PRIMARY CARCINOMA OF THE DUODENUM

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PRIMARY CARCINOMA OF THE DUODENUM is a very rare condition, having a reported incidence of from .03 to .003 per cent of all autopsies, or, in other words, from one case in 3,000 to one in 31,000 autopsies.[16, 21, 27, 31] While an extensive literature has accumulated on this subject, critical analysis of the cases reported demands that many, especially among the earlier papers, must be discarded for the lack of pathologic proof of the diagnosis. We wish to present a proven case of primary carcinoma of the third (infrapapillary) portion of the duodenum, and to briefly review the literature in order to emphasize the more important clinical facts and to bring up to date the statistics relative to the incidence and the results of surgical therapy.

Case Report.—Hosp. No. 243817: H. B., white, male, age 53, was admitted to the Jewish Hospital, August 14, 1941, with pain in the entire right side of the abdomen for 3 mos., radiating to the back, occasionally relieved by food; constipation 6 mos.; weakness and anorexia, 3 mos.; loss of 20 lbs. in 3 mos. The pertinent physical findings were pallor, evidence of recent weight-loss, tenderness in the right loin, right lower quadrant, and right costovertebral angle. All laboratory data were normal except for a R.B.C. count of 3,860,000, Hb. of 56 per cent, and occult blood in the stool. Roentgenograms of heart, lungs, and kidneys were normal; a shadow on a plain film of the abdomen was suspicious of gallstones. G.I. series revealed an irregular duodenal cap on most films, judged to be spastic. Barium enema showed some irregularity of the cecum. Gastroscopy, 8/24/41, was negative. *Preoperative Diagnosis:* Malignancy of the cecum and cholelithiasis.

Celiotomy, September 5, 1941, revealed a generalized abdominal carcinomatosis, but no intrinsic lesion was observed in any organ. Infiltrated para-aortic nodes were palpated all the way up to the root of the mesentery. The gallbladder contained calculi. An omental nodule, removed for biopsy, was reported as metastatic adenocarcinoma, origin unknown. The subsequent course was uneventful until September 18, 1941, the 12th postoperative day, when, while out of bed, the patient complained of sudden severe generalized distress, and died within five minutes. The clinical impression of the cause of death was coronary occlusion.

Necropsy.—No. 41-168. Dr. I. Roy Gold: The principal findings were generalized arteriosclerosis, with a fresh coronary thrombosis; carcinoma of the infrapapillary portion of the duodenum, with metastases to the lymph nodes, pancreas, liver, mesentery and peritoneum; cholelithiasis; urolithiasis (bladder); and a small leiomyoma of the stomach wall. The duodenal neoplasm (Figs. 1 and 2) almost completely encircled the bowel, beginning 1.5 cm. beyond the opening of the common bile duct (which in this case was separate from and 2 cm. distal to the opening of the duct of Wirsung), and extended caudad for 6 cm. The mucosa in the base of the lesion was excavated in a Y-shaped area but was intact over its raised, firm, pearly-white edges. Both ducts and the papilla were entirely uninvolved; and the head of the pancreas was secondarily invaded. Posteriorly, the lesion was continuous with a large mass of similar tumor tissue which replaced the para-aortic lymph nodes. The microscopic appearance was typical of cylindrical cell carcinoma of intestinal origin (Fig. 3).

COMMENT.—While the diagnosis of gastro-intestinal malignancy was made in this case before operation, its duodenal origin was not determined either clinically or roentgenographically, or even at exploration. Similar errors are common among reported cases, for several reasons. The symptoms are often vague or obscure, and, as in this case, fail to point to any specific level. When signs of intestinal obstruction are present, the condition is usually mistaken for ulcer or gastric neoplasm, while jaundiced cases are commonly

