference; Review of Chicago Meeting; Conference Room, Bldg. I, Veterans Hospital.

Monday, November 6 (Cont.)

- 4:30 - 5:30 Dermatological Seminar; M-436, U. H.
 5:00 - 5:50 Clinical Medical Pathologic Conference; Todd Amphitheater, U. H.
 5:00 - 6:00 Urology-Roentgenology Conference; C. D. Creevy, O. J. Baggenstoss,
 and Staffs; Powell Hall Amphitheater.

Tuesday, November 7

- 8:00 - 9:00 Pediatric Rounds; Dr. Adams; 4th Floor, Minneapolis General Hospital.
 8:45 - Surgery Journal Club; Conference Room; Bldg. I, Veterans Hospital.
 8:30 - Pediatrics Allergy Rounds; Dr. Nelson; 4th Floor, Minneapolis General
 Hospital.
 8:30 - 10:20 Surgery Conference; Seminar Conference Room, Bldg. I, Veterans Hosp,
 9:00 - 9:50 Roentgenology Pediatric Conference; L. G. Rigler, I. McQuarrie and
 Staffs; Eustis Amphitheater, U. H.
 9:00 - Infectious Disease Rounds; W. Hall, Veterans Hospital.
 9:00 - 10:00 Pediatric Rounds; F. H. Top; 7th Floor, Minneapolis General Hospital.
 9:00 - 12:00 Cardiovascular Rounds; Station 30, U. H.
 9:30 - Surgery-Pathology Conference; Conference Room, Bldg. I, Veterans
 Hospital.
 10:30 - 11:50 Surgical Pathological Conference; Lyle Hay and E. T. Bell; Veterans
 Hospital.
 10:30 - Surgery Tumor Conference; Conference Room, Bldg. I, Veterans Hospital.
 12:30 - 1:20 Pathology Conference; Autopsies; J. R. Dawson and Staff; 102 I. A.
 1:00 - Chest Surgery Conference; J. Kinsella and Wm. Tucker; Conference Room,
 Bldg. I, Veterans Hospital.
 1:00 - 2:30 X-ray Surgery Conference; Auditorium, Ancker Hospital.
 1:30 - Liver Rounds; Samuel Nesbitt; Veterans Hospital.
 2:00 - 2:50 Dermatology and Syphilology Conference; H. E. Michelson and Staff;
 Bldg. III, Veterans Hospital.
 3:15 - 4:20 Gynecology Chart Conference; J. L. McKelvey and Staff; Station 54, U.H
 3:30 - 4:20 Clinical Pathological Conference; Conference Room; Bldg. I, Veterans
 Hospital.
 4:00 - 5:00 Physiology-Surgery Conference; Neurophysiology of Cardiospasm;
 Brannon Hubbard and Fred Cross, Todd Amphitheater, U. H.

Tuesday, November 7 (Cont.)

- 4:00 - 5:00 Pediatric Rounds on Wards; I. McQuarrie and Staff; U. H.
- 5:00 - 6:00 X-ray Conference; Presentation of Cases by Veterans Hospital Staff; D. L. Fink, B. J. O'Loughlin, et al; Eustis Amphitheater, U. H.

Wednesday, November 8

- 8:00 - 8:50 Surgery Journal Club; O. H. Wangensteen and Staff; M-109, U. H.
- 8:00 - 9:00 Roentgenology-Surgical-Pathological Conference; Allen Judd and L. G. Rigler; Todd Amphitheater, U. H.
- 8:30 - 9:30 Clinico-Pathological Conference; Auditorium, Ancker Hospital.
- 8:30 - 10:00 Orthopedic-Roentgenologic Conference; Edward T. Evans and Bernard O'Loughlin; Conference Room, Bldg. I, Veterans Hospital.
- 8:30 - 12:00 Neurology Rehabilitation and Case Conference; A. B. Baker; Veterans Hospital.
- 9:00 - 10:00 Pediatric Rounds; Dr. Lowry; 5th Floor, Minneapolis General Hospital.
- 11:00 - 12:00 Pathology-Medicine-Surgery Conference; Medicine Case; O. H. Wangensteen, C. J. Watson and Staffs; Todd Amphitheater, U. H.
- 11:50 - 12:50 Radio-Isotope Seminar; Measurement of Blood Volume with Iodinated Albumen; S. N. Chou; 113 Medical Sciences.
- 12:15 - Staff Meeting; Classroom, 4th Floor, Minneapolis General Hospital.
- 2:00 - 4:00 Infectious Disease Rounds; 8th Floor, Minneapolis General Hospital.
- 3:00 - 4:00 Pediatric Rounds; E. J. Huenekens; 4th Floor, Minneapolis General Hospital.
- 3:30 - 4:30 Journal Club; Surgery Office, Ancker Hospital.
- 4:00 - 5:00 Infectious Disease Rounds; Wesley Spink; Main Conference Room, Bldg. I, Veterans Hospital.
- 5:00 - 5:50 Urology-Pathological Conference; C. D. Creevy and Staff; Powell Hall Amphitheater.
- 5:00 - 7:00 Dermatology Clinical Seminar; Dining Room, U. H.
- 7:00 p.m. Lectures in Basic Science of Orthopedics; Conference Room, Bldg. I, Veterans Hospital.
- 8:00 p.m. Dermatological Pathology Conference; Todd Amphitheater, U. H.

