1958

Peptic ulcer in infancy and childhood

Albert Leone Muggia
Yale University

PEPTIC ULCER IN INFANCY AND CHILDHOOD -

Presentation of 24 cases, with a review of the literature.

ALBERT L. MUGGIA

THESIS

PRESENTED TO THE FACULTY OF

THE YALE UNIVERSITY SCHOOL OF MEDICINE,

IN CANDIDACY FOR THE DEGREE OF DOCTOR OF MEDICINE

Department of Internal Medicine
1958

ACKNOWLEDGEMENT

The author is very grateful to
Dr. H.M. Spiro for his invaluable advice,
inspiration, interest, and encouragement;
and to Dr. A. Solnit for his help in
the psychiatric aspects of this paper.

TABLE OF CONTENTS

INTRODUCTION

It is the purpose of this paper to review the patients under the age of 16, seen at the Yale University School of Medicine, on whom the diagnosis of peptic ulcer was made. Various aspects of peptic ulcer in infancy and childhood will be discussed, with emphasis on clinical symptoms, follow-up and prognosis, with the intention of reaching some conclusion as to the best method of therapy in children afflicted with a peptic ulcer.

Between 1940 and 1957 the diagnosis of peptic ulcer has been made 21 times in the age group under 16, at the Grace-New Haven Community Hospital. Three patients were added to this series, who were seen at the Middlesex Memorial Hospital in Middletown, Connecticut, through the courtesy of Dr. A.F. Turano.

An attempt was made to see personally all the patients in the series, who could be reached, and to evaluate how much their ulcer has interfered in their daily life. Serum pepsin levels were determined on all the patients who were willing.

An attempt will also be made to summarize the surgical and medical literature on the subject, and to derive conclusions.

HISTORY

Until 1920 peptic ulcer was considered very rare in children. The first case described was an autopsy finding by Rufz in 1843, in a child who had died of massive gastrointestinal hemorrhage. (40) Henoch in 1893 talked of the rareness of peptic ulcer in children commenting that it was a disease of puberty no different from the adult disease. (41) Between 1906 and 1924 the Mayo Clinic admitted only two children with peptic ulcer out of 8260 peptic ulcer patients. (41)

The first significant compilation of peptic ulcer in infancy and childhood was by Theile (45) in 1919 who published 248 cases, of which 4 were personally studied. He differentiated between acute and chronic ulcer and stated that the chronic ulcer never occurred before the age of 20. In the United States the first report was in 1925 by Proctor at the Mayo Clinic. (41) He stated that 2% of adults with peptic ulcer had had symptoms when they were young.

In 1936 Reyderman showed that of 12 children between the ages of one and five with peptic ulcer, only a few had hyperacidity. Only three, however, were diagnosed by X-Ray. (42)

In 1942 Burdick found 10 cases in 21,231 hospital admissions of children between the ages of 4 and 13. (11)

In 1940 DeToni published his observations on 40 cases, and pointed out the relationship to cerebral disease in infancy.(15) In the same year Dubarry assembled 30 cases of ulcer and pseudoulcerous duodenitis, without attempting to differentiate between the two clinical entities. (17) Since then, reports of ulcer in infancy and childhood have been numerous.

INCIDENCE

Between the years 1940-1952 at the Grace-New Haven Hospital the diagnosis of peptic ulcer was made only once in a patient under the age of 16; this was an autopsy diagnosis in a premature new born, who died after perforation and massive hemorrhage from a duodenal ulcer. (case number 1) Since 1952 the diagnosis has been made 20 times, and in 1954 alone 6 cases were seen, thus demonstrating an increase in incidence and diagnosis.

Site:

Peptic ulcer may be either duodenal or gastric. Including all ages the ratio of gastric to duodenal varies from 1-2 to 1-10 as shown in Table A. However, autopsy studies suggest an equal distribution. Since most authors who have studied peptic ulcers in children fail to differentiate between the gastric and the duodenal location of the ulcer, the figures in the literature have little value. The differentiation is not an important one for prognosis or therapy, since no malignancies of the stomach have been reported under the age of 16. (1)

In the present series there were 21 duodenal and 3 gastric ulcers. A gastric ulcer developed in a 5 year old nephrotic who was under steroid therapy, (case No. 7), and two other cases of gastric ulcer were seen at the Grace-New Haven Hospital in the period 1940-1957, one in a 6 year old boy (case number 24), and one in a 4 month old boy. (case number 23). Thus,

at the Grace-New Haven Hospital 18 duodenal and 3 gastric ulcers were seen, and at Middlesex Memorial Hospital 3 duodenal ulcers.

Sex:

In adults duodenal ulcer is more prevalent in males than in females, while the incidence of gastric ulcer seems to be the same in both sexes. In children, over half of the peptic ulcers have been reported in males, and in some series the male predominance is even more marked as shown in Table B. However, this difference in sex does not seem to be present before the age of 2.

Age:

The difference in incidence of peptic ulcer by age groups shows marked variations from series to series as shown in Table C.

Complications:

Before the age of 2 hemorrhage is by far the commonest complication. From 2 to 5 the incidence of obstruction predominates over that of hemorrhage, and above the age of 6 obstruction is the commonest complication. (38)

ETIOLOGY

Duodenal ulcer in the neonatal period is a well known entity, but we can only speculate about its etiology, and its relationship to trauma at birth.