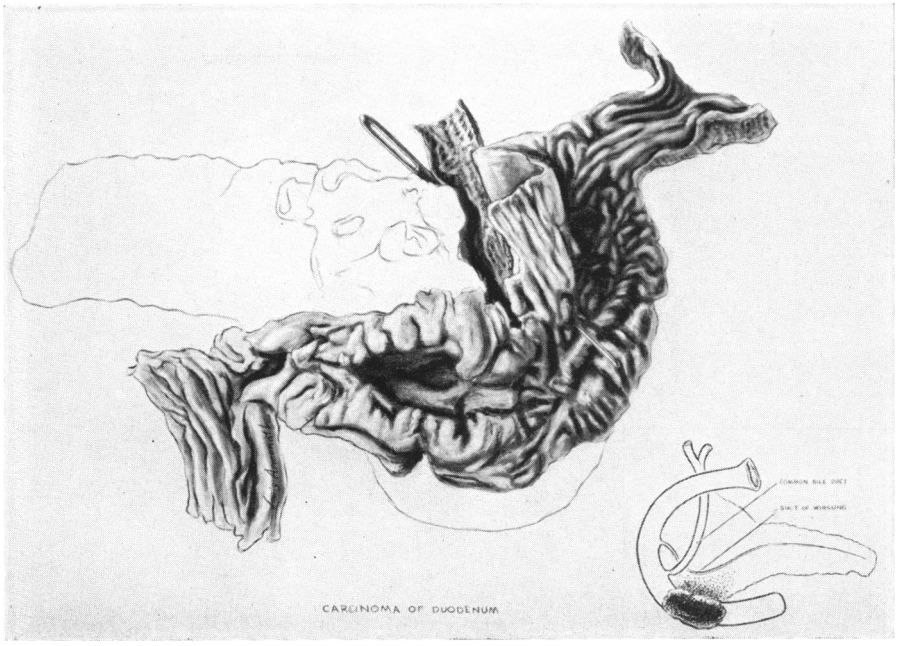

FIG. 1.—Drawing of the gross specimen as opened from behind. Probe is in the opening of the duct of Wirsung, which did not join the papilla of Vater in this case. The common duct and papilla have been opened, the latter appears midway between the duct of Wirsung and the upper margin of the tumor. Inset shows the lesion and ducts in their anatomic positions.

mistaken for carcinoma of the head of the pancreas or for intrinsic common duct obstruction. The location of the primary site at operation may be difficult in the distal retroperitoneal duodenum, as in the present case, where the cancer, though large, was obscured by the massive retroperitoneal lymph node involvement around it as well as by the root of the mesentery.

However, the chief reason for error is the fact that duodenal carcinoma, because of its rarity, is usually not consciously considered. In this case the lesion was plainly to be seen on the roentgenograms, when they were reviewed, to be in the distal duodenum (Fig. 4). The roentgenographic appearance of the condition has been well described by Hoffman and Pack,[21] Howes,[23] Doub and Jones,[14] and Weintraub and Tuggle.[47]

Primary duodenal carcinoma is anatomically subdivided into supra-papillary, peripapillary and infrapapillary tumors on embryologic, patho-

logic, as well as upon clinical grounds. The suprapapillary portion is above the common duct opening into the duodenum; it is derived from the foregut. The infrapapillary portion arises from the midgut (yolk sac) while the region of the papilla is in the zone between the two. In the latter area, carcinoma may arise from one of several of the epithelia in the region (duodenum, ampulla of Vater, terminal bile duct, or terminal pancreatic duct), while in the other areas, the duodenal mucosa is the sole offending epithelium.