Thursday, November 9

- 8:00 - Pediatric Rounds; Forrest Adams; 4th Floor, Minneapolis General Hospital.
- 8:00 - Surgery Ward Rounds; Lyle Hay and Staff; Veterans Hospital.

Thursday, November 9 (Cont.)

- 9:00 - 9:50 Medicine Case Presentation; C. J. Watson and Staff; M-109, U. H.
- 9:00 - 10:00 Pediatric Rounds; F. H. Top; 7th Floor, Minneapolis General Hospital.
- 9:15 - Surgery Grand Rounds; Conference Room; Bldg. I, Veterans Hospital.
- 10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.
- 10:00 - Pediatrics Rounds; Adult Contagion; Minneapolis General Hospital.
- 11:00 - Surgery Roentgen Conference; Conference Room, Bldg. I, Veterans Hospital.
- 11:00 - 12:00 Cancer Clinic; K. Stenstrom and A. Kremen; Todd Amphitheater, U. H.
- 11:00 - 12:00 Clinical Pathology Conference; Large Classroom, Minneapolis General Hospital.
- 11:30 - Pediatric Conference; Main Classroom, General Hospital.
- 12:00 - 1:00 Physiological Chemistry Seminar; Relation of Cholesterol in Diet and in Blood; Donald Ramras; 214 Millard Hall.
- 1:00 - Chest Rounds; William Stead; Veterans Hospital.
- 1:00 - 2:00 EKG and X-ray Conference; Classroom, 4th Floor, Minneapolis General Hospital.
- 2:00 - EKG and X-ray Conference; Classroom, Sta. I, Minneapolis General Hospital.
- 4:00 - 5:00 Physiology Seminar on Circulation; Utilization; 116 Millard Hall.
- 4:30 - 5:20 Ophthalmology Ward Rounds; Erling W. Hansen and Staff; E-534, U. H.
- 5:00 - Bacteriology Seminar; Problems Concerning the Study of Pantothenic Acid Metabolism; 214 Millard Hall.
- 5:00 - 6:00 X-ray Seminar; Report of Army Medical Mission to Japan; L. G. Rigler; Eustis Amphitheater, U. H.
- 7:30 - 9:30 Pediatrics Cardiology Conference and Journal Club; Review of current literature 1st hour and review of patients 2nd hour; 206 Temporary West Hospital.

Friday, November 3

- 8:30 - 10:00 Neurology Grand Rounds; A. B. Baker and Staff; Station 50, U. H.
- 9:00 - 10:00 Pediatric Rounds; Dr. Lowry; 5th Floor, Minneapolis General Hospital.
- 9:00 - 9:50 Medicine Grand Rounds; C. J. Watson and Staff; Todd Amphitheater, U.H.
- 9:30 - Surgery-Pediatric Conference; O. S. Wyatt and T. C. Chisholm; 4th Floor, Minneapolis General Hospital.

Friday, November 3 (Cont.)

- 10:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.
- 10:30 - 11:20 Medicine Grand Rounds; Conference Room, Bldg. I, Veterans Hospital.
- 10:30 - 11:50 Otolaryngology Case Studies; L. R. Boies and Staff; Out-Patient Department, U. H.
- 11:45 - 12:50 University of Minnesota Hospitals Staff Meeting; The Treatment of Parkinsonism; Sidney K. Shapiro; Powell Hall Amphitheater.
- 1:00 - 2:50 Neurosurgery-Roentgenology Conference; W. T. Peyton, Harold O. Peterson and Staff; Todd Amphitheater, U. H.
- 1:00 - Microscopic-Pathology Conference; E. T. Bell; Conference Room, Bldg. I, Veterans Hospital.
- 1:00 - 3:00 Pathology-Surgery Conference; Auditorium, Ancker Hospital.
- 1:30 - Chest Conference; Wm. Tucker and J. A. Myers; Ward 62, Day Room, Veterans Hospital.
- 2:00 - 3:00 Dermatology and Syphilology Conference; Presentation of selected cases of the week; H. E. Michelson and Staff; W-312, U. H.
- 2:00 - 4:00 Physiology Conference; Cardiovascular Demonstration Course; Rodney Harvey, 214 M. H.
- 3:00 - Renal Pathology; E. T. Bell; Conference Room, Bldg. I, Veterans Hospital.
- 3:00 - Orthopedic Journal Club; Conference Room, Bldg. I, Veterans Hospital.
- 3:00 - 4:00 Neuropathology Conference; F. Tichy; Todd Amphitheater, U. H.
- 4:00 - 5:00 Clinical Pathological Conference; A. B. Baker; Todd Amphitheater, U.H.
- 4:15 - 5:15 Electrocardiographic Conference; 106 Temp. Bldg., Hospital Court, U.H.
- 5:00 - 6:00 Urology Seminar; Urethroplasty; Ronald Kiumbach; Powell Hall Amphitheater.

Saturday, November 11 -- HOLIDAY