In infants, an acute ulcer is usually associated with extensive body burns, with severe infection, or with cerebral disease. Such ulcers are not rare, and in fact, a perforated ulcer is the most common cause of pneumoperitoneum in infants. (21)
A list of the causes of acute ulcers is entirely non-specific and includes in addition to infection and burns, many other unrelated factors such as: epigastric trauma, hydrocephalus and intracranial tumor, nephrosis, extensive liver damage(27), congenital defects, fibrocystic disease, erythroblastosis, snake bite, and administration of steroids. (14)

Chronic peptic ulcer apparently has the same basic "etiology" in children, as in adults, to the extent of obvious nervous and emotional factors superimposed on a hereditary background. Some evidence for this is found in the early symptoms of some adults with a duodenal ulcer. Proctor found that many adults with peptic ulcer had the beginning of their trouble in infancy, and therefore, he felt that acute ulcer in childhood may lead to a chronic ulcer. (41)
Klein, on the other hand, found that few adults with ulcer gave a history of gastrointestinal difficulties in childhood; he added that such studies were

unreliable because of an unconscious need for the denial of such disturbances. (29) Michaelson and Henderson found that 2-3% of adults with ulcer had symptoms before the age of sixteen. (36, 24) Alvarez stated that very few children with pseudo-peptic ulcer, that is: upper gastrointestinal distress without a demonstrable ulcer, went on to develop a duodenal ulcer. (5)

Girdany in 1953 reviewed the background of ulcer in a series of 45 children between the ages of 14 months and 11 years. In 5 the symptoms appeared after physical trauma to the abdomen, in 2 after the birth of a sibling, in 4 after the beginning of school, and in one case the first symptom appeared after the accidental ingestion of an overdose of aspirin. He also noted that exacerbations of symptoms during febrile illnesses and upper respiratory infections were common.(21)

In the present series peptic ulcer was associated with a variety of diseases: fibrocystic disease (case No. 14), Congenital Heart Disease (case No. 2), (case No. 23) Nephrosis (case No. 7) being treated with steroids, chronic terminal ileitis (case No. 14), and chalasia of the esophagus (case No. 4). Four patients had associated tension headaches (cases No. 9, 11, 16, 21). A history of allergy or of allergic family history was elicited in only 4 cases: one child had had one attack of asthma (case No. 8), another child had an "allergy" to aspirin in that he always developed a

diarrhea after taking aspirin (case No. 4), one child had hay fever (case No. 20), and one had a mother and a sister with hay fever, but no personal allergic history. (case No. 5). No history of eczema or other allergies was elicited in any of the 22 patients.

ACID

Surprisingly, hypersecretion is rarely found in children with duodenal ulcer. The reason for this is obscure. Goldberg found hyperacidity only in 1 of his 20 patients. (22) Peluffo and coworkers in Uruguay found hyperchlorhydria in only 2 of 9 children between the ages of 5 and 14, even after histamine stimulation. They concluded that hyperacidity made an existing ulcer worse, but that acid was not an important etiologic agent. One case was achlorhydric even when his symptoms were at its worst. (40)

Miller pointed out that maximal gastric acidity exists 24 hours after birth. Thereafter, it drops to levels below those of adults until about the age of 6 months when gastric acidity starts rising again. The total acidity in the fasting state declined steadily in 50 healthy infants until the tenth day. The heavier the child was at birth, the more likely he was to have a more perfectly developed gastric mucosa and potent gastric secretion. There was, however, no connection between acidity and weight progress. Miller postulated a "gastrogenid hormone" from the mother or from the placenta, whose effect starts to wear off in 48 hours,

so that the infant controls its own gastric secretion by about the tenth day of life. (37)

Interestingly, in view of the relationship between cerebral disease and duodenal ulcer, Miller found achlorhydria in 10 out of 13 infants with a cerebral hemorrhage.(37)

In the present series no gastric aspirations for free acid were done, but blood pepsin levels were measured on 7 patients with the following results: 285, 255, 305, 455, 520, 545, and 560. In this laboratory 200-450 units is the normal range. The youngest child on whom a pepsin determination was done was 5 years old. It is interesting that all the high pepsins were drawn at a time at which the patient was symptomatic, whereas all the low and normal values were drawn at a time that the patient had been asymptomatic for at least a year.

The fact that hyperchlorhydria is frequently absent in children may explain why duodenitis has been so commonly reported whereas true ulcers are relatively rare.

PATHOLOGY

It is important to differentiate between acute and chronic ulcer of the duodenum. The acute ulcer is a small, hemorrhagic, punched out lesion involving the mucosa and the submucosa. The base is covered with grayish white fibrin.

The typical chronic peptic ulcer has involvement of the muscularis, an indurated, fibrotic edge, and the floor of the ulcer consists of scar tissue and granulation tissue. In infants below a year of age there usually is a lack of pathological inflammatory reaction. The autopsy ulcer without involvement of muscularis is a completely different entity lacking clinical significance since there is no scarring. (19)

This is in contrast to "duodenitis" where there is only hyperemia and stippling of the serosa, together with some superficial denuding of the epithelium. Duodenitis feels normal to palpation. To be a true ulcer the lesion has to be a circumscribed defect extending through the muscularis mucosa.