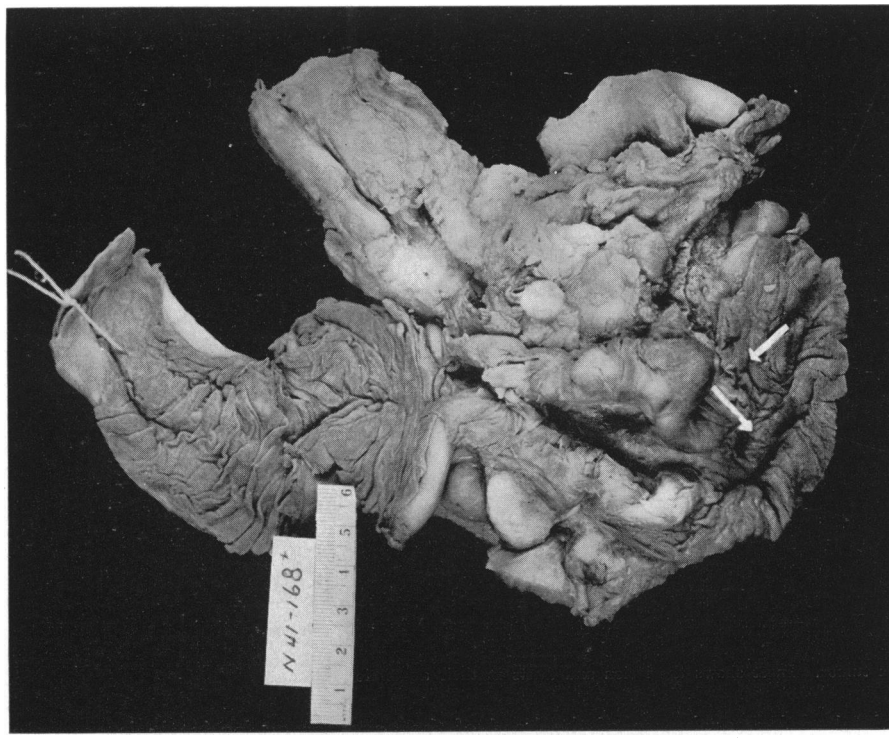

FIG. 2.—Photograph of gross specimen as opened from behind. Upper arrow points to opening of duct of Wirsung; lower arrow to papilla of common duct. The lesion is surrounded by enlarged, invaded retroperitoneal lymph nodes, and above, by the pancreas, also secondarily invaded.

Symptomatology and surgical therapy also vary with the different locations.

The literature of all three groups was very carefully analyzed in a series of three articles by Stewart and Lieber,[45] and Lieber, Stewart and Lund,[30, 31] up to 1937, for supra- and infrapapillary growths, and, up to 1939, for peripapillary tumors. These three papers reviewed a total of 565 previously reported cases, of which only 298 were acceptable as authentically proven, to which the authors added 25 of their own, making a total of 323 acceptable cases. We have found 80 additional cases in the literature to date, of which 62 were acceptable. This number, plus the present case, added to the above figure aggregates 386 known proven cases to date.

Of these, 77, or 19.9 per cent, were suprapapillary; 250, or 65 per cent, were peripapillary; and 58, or 15 per cent were infrapapillary. The distribution of the three types, as reported by other authors from smaller series, varied somewhat, but not radically from our figures.[14, 21, 48]

While the over-all incidence of primary duodenal carcinoma, as mentioned above, is from .03 to .003 per cent, Hoffman and Pack[21] estimated that it comprises 0.3 per cent of all intestinal carcinomata. They also report that in a series of 228 reported cases of small intestinal carcinoma, 45.6 per cent occurred in the duodenum. Most cases occur in the sixth decade of

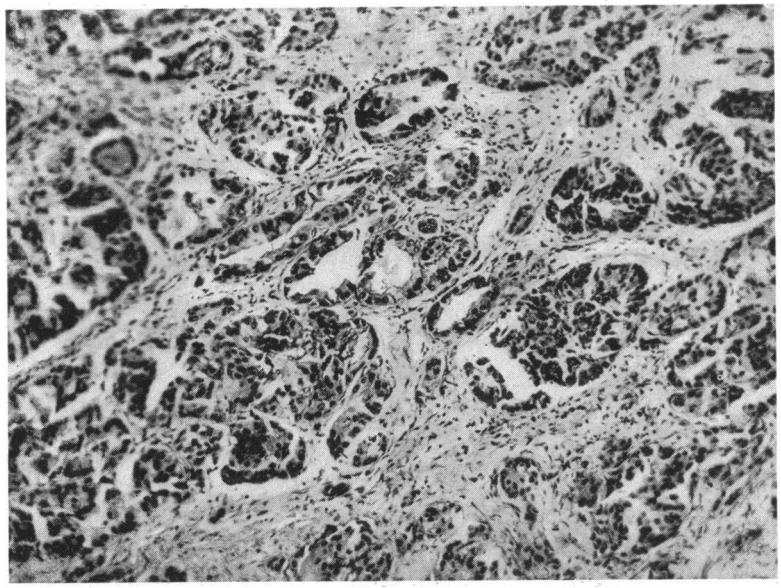

FIG. 3.—Photomicrograph of the general histologic picture. The cells are irregular in size and shape and are arranged in acinar fashion; they invade the muscles and lymphatics of the duodenal wall. (× 200)

life. In the larger series reported, males predominated over females, in ratios varying from 2:1 to 4:1.[21, 30, 31, 45]

In the review below, certain clinical highlights of the disease are stressed, especially the more recent contributions. For detailed analyses of all phases of the subject, the reader is referred to the excellent articles of Stewart and Lieber,[45] Lieber, Stewart and Lund,[30, 31] Hoffman and Pack,[21] and Cooper.[12]

CARCINOMA OF THE SUPRAPAPILLARY PORTION

Stewart and Lieber[45] analyzed 104 reported cases, accepted 57 as authentic, and added six of their own, making a total of 63 proven cases up to 1937. We have analyzed 15 additional cases, 14 of which are acceptable, bringing the present total of proven cases up to 77. The new cases are: Three reported by Hoffman and Pack;[21] two by Cace;[9] and one each by Jerrel,[25] Woods,[48] Allen,[1] Hart Hansen,[20] Nicolini,[39] Bolo, Jakob and

Busch,[3] Wiig,[51] Masciottra,[35] and Bonarino-Udaondo.[4] Another case of Hart Hansen's,[20] was discarded for lack of pathologic proof.

The chief symptomatology of all malignant tumors of the duodenum is that of duodenal obstruction, which varies more with the degree of obstruction than with the location of the growth in the duodenum (Eger[16]), except that periampullary carcinoma produces jaundice much earlier than those of

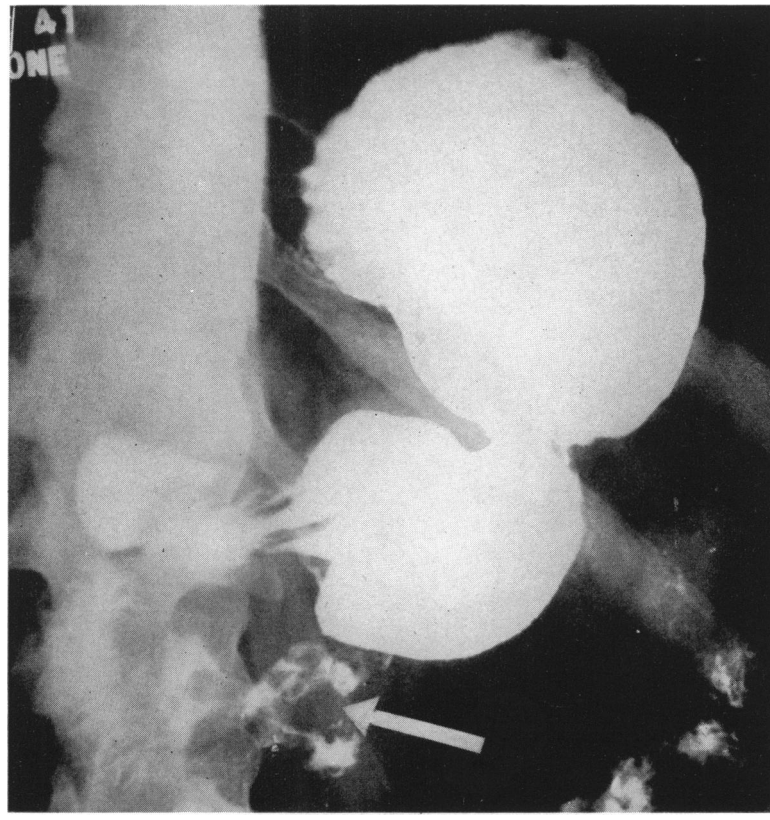

FIG. 4.—Roentgenogram of the stomach and duodenum. Arrow points to the Y-shaped irregularity in distal duodenum, which corresponds to the crater of the actual lesion.

the other two segments. In the suprapapillary group, the onset was acute in about half the cases; the chief symptoms in order of frequency being vomiting, epigastric pain, weakness, weight-loss, jaundice and dyspepsia. Those with gradual onset complained of pain, dyspepsia, weight-loss, vomiting and jaundice in that order. About one-fourth of the cases had a palpable mass in the region of the tumor. The usual roentgenographic picture was that of an ulcerating or obstructing lesion in the duodenum, though in some cases it was negative. The correct preoperative diagnosis was made only twice, and then from the roentgenograms. Roentgenologic studies are chiefly valuable in ruling out lesions of stomach, colon and gallbladder.