Cole reports a 2-1 autopsy ratio of duodenal ulcer to gastric ulcer in infants under one year of age, and a 3-1 ratio in older age groups. The site, in order of frequency, in gastric ulcer is: pyloric ring, posterior wall, cardia, and anterior wall. Duodenal ulcer is usually found on the posterior wall above the ampulla of Vater. (14)

The autopsy statistics cover quite a wide range: Tudor reports that 0.1 to 0.2% of autopsies in children demonstrate a peptic ulcer. (47) Guthrie in Glasgow reported 0.14% in 1942. (23) Berglund in 1928 found 14 cases in 1323 autopsies of children, only one of which had been diagnosed during life.(7) The largest report is one by Arlberg who reports a duodenal ulcer in 1.7% of children autopsies. (40) It is quite evident that the autopsy incidence depends a lot on how hard the ulcers are looked for, and on how far the definition is stretched. Multiple ulcers and esophageal ulcers are very rare.

Only clinical incidence of duodenal ulcer will concern us, since the lesions of the Gastrointestinal tract seen at autopsy may be part of the agonal process. In the same way, we are concerned only with ulcers that make their appearance after birth. We cannot consider ulcers in utero, the same clinical entity.

The only case in the present series that was autopsied was case No. 2, a three month old child with congenital heart disease. A "sharply demarcated punched out lesion in the first part of the duodenum, 0.5 cm. from the pylorus" bled. There was a microscopic picture of acute duodenal ulceration.

FAMILY HISTORY

Although peptic ulcers have been suspected in children with abdominal pain, because of a very strong family history, most writers have failed to find an impressive incidence of family disease in their patients. There are, of course, exceptions and in 1937 Block presented three families with a history of duodenal ulcer, including all children.(10) Levrat, Brette and Richard consider that in general the stronger the family history the earlier the ulcer makes its appearance. In their series 37% of ulcers appearing before the age of 20 had a family history of peptic ulcer, while there was a family history in only 11 % of those who first developed an ulcer after the age of 60. They found in the literature 26 cases of identical twins with duodenal ulcer, and in 21 of them both twins suffered with about the same severity, at about the same time, and with the same localization of pain. (32) Of course, it is more likely that ulcers occurring in both of a set of twins be reported, than ulcers occurring in only one twin.

Peluffo and coworkers had a family history in only 3 of their 22 cases (40), Goldberg had a family History in 4 out of 20 (22), and in the present series 6 out of 24 patients had a family history of duodenal ulcer, but in only two it was very suggestive, as can be seen from Table D.

SYMPTOMATOLOGY

Peptic ulcers in children can be divided into four groups according to the age of onset of symptoms.

Neonatal

A duodenal ulcer in the neonatal period is manifested by a sudden episode of melena or hematemesis, occasionally accompanied by intestinal obstruction or by a perforation. Peluffo and coworkers report that 40% of melena in newborns is the result of a duodenal ulcer.(40) Such ulcers heal very fast or lead to a rapid demise and diagnosis is usually made at necropsy. These ulcers may occur in very young infants. Cole reports a case in a 34 hour old infant.(14) Kennedy reports a case of melena neonatorum present at birth, (28) and Lee and Wells in 1923 found a perforated gastric ulcer in an infant born dead. (31) Very few cases have been operated on succesfully; one of these by Bird who ligated the bleeding vessels in a newborn with full recovery of the baby. (8)

In the Grace New Haven Hospital series the youngest case was that of a premature infant with a perforated duodenal ulcer,who died during operative intervention. The ulcer manifested itself by abdominal distension and massive bleeding from the rectum. (case No. 1) Another case was that of a 1 1/2 month old child with tarry stools and congenital heart disease, who died of unknown causes. The diagnosis was made at autopsy. (case No. 2)

Infantile

The infantile group includes children from 6 months of age to about 2 years of age. In these children obstruction, hemorrhage, or melena is the usual presenting symptom. Occasionally, less specific symptoms such as loose stools, vague abdominal pain, vomiting, failure to thrive, and feeding problems have suggested the diagnosis of an ulcer. It is usually impossible to suspect the diagnosis unless melena is present. A typical case is No. 3, that of a 6 months old girl, who on three occasions had had black, tarry stools, and on one occasion had vomited up some blood. Accompanying symptoms were restlessness, irritability, and lack of weight gain.

Occasionally a gastrointestinal series may be taken to evaluate cyclic vomiting, or for some other reason and an unexpected ulcer may be visualized. Thus, in one of the cases in this series a deformed duodenal cap was shown in a 10 months old boy in a gastrointestinal series taken to demonstrate chalasia. (case No, 4)

Early Childhood

The early childhood group, ages 2 to 9 is characterized by a long standing histoy of recurrent abdominal pain, usually periumbilical or epigastric. Pyrosis, eructation and flatulence are rare, while nausea and vomiting are quite common. It is in this age group that psychological factors are considered to become

important, and it is here that there is first noticed an increase in male predominance. Anorexia and early morning pain, before breakfast, as well as a tendency not to eat breakfast are common reported symptoms. Tension headaches and temper tantrums are reported often in these children. Response to therapy is always excellent if no complications have occurred, even though pain relief from food is not consistent. The symptoms in the 7 children between 2 and 9 years of age of the present series are demonstrated in Table E, arranged in order of importance.