The usual pathologic picture is that of cylindrical cell carcinoma, though rare cases of squamous metaplasia have been reported,[32] and a few of malignant adenoma.[21] Hoffman and Pack[21] found that suprapapillary growths were most often of a hard, fibrous or colloid type, rather than scirrhous or polypoid. All three types usually obstruct the lumen and eventually neighboring structures. There is no conclusive evidence that suprapapillary cancer develops on the basis of simple ulcer. The incidence of metastasis is low, due probably to the rapid development of the disease and the early interference with vital functions. Hoffman and Pack[21] report metastasis in 33 per cent of 18 cases, and quote Outerbridge's figure of 20 per cent in 125 cases, though Stewart and Lieber[45] found metastases in 75 per cent of their suprapapillary cases.

Results of treatment are very discouraging. Of course, there is no medical treatment for any duodenal carcinoma beyond palliation and supportive measures. Of 27 cases treated surgically to date, 20 had palliative or purely explorative procedures, with an operative mortality of 13 (65 per cent), while two were reported merely as operative recoveries, four died within the first year, and one at 3½ years after operation. In seven cases in which resections were attempted, three failed to survive operation (42.8 per cent), two are reported merely as operative survivals, one was alive for 3 months and another (Wiig's[51] case) for 7½ months after operation. The operation of choice is resection of the whole duodenal segment, with gastro-enterostomy if the bile and pancreatic ducts are not compromised. If they are, the procedure recommended below for peripapillary tumors is indicated. Palliative procedures are dictated by the pathology; gastro-enterostomy, with or without pyloric exclusion, for relief of alimentary obstruction; cholecystostomy or some type of gallbladder anastamosis for obstructive jaundice.

CARCINOMA OF THE PERIPAPILLARY PORTION

Of all duodenal carcinomata, this group is the most common (65 per cent) and, therefore, the most important. It is impossible to be certain of statistical data in this group because of many contradictions and the confusion of diagnosis in the literature. We have attempted to trace some of these discrepancies to their source and humbly offer the following conclusions, none too sure of their accuracy, since some original sources were not available. Though they themselves were found guilty of several misquotations, the study made by Lieber, Stewart and Lund,[31] in 1939, was found to be the most critical, and we accept their figures as the most accurate available, with some corrections offered.

These authors carefully analyzed 399 cases reported up to 1939, but discarded 194, almost half, for lack of pathologic proof or insufficient data. To 205 acceptable cases, they added 17 new ones, making a series of 222 proven cases to 1939. We have analyzed 45 additional cases to date, of which 29 are acceptable as proven, bringing the current total up to 251.

The new cases are: Fourteen reported by Cooper;[12] six by Hart Hansen;[20] three by Allen,[1] and one each by Cace,[9] Duckworth,[15] Gasbarrini,[18] Hoshino and Abe,[22] Orr,[42] and Cabot,[7] Case No. 24162. Five cases reported from the roentgenographic standpoint only (four by Weintraub and Tuggle,[47] and one by Doub and Jones[14]), were excluded because of insufficient data. Eleven cases, reported surgically, by Whipple,[49] in his excellent article on the surgery of this condition and of carcinoma of the head of the pancreas, have also been excluded from our statistics since no differentiation was made between the duodenal or pancreatic origin of the tumors.

The relatively early development of obstructive jaundice (acute in 80 per cent) is the cardinal symptom of peripapillary carcinoma and was present in 99 per cent of the recorded cases. The jaundice was accompanied by fever in 33 per cent of the cases. The principal accompanying symptoms were pain (60 per cent), loss of weight and strength, anorexia, vomiting, constipation and diarrhea, in that order. Very few patients presented any palpable mass, while 78 per cent had enlarged livers and half the cases had palpable gallbladders. The correct preoperative diagnosis was made in 20 per cent of the cases, and was suspected, roentgenographically, in about 25 per cent. Weintraub and Tuggle[47] reported a case in which the roentgenologic diagnosis was made by the discovery of air in the biliary tree, due to duodenobiliary fistula.

The close proximity in this region of several complex and anatomically variable structures, and the early spread of cancer in the area to adjacent tissues, makes it very difficult to determine the exact site of origin of most peripapillary cancers and to exclude tumors arising in the bile ducts and pancreas. From the standpoint of surgical therapy, such refinements are mainly academic, as the whole area, including the terminal bile and pancreatic ducts and the head of the pancreas may be considered as one unit, but for purposes of nosology an attempt at differentiation is necessary. Lieber, Stewart and Lund[31] classified 229 cases as follows:

1. Primary carcinoma of the ampulla of Vater	3
2. Primary carcinoma of the terminal duct of Wirsung	1
3. Primary carcinoma of the terminal common bile duct	7
4. Primary carcinoma of the intestinal mucous membrane covering the papilla of Vater	3
5. Carcinoma involving all the epithelial structures comprising the papilla of Vater under Groups 1, 2, 3 and 4	182
6. Carcinoma involving all the epithelial structures comprising the papilla of Vater exclusive of the intestinal mucous membrane	33

Thus, 79 per cent of their cases fell into the large, indeterminate Group 5, despite very careful microscopic studies in many instances. Hoffman and Pack[21] believe that "carcinoma of the ampulla of Vater is not a true duodenal carcinoma, since it arises from the epithelium lining the terminal portion of the common bile duct. The growth usually exhibits the histologic characteristics of the epithelium of the bile duct and may even develop true epidermoid carcinoma," of which they present an example. Carcinomata of this region are frequently of the soft, bulky, polypoid variety, with an early

tendency to ulceration and bleeding,[21] which accounts for the fact that about 20 per cent exhibit blood in the stool[31]—a guide to early diagnosis.

From the viewpoint of etiology, Cohen and Colp[11] pointed out that the papilla and ampulla are exposed to the chronic irritation of an alkaline current from the ducts as well as the acid wash of the gastric contents. However, the higher incidence of carcinoma in this region may be due to the fact that the presence in this area of the duct epithelia, which are susceptible to carcinogenesis, outweighs the factor of relative immunity exhibited by the duodenal mucosa itself, for we have seen that it is usually impossible to tell the specific site of origin of most of the tumors.

In evaluating reported surgical results, one is confronted by contradictions in the reports of various authors, based on the loose interpretation of diagnostic criteria for one thing, and also on sheer misquotation in several instances. In 1927, Cohn and Colp[11] reviewed 59 cases treated by radical surgery, reporting an operative mortality of 44 per cent among 53 cases of transduodenal resection. In 1928, Busch[6] reported nine survivals of one year or more, based mainly on Fulde's[17] paper of 1927. Muller and Rademaker,[38] in 1931, quoting Busch,[6] reported eight survivals of four years or more, and are, in turn, quoted by Cooper.[12] In 1935, Hunt and Budd[24] collected 18 additional cases, which added to those of Cohn and Colp, comprised a series of 76 cases subjected to radical surgery with a mortality of 38.1 per cent. Allen,[1] in 1938, reviewed 97 reports of radical surgery (from the above papers) and found a 25.7 per cent survival of one year or more. Basing our present figures mainly on Lieber, Stewart and Lund's[31] critical analysis of the original reports up to 1939, on our own review of the cases reported since then (analyzed by the same criteria), and on reference to original sources where discrepancies appeared among many of the above reports, we have concluded that to date, a total of 136 adequately proven cases of peripapillary carcinoma have been subjected to surgery of any type. In 122 cases, some operative result is known. Of these, 64 had purely palliative procedures for the relief of obstructive jaundice, with an operative mortality of 73.5 per cent, while in 58, radical resection of the primary tumor has been attempted alone or in combination with other procedures, with an operative mortality of 29.3 per cent. Of the latter group, the eight cases below, all of whom had transduodenal