Late Childhood

Adult-like characteristics, such as the typical hunger pain are found in children over 9 years of age. Failure to grow is an important symptom in this group, the reason for this is unknown. Proctor has 2 cases in which the family had noticed a sudden and complete cessation of growth: one in a 14 year old girl who weighed only 50 lbs, and another in a 16 year old boy who had had symptoms only for 3 weeks but who was very thin and weighed only 70 lbs. (41) Foshee reported on a similar case in a 15 year old male (18), and Thevenard in an 11 year old. (46) In most of these there was some improvement after an anti-ulcer regimen. Huguenin and Bacquere report on a case of nutritional infantilism seen in Algeria in a 10 year old boy who had stopped growing when his gastrointestinal trouble

started. Following the surgical removal of a pyloric ulcer, he had a remarkable change, with a 20 lb gain, improvement in height and strength. (25)

With the increase in age, there is also an increase in the chronicity of the ulcer. The symptoms observed in the patients in this series that fit in this age group with adult-like symptoms are domonstrated in Table F, and discussed below.

Bleeding: The percentage of bleeders is about the same as in the early childhood group.

Vomiting: Vomiting is less common in this group than in the early childhood group, but is nevertheless a fairly frequent finding; it is often cyclic and usually of the psychogenic type, that is, during or immediately after meals, associated with nausea and sometimes with anorexia. It is most common in the early morning.

Pain: Pain is found with about the same frequency in late childhood as in early childhood. The pain is usually periumbilical or epigastric, but can be colicky. It is very variable, and usually it is more annoying than painful. The typical hunger pain of adults becomes common only after the age of 15.

Girdany, in his series of 45 children up to 11 years of age found recurrent pain in 41, as the chief complaint. He considers that, as in adults, night pain waking the child up from sleep is the most frequent symptom. However, early morning pain is also a frequent finding, and this is relatively

rare in adults. Only 5 children in Girdany's series volunteered that milk relieved the pain. (21) Similar observations were made in the present series.

In any case, ingestion of food and alkali definitely gives relief less constantly in children than in adults. Relief of pain following vomiting is a general rule.

Goldberg reports pain in 14 out of 20 patients in his series and in only 5 was this pain typical of adult ulcers. He also reports hematemesis in 5, but his series was surgical. (22)

Donovan and Santuli emphasize that the pain is not related to meals, non-radiating, not localized, and usually intermittent. When the patient is awakened from sleep they feel that not only epigastric pain, but a fullness and a desire to vomit are responsible for the discomfort.(16)

Heartburn: Surprisingly heartburn is rarely reported as a complaint, and none of the children in the present series complained of it.

Constipation: Alexander considers constipation a rare finding in children with an ulcer, (2) but Ladd and Gross consider constipation alternating with diarrhea as one of the symptoms of an ulcer.(30) None of the patients in the present series complained of either.

Aerophagia: Aerophagia and eructations are considered important by Peluffo and coworkers who feel that it may

be the only symptom. This is probably true only in the older age groups. (40)

It should be mentioned that there is no apparent difference in symptoms between duodenal and gastric ulcers, and "duodenitis".

Four typical cases, may be presented as follows:

I.- A 20 day old child with a history of regurgitation of most feedings for the preceding few days, with vomiting of greenish mucus, and then of bright red blood. Death often follows shortly thereafter.

II.- A 2 month old child who has been a feeding problem, and has failed to gain weight, who begins to vomit his feedings and has a massive bleeding episode. At operation a bleeding duodenal ulcer is found.

III.- A 5 year old child with a long history of abdominal pain, anorexia and nausea, starts vomiting after meals. X-ray studies revealed a duodenal deformity and some irritability of the cap.

IV.- A 14 year old male with a 2 year history of epigastric pain occurring in the early morning and late at night, with good relief from milk, presents with a 3 day history of tarry stools.

RADIOLOGY

Radiology is most important for the diagnosis of duodenal ulcer in children; failure to use X-rays in the past is probably the main reason for the apparent rarity of this syndrome, as proven by Alexander who in 1954 took gastrointestinal series of 154 boys and girls between the ages of 2 and 14, who had had irregular and atypical abdominal pain for at least six months, and he found 30 radiologically proven ulcers. (3)

In children multiple spot films of the duodenum with pressure devices are necessary to evaluate completely non-specific abdominal pain.(21) The crater is usually too small, and the motility of the gastrointestinal tract is too rapid for the fluoroscopist. Barium may go through very fast and it is easy for the radiologist to miss a small ulcer niche. Since gross deformities and large ulcer niches are very rare in children, pylorospasm or a duodenal bulb deformity may be used as evidence in favor of the diagnosis; irritability of the cap is too common in children to put any reliance on it. (21) No longer is a well outlined ulcer crater a prerequisite for the diagnosis of peptic ulcer in children, hence the increase in diagnosis of duodenal ulcer.

A large amount of gas or fluid in the stomach, with or without signs of irritability of the adjacent stomach wall is considered by some authors to be a sign very suggestive of "duodenitis".

Attempts have been made to correlate radiological findings with duration of symptoms, thus, Goldberg reports that the average length of symptoms where a definite ulcer niche was shown was 23 months, where a deformed duodenal cap was seen the symptoms had been present for 7 months, and with symptoms for 4 months only irritability of the duodenum was seen. No such conclusion could be derived from this series. (22)

In the present series of 24 patients an ulcer crater was demonstrated radiologically in 13. 4 Patients had one or more of the following signs: irritability, filling defect, constant irregularity, or a deformity of the cap. 2 Patients with symptoms that were pathognomonic for an ulcer had indeterminate X-rays. 2 ulcers were proven at autopsy, and three were demonstrated on the operating table.

SURGERY

Before the common use of radiology young children with peptic ulcer might be operated on for appendicitis, and die from hemorrhage during or after surgery.