Reported By	Year	Survival Period (Living and Well)	Final Authority for Survival Figure
1. Körte, Case 32	1909	22 years	Busch [6], 1928
2. Oleani	1919	4 years*	Oleani [41], 1919
3. Lewis (Kelly's case)	1921	9 years*	Lewis [29], 1921
4. Kleinschmidt, Case 2	1922	6 years	Lieber, Stewart and Lund [31], 1939
5. Tenani	1922	3 years*	Tenani [46], 1922
6. Fulde	1927	2 years	Fulde [17], 1927
7. Clar	1927	13 years	Nèmenyi, quoted by Lieber, Stewart and Lund [31], 1939
8. Lauwers, Case 1	1933	3 years, 10 mos.	Lieber, Stewart and Lund [31], 1939

* Incorrectly cited by Lieber, Stewart and Lund[31] as Oleani 1 month, Lewis, 4 months, Tenani 5 months.

resection, with or without other procedures, are known to have been living and well for two years or more after operation (13.8 per cent two-year cures), while four of these were alive and well five years or more (6.8 per cent five-year cures)

Also worthy of mention are Muller and Rademaker's[38] case, who died four years and eight months after operation, of metastases, and that of Judd, quoted by Cooper,[12] who was alive 2½ years after operation, but known to have a recurrence, both patients having also had transduodenal resections. Cabot's case, originally reported by Potter[44] as an eight-year cure, was excluded because it was a carcinoma of the common bile duct proximal to the duodenal segment, while three other cases, also reported by Muller and Rademaker[38] and Cooper[12] as five-year cures, were excluded because of insufficient data, namely, the cases of Oehler,[40] Van Remynse and Van Ardenne.†

In the surgical approach to peripapillary carcinoma, the problem of re-establishing biliary and pancreatic continuity, especially the latter, has been most formidable. However, in 1935, Whipple, Parsons and Mullins[50] demonstrated that the reestablishment of pancreatic flow is not essential to life, thus increasing the prospect for a higher percentage of radical cures. The two-stage procedure which they evolved, as revised in 1938 by Whipple,[49] consists of a first stage, in which the common bile duct is ligated, the jejunum is sectioned and a cholecystojejunostomy and entero-anastomosis are performed according to the Y-principle of Roux. At the second stage, gastroenterostomy is performed, and is followed by a block resection, including the descending portion of the duodenum together with the distal portion of the common duct, and a V-shaped section of the head of the pancreas. The open duodenal ends are closed and the pancreatic ducts are ligated tightly. In 1941, Orr[42] reviewed 15 cases of ampullary and pancreatic carcinoma treated by some variation of Whipple's principle, including one case of his own, and found a 33 per cent mortality, and 26.6 per cent survival (four cases: alive 3 months, 4 months and 6½ months, and one an unknown period, post-operatively, respectively). In the exceptional case of very small tumors, simple excision may be radical enough to get wide of the growth; in others, the two-stage procedure of Whipple appears to be the operation of choice for the future. In very good risks, with adequate preoperative preparation, the two-stage operation is now undertaken in one sitting (Ziegler[52]). Orr[42]

† Oehler[40] originally reported his case in 1910 as alive and well three months after operation. Melchior,[36] in 1917, cited the same case as "alive one year, 11 months post-operative, slightly jaundiced, recurrence? . . . by personal communication of Kausch." This reference was misquoted by Fulde,[17] in 1927, as a six-year cure, the error being perpetuated through Busch[6] (1928) to Muller and Rademaker[38] (1931), and Cooper[12] (1937). The "cures" of Van Remynse (six years) and Van Ardenne (five years) were credited to a report by Klinkert,[26] in 1929, but reference to this source reveals no evidence whatever to consider these cases. They received only the briefest one-sentence mention by a discusser of Klinkert's paper, which reported an entirely different case.

suggests the use of lipocaic (pancreatic hormone) in combination with the above procedure.

CARCINOMA OF THE INFRAPAPILLARY PORTION

This group, in which our own case falls, is the smallest of the three (15 per cent). Stewart, Lieber and Lund[30] analyzed 62 reported cases, accepted 36 as authentic, and added two of their own, making a total of 38 proven cases up to 1937. We have analyzed 19 additional cases, all proven, which, with our case, bring the total known to date to 58. The new cases are: Six reported by Hoffman and Pack,[21] three by Hart Hansen,[20] two by Bergendahl,[2] and one each by Howes,[23] Hadfield-Jones,[19] Allen,[1] Claiborn and Dobbs,[10] Brunschwig and Childs,[5] Pollack,[43] MacIndoe,[33] and Cabot[8] Case No. 27092.

The principal symptoms were pain, vomiting and cachexia, regardless of type of onset, while anorexia, constipation, diarrhea and jaundice were found less commonly. Only 16.6 per cent had a palpable mass in the region of the tumor.[30] The preoperative diagnosis was rarely made. Lieber, Stewart and Lund[30] found in a series of 15 cases studied roentgenographically that an obstructing lesion of the duodenum was present in 40 per cent; in 33 per cent the lesion was incorrectly diagnosed as at or near the pylorus, while in 27 per cent no lesion was demonstrable.

The usual pathologic picture was that of a broad, flat, ulcerating mass, as in our case. The average size was 3–5 cm. in diameter in the majority of cases.

TABLE I

DISTRIBUTION OF CASES AND RESULTS OF SURGICAL THERAPY OF PRIMARY CARCINOMA OF THE DUODENUM

Primary Carcinoma of Duodenum	Suprapapillary	Peripapillary	Infrapapillary	Total
Total No. of reported cases	125	461	84	670
Distribution in duodenum	18.6%	68.8%	12.5%	
Total No. accepted as proved	77	251	58	386
Distribution in duodenum	19.9%	65.0%	15.0%	
Total subjected to surgery	27	136	33	196
Palliative surgery	20	64	22	106
Operability	25.9%	25.4%	37.9%	27.2%
Op. mortality	65.0%	73.5%	90.0%	75.5%
Radical surgery	7	58	11	76
True operability	9.0%	23.1%	18.9%	19.6%
Op. mortality	42.8%	29.3%	33.3%	31.0%
No. alive and well at 2 years	0	8	0	8
Per cent 2-yr. cures	0	13.8%	0	10.5%
No. alive and well at 5 years	0	4	0	4
Per cent 5-yr. cures	0	6.8%	0	5.2%

To date, there are 33 reported cases in which surgical therapy has been applied. Of these, 22 had purely palliative or exploratory operations, in two of which the results are not recorded. Of the 20 known results, 18 were immediate operative mortalities (90 per cent), while all were dead in three months. Eleven radical resections have been attempted, in two of which no results are recorded. Of the nine known results, three were operative mortalities (33 per cent), while six were successful. Of these, three patients

were alive at three months, and three at 15, 16 and 20 months after operation (the cases of Brunschwig and Childs,[5] Hadfield-Jones[19] and Bergendahl,[2] respectively.

Since the bile and pancreatic ducts are not involved, the operation of choice for infrapapillary tumors is resection of the affected segment and reestablishment of alimentary continuity by duodenojejunostomy, end-to-end, end-to-side, or side-to-side. Hadfield-Jones[19] brought the jejunum to the right, under the superior mesenteric artery, until it lay in position for anastamosis to the proximal duodenal segment without tension. Lahey's[28] plan of antecolic duodenojejunostomy, recommended for high jejunal lesions, may also be applied to infrapapillary duodenal lesions.

SUMMARY AND CONCLUSIONS

A proven case of primary carcinoma of the infrapapillary portion of the duodenum is presented, and discussed from the point of view of clinical roentgenographic, operative and autopsy findings.

The literature on all types of primary duodenal carcinoma is reviewed, covering a total of 386 proven cases to date, of which 19.9 per cent were suprapapillary, 65 per cent peripapillary, and 15 per cent were infrapapillary.

Each subgroup is briefly considered from the standpoint of incidence, principal symptomatology, roentgenographic findings, pathologic picture and recorded surgical results. The latter are summarized in Table I.

Earlier diagnosis depends on a better awareness in the mind of the clinician that the diagnosis of duodenal carcinoma is possible though rare (from .03 per cent to .003 of all autopsies). Roentgenologic examination is especially helpful if the lesion is looked for consciously.

While the results of radical surgery in duodena carcinoma so far have been very discouraging (5.2 per cent five-year cures), with earlier diagnosis and with improved methods of pre- and postoperative care, such as exist today, the prospect for improved results in the future looks brighter, since a rational surgical technic is available for each group of cases, and since metastasis at the time of exploration is low.

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