The treatment of choice for peptic ulcer in infancy and childhood is medical, and surgical procedures should be resorted to only for obstruction, perforation, hemorrhage, and on occasions for intractable pain. As has already been mentioned no carcinomatous changes have been reported in this age group.

The incidence of the above mentioned complications in 4 different series is reported in Table G. The most extensive surgical review was that by Tudor in 1954 who collected 481 cases of duodenal ulcer in children, and of these 136 were operative ones. (47) The percentage of ulcers going to surgery has considerably decreased lately because of better diagnostic methods and earlier medical therapy. However, as shown in table G, the percentage of complications is still quite high: 59% in the Tudor series (47), and 70% in the present series, but most of these were not too serious and consisted of nothing more than Guaiac positive stools, for example. The other two series are of a selected group of patients that were operated on, therefore 100% had complications.

Proctor had an operative mortality of 50% in his series. (41). Bird, Limper and Mayer had an operative mortality of 70% if they counted only the 0-2 years of age, and an operative mortality of only 5% for those

above 2 years of age. The youngest child operated on successfully was 34 and a half hours old. (8)

In the literature up to 1954, there are 29 reports of perforations of the stomach in newborn infants; of these 3 recovered after surgical intervention. The characteristic triad of symptoms is that of cyanosis, abdominal distention, and hematemesis or melena.

The operation of choice for the relief of the complications of a peptic ulcer in children is considered by some surgeons to be gastroenterostomy. However, recently the trend has been in favor of a partial gastrectomy due to the relatively common occurrence of marginal ulceration, that was once considered very rare.

Bird considers marginal ulcers in children very rare. (8) This could be explained by the fact that children usually do not have hyperchlorhydria. MacAleese and Sieber operated on 16 children with peptic ulcer in 14 years at Pittsburgh. They did 5 gastroenterostomies, and followed up 4. Two of these developed an anastomotic peptic ulcer, and one required a reoperation and subtotal gastrectomy at age eleven for uncontrollable hemorrhage. (35)

In 1926 Michaelson reported on two cases: a 14 year old girl who required a gastrectomy for intractable pain 6 months after a gastroenterostomy for pyloric stenosis secondary to an ulcer. On a 2 year follow-up this patient was asymptomatic. The second case was a 15 year old girl who required a gastrectomy because of perforation

of a marginal ulcer 3 years after a gastrojejunostomy.(36) Strode in 1933 reports on a gastrectomy he had to do 2 years after a gastrojejunostomy in a 10 year old boy. (44)

Cameron emphasized the frequency of jejunal ulcers after a gastroenterostomy and presented 21 cases of serious complications after this operation: jejunal ulcer, bleeding, obstruction. He feels that the operation should be discarded in children as in adults. He feels that an extensive gastric resection is the only way to insure protection against jejunal ulcers. He points out, however, that development and hematopoiesis may be seriously affected by the removal of part of the stomach; one of his cases was later seen as a markedly cachectic 27 year old man. (12)

Neilson and Black are opposed to gastroenterostomies, consider subtotal gastrectomy dangerous, and feel that a moderate resection is usually sufficient. They present the case of an 18 month old girl who bled twice in 3 months, and had 2/3 of the stomach removed and an ante-colic Polya gastrojejunal anastomosis performed. Her post-operative period was marred by months of nausea and nervousness, but at a 3 year follow up she was asymptomatic, and weighed and looked just like her twin sister. (39)

On the other hand, Ladd and Gross still favor a posterior gastroenterostomy, and they feel that further resection is not necessary to alleviate pain and to end

vomiting. An advantage of this operation is the adequate weight gain which follows it almost invariably. This is not so with gastric resections.(30)

In summary, one can find a case to prove any point. Thus, we have cases like Girard's of a 14 year old boy where a gastroenterostomy was done and who died because of bleeding from the marginal ulcer.(38) We also find reports like that of Antoine, who in 1955 ran into a 30 year old man on whom he had done a gastroenterostomy at age 8 for a pyloric stenosis due to a peptic ulcer. In the interim this man had had no symptoms and the X-ray studies were perfectly normal.(6)

The big problem in evaluating the best surgical therapy is that most authors have a follow up of months to a few years; and very few cases have been personally followed. Growth is apparently affected by a gastrectomy.

In this series of 24 patients, only three were operated on, and in all three occasions it was for massive bleeding. Case No. 6 was a 3 year old boy who bled massively twice in six months, and then again 5 months after the bleeding point was sutured. There was a strong family history of duodenal ulcer. Case No. 1 was a newborn who died during surgery, and was found to have a perforated duodenal ulcer that was bleeding. This is the only perforation in the present series. Case No. 17 had a subtotal gastrectomy at age 20 after having bled three times in 3 years.

One could deduce that the first bleeding episode may be the only one, but repeated bleeding, as in adults, should be an indication for a gastrectomy. As has been mentioned, the one case in which the bleeding point was sutured, and no definitive surgery was undertaken, bled again shortly after. A gastrectomy at that time might have saved the patient a lot of future trouble.

Out of 24 patients in this series 13 bled to some degree, but only three have bled more than once, and the repeated bleeder that has not had surgery yet is a 2 year old girl who has had a few Guaiac positive stools, but has never had any massive bleeding.

PERSONALITY

It has generally been considered that in children, as in adults, psychological factors play an important background role in peptic ulcer disease. The child with an ulcer has been superficially described as an axious and neurotic child, even before the ulcer appears, he is seen to have a great need for affection and to lack in parental love and help.

Mirsky feels that children with an ulcer have in common a conflict related to the persistence of strong infantile wishes. He has postulated that an unconscious desire to be fed leads to hypersecretion and to an increase in gastric activity. (49) An anxiety reaction which would cause pylorospasm in a normosecretor will lead to a peptic ulcer in the hypersecretor, and in the same way environmental events which are innocuous to most, become noxious to the hypersecretor.

Moses has emphasized the economic and emotional insecurity in the families of children with ulcers. Kelloch, however, found similar insecurities in families of children without ulcers. (32) Many children come from families where digestive disturbances have led the parents to a bland diet and the children to an undue concern over foods, diets, and their stomach. Both the children and the parents are usually found to be very cooperative, anxious to help and to please the doctor in all respects. The parents of children with ulcers usually call them nervous and hyperactive.

These children are usually described as bright, but somehow because of the inefficiency caused by their anxiety, their marks do not reflect their true ability..

Chapman has summarized three characteristics: unmet needs for affection and emotional security, difficulty in asserting hostile feelings, and a passivity and desperate need to secure affectionate approval. All of these characteristics were present to some degree in the patients of this series. (13)

A description of the personalities of some of the patients in this series offer illustrative examples: Case number 20 was an 18 year old boy very concerned with his health; he had been seen repeatedly in the hospital for minimal complaints, usually connected with his gastrointestinal tract. He stated that his ulcer pain was seasonal and not related to nerves. Very few patients in this series admitted that they felt the pain more often when tense or excited. He was a shy boy who responded readily to friendliness and encouragement; he seemed to crave recognition and affection, and to want only a chance to show his parents how good he was. An unconscious fear of being deserted by his family seemed to underlie his desire to be appreciated. His father was very strict and demanding. Both his father and his brother had ulcers, and he felt that they had the same type of personality as his.

Case number 8 had had ulcer symptoms since age 5. He was a nervous, high strung, very intelligent boy.

He belonged to a closely knit family, and he was very attached to his father. His mother was an over-solicitous worrisome mother who wanted to do for him all sorts of things that he didn't want done. He wanted to be sought after, but would not seek others. His family travelled all over the world, and his ulcer symptoms were most severe, the first few weeks in a new location. The worst symptoms of his ulcer occurred the first few months in college, when he bled for the first time.

Case number 11 was a 7 year old boy whose pain episodes could definitely be related to visits to his younger mentally deficient institutionalized brother. His symptoms improved considerably when another sibling was born. He lived in a tough neighborhood, and in spite of himself was always getting into fights, even though he tried to be very friendly to everybody. He never expressed his resentment, except to his mother. He refused to diet and ignored his ulcer as much as he could. Whenever he had the pain he was miserable and unhappy, but refused to do anything or to eat until the pain went away.

Case number 15 was a worrisome 11 year old boy who hated to be alone. He had many fears and attention-getting devices. He was very hostile to his sister. He had unable to learn to read in spite of apparently normal intelligence. He had

been hospitalized for a month at age 2, for severe burns over the back and axilla, after which he was nervous, cried, stuttered and couldn't sleep. Apparently, hospitalization at this young age is quite traumatic and could be a factor in the development of an ulcer.

Case number 4 also developed an ulcer after a long hospitalization for chalasia of the esophagus. His mother was all worn out by his long illness and apparently did not give him all the love he needed.

Cases number 10 and 13 are two examples of children with ulcers in whose families nothing unusual could be found. Both of the children were nervous, hyperactive youngsters of average intelligence. Both of them felt that they got the pain when worried or frustrated.

Case number 12 is an example of the very bright and perfectionistic type of ulcer patient. She always wanted things "just so", hated noise and dirt. She was very unconcerned about her symptoms and her disease. She soon became asymptomatic except for early morning vomiting whenever she had to go someplace or do something. She apparently loved school, but she was never sick on weekends. This "psychogenic" type of vomiting is found in many patients of this age group, and it may be related to the psychological dynamics of the patient more than to the peptic ulcer.

Case number 14 was a very withdrawn girl, always

alone with her books, who in addition to an ulcer had fibrocystic disease, and was partially deaf, even though her deafness was considered to have a large psychogenic overlay. Her symptoms improved markedly once she obtained a hearing aid, and was able to meet more people.

Case number 5 was a young temperamental 5 year old boy, who has lived with a psychotic grandmother at home, and whose father left the house as much as possible to avoid the grandmother. The patient often had fits of screaming and jumping, and temper tantrums.

Case number 16 is a quite, bashful boy, always alone with his books, very dependent on his mother. He lived in a house full of women, and was dominated by his older sisters, and his overprotective mother. He reacted by frequent headaches and abdominal pain, but never complained verbally.

One of the cases (number 22) was that of a 17 year old boy who committed suicide after a year of ulcer-like symptoms.

Case number 17 bled three times, and every time it was right at the end of the"ulcer season" when he was very anxious about starting a new job, since he did not work during his "ulcer season". He was a very dependent youngster who wanted to please others very much, and to whom close friends meant very much.

As can be seen, the personalities of children with ulcers have little in common with eacheother, but a specific dynamic configuration seems to play a role, even if it is not a determinant in the development of the somatic disorder. A definite improvement or worsening of symptoms seems to occur sometimes with environmental manipulations, with sedation, with changes of way of life, and with changes in parental reaction and understanding of the disease.

Most of these patients seem to have developed an ulcer when under some kind of conflict, or following an event responsible for fear of loss of security. We can postulate a theory for the development of an ulcer on the basis of unresolved conflicts, or of an excess of tension superimposed on a constitutional or physiological predisposition to ulceration of the gastroduodenal mucosa. The source of these conflicts may be, for example, the trauma of a long hospitalization, or a lack of adequate love in the home. These conflicts can not be considered a sole etiological factor, since the fact that some of the children with an ulcer have a high gastric acidity points to a definite constitutional factor.

In studying the personality of patients with an ulcer one has to distinguish between their basic personality and the changes which have come on secondary to the distress caused by their organic disease. Thus, the psychogenic type of vomiting

the irritability, failure to thrive, and other non-specific symptoms of young children with an ulcer may be secondary to the relative invalidity caused by their disease.

Psychiatric help should be offered to children with ulcers, and to their parents. This should be stressed more than in adults because the psyche of the child is less capable of tolerating a disease that makes him different from other children, and imposes some limitation on his activity and on his eating habits. Moreover, a change in parental attitude may relieve a considerable part of the anxiety of the youngster, and bring with it some improvement. In addition, psychoanalysis may be useful in that it may reveal what factors will intensify the underlying conflicts.

SUMMARY

One should think of a peptic ulcer in the differential diagnosis of melena, hematemesis and of any acute abdominal condition, in children almost as much as in adults. There has been a definite increase in the incidence of peptic ulcer in children, whether this is a result of more accurate diagnosis is a moot point. It should also be considered in studying a child who has been vomiting for a long period of time. In spite of the esposure to radiation, any child with a long history of abdominal pain, even if vague and not characteristic, should have a gastrointestinal series.

A failure to thrive in a child may be entirely due to a duodenal ulcer, and it should be considered in the differential diagnosis of an underdeveloped child with some abdominal complaints. Physical examination is generally not contributory to the diagnosis, but an occasional child with a duodenal ulcer will have some tenderness to deep palpation in the epigastrium.

There are some definite personality patterns in children with duodenal ulcer; in most cases they have over-protective, worrisome mothers, they have a compulsive type of personality, and in their homes considerable emphasis has been placed on eating the right type of diet, and on avoiding certain foods.

The diagnosis of duodenal ulcer in children is harder to come by than in adults because children have no pathognomonic symptoms, x-rays are not taken as often in children, and it is harder to get an accurate history. It is important to keep a high index of suspicion because, except for melena or hematemesis, most of the other characteristic symptoms can be considered on a functional basis. The diagnosis cannot be made on purely clinical grounds, as it can be in adults, it has to be confirmed by the demonstration of an ulcer crater, or of delayed emptying of the stomach with some irritability or scarring of the duodenum. Studies of gastric acidity should be done, even though they are of less importance than in adults. In this series, all the children that were symptomatic had an elevated blood pepsin level.

Treatment, once the diagnosis is made is very similar to that in adults. Youngsters, in general, will not follow a diet; they want to eat what their friends eat and when their friends eat, they want to eat only when they are hungry. A diet can have a very profound psychological effect, making them feel different from their friends and more delicate. The best way to handle this problem is to tell them to eat as frequently as they can, to take milk or antacids if they like either, and to avoid any food which causes obvious distress. Response to medical therapy is very good and very prompt in most cases,

and there may be complete radiologic healing in 6-12 weeks, subjective improvement may occur even earlier. (40) In addition, of course, parental understanding of the problem should be sought, and an attempt should be made to find any psychological factors which may contribute to the symptoms. Very often the symptoms are found to be seasonal, and medicines will have to be taken only for a few months of the year.

A few patients in this series became asymptomatic and stayed asymptomatic for long periods of time without any dietary restrictions, and without any therapy. Most of them are, however, following some type of bland diet and take antacids and anticholinergic drugs. The latter are mostly in the younger group. Some seem to have "outgrown" their ulcer and are perfectly healthy. The only two children in this series that did badly are the only two who bled profusely, and who had to be operated on after the 2nd. and 3rd. bleeding episode, respectively. Bleeding, then, in this series, is the only symptom to which we can attach a bad prognosis.

Follow up studies reveal that the earlier the onset of the ulcer symptoms the more frequent the recurrences, and the more unlikely a complete cure. The children who had the onset of their symptoms prior to their 6th. birthday were all symptomatic when last seen, and one of the cases had been

followed for 16 years, as can be seen from table H.

Surgery should be resorted to: after a perforation, after two massive bleeding episodes, during incontrollable bleeding, and for intractable pain. The surgical procedure of choice is still debatable and has to be individualized. Most surgeons prefer gastrojejunostomies with partial gastric resections, or subtotal gastrectomies if there is a considerable amount of free acid.

In conclusion, peptic ulcer in children differs from that of adults in that free acid is not always present, the pain has a less definite pattern, relief from milk is less constant, there is an increased incidence of early morning pain or nausea, and vomiting and anorexia are common complaints.

TABLE A: Incidence of peptic ulcer by location.

Author	Number of cases	Ages	Duodenal	Gastric	Mult.
Tudor (47)	481	0-16	76%	24%	
Bird, Limper and Mayer (8)	118	0-15	70%	26%	4%
Morin and coworkers (38)	130	7-15	76%	24%	
Cole (14)	31	0-2	70%	30%	
Grace New Haven	24	0-16	88% (21 cases)	12% (3 cases)	

TABLE B: Incidence of peptic ulcer by Sex

Author	Number of cases	Males	Females
Alexander (3) (250 children X-rayed)	30	60%	40%
Goldberg (22) (Surgical series)	20	70%	30%
Peluffo and coworkers (40)	22	81%	19%
Reyderman (42)	12	75%	25%
Tudor (47)	481	62%	38%
Grace New Haven	24	83% (20 cases)	17 % (4 cases)

TABLE C: Incidence of peptic ulcer by age groups.

Author	Number of cases	0-5 yrs.	5-10 yrs.	10-15 yrs.
Alexander (3)	30	33%	27%	40%
Bird, Limper and Mayer (8)	243	45%	24%	31%
Peluffo and coworkers (40)	22	36%	42%	22%
Grace New Haven	24	33% (8 cases)	29% (7 cases)	37% (9 cases)

TABLE D: Family History of Peptic ulcer in the patients of the Grace New Haven series.

Case No.	Age of onset of symptoms	Sex	Member in family with peptic ulcer
5	2 years	male	one cousin
6	2 1/2 years	male	Paternal uncle Father Maternal Grandfather
11	7 years	male	Paternal uncle Maternal uncle
13	9 years	male	Paternal Grandfather Paternal Grandmother
17	14 years	male	Paternal Grandfather
20	15 years	male	Father Brother

TABLE E: Symptoms found in 8 children with peptic ulcer, between the ages of 2 and 9, in the Grace New Haven series.

Symptom	Number of cases
Hematemesis	1
Bleeder	4
Repeated bleeder	1
Vomiting	4
Pain	8
Low grade fever	1
Failure to thrive	1
Diarrhea	3
Anorexia	5
Tension headaches	2

TABLE F: Symptoms found in 11 children with duodenal ulcer, between the ages of 9 and 16, in the Grace New Haven series.

Symptom	Number of cases
Hematemesis	2
Bleeders	6
Repeated bleeders	2
Vomiting	3
Pain	10
Anorexia	2
Marked aerophagia	3

TABLE G: Incidence of complications found in children with duodenal ulcer.

Author	ages	Hemorrhage	Perforation	Obstruction
Tudor(47)	1-15	26%	21%	12%
Bird,Limper & Mayer (8)	1-15	27%	34%	25%
Proctor(41)	1-6	40%	25%	35%
Grace New Haven	1-16	55%	5%	10%

Bird,Limper and Mayer in addition, report 14% operated on for intractable pain.

TABLE H: Correlation between the age of onset of the ulcer symptoms and present status of the patients in the Grace New Haven series who were followed for over a year.

Case No.	Time of follow up	Age of onset of symptoms	Present status
3	2 years	6 months	On diet- Symptomatic
5	2 years	2 years	On diet- Occasional symptoms
6	3 years	2 years	On diet- Symptomatic
8	16 years	5 years	On diet- Occasional symptoms.
9	2 years	5 years	On diet- Occasional symptoms
10	4 years	6 years	Asymptomatic
11	1 year	7 years	Asymptomatic
12	1 year	9 years	Asymptomatic
13	2 years	9 years	Occasional symptoms
15	3 years	11 years	Asymptomatic
16	3 years	13 years	Asymptomatic
17	5 years	14 years	Bled three times. Gastrectomy.
19	26 years	14 years	Asymptomatic
20	7 years	15 years	Seasonal pain.
21	7 years	18 years	Asymptomatic

B I B L I O G R A P H Y

1.- Ackerman and Regato. Cancer, 1954

2.- Alexander, F.K. Peptic ulcer in children.
A.M.A. Arch. Surg. 70 - 935- June 1955

3.- Alexander, F.K. Duodenal ulcer in children.
Radiology. 56 - 799 ⊖ 1951

4.- Alexander, F. Influence of Psychological factors upon gastrointestinal disturbances.
A Symposium- Psychoanalyst Quart. 3: 501 - 1934

5.- Alvarez, W.C. Nervousness, Indigestion and Pain - New York, 1943

6.- Antoine E. - On long term results of surgical intervention for stenosing ulcers in infancy.
Arch. mal. app. dig. 44 - 94 - 1955

7.- Berglund N. A
Acta Paediatrica Stockholmo - 8 - 323 - 1929

8.- Bird, Limper and Mayer - Surgery in peptic ulcer of stomach and duodenum in infants and children.
Ann. Surg. 114: 526 - 1941

9.- Block W.M. - Peptic ulcer in children.
Am. J. Dig. Dis 45- 54 - 1937

10.- Block W.M. - Chronic gastric ulcer; analysis of literature with report of a case in an 11 year old boy.
A.M.A. Am. J. Dig. Dis. - 85 - 566 - May 1953

11.- Burdich W.F. -
J. Pediat. 17: 654 - 1940

12.- Cameron A.L. - Objections to gastroenterostomy for peptic ulcer disease of childhood.
Journal Lancet - 74: 171 - May 1954

13.- Chapman A.H., Loeb D.G., Young J.B.-
Psychosomatic study of 5 children with duodenal ulcer.
J. Pediat. St. Louis 48 : 248 (2), 1956

14.- Cole A.R.C. Gastric Ulcer of the pylorus simulating hypertrophic pyloric stenosis.
Ped. 6: 897 - 1950

15.- De Toni A. - Duodenal ulcer in Infancy.
Arch. Italiano di Chir. No. 6 - 1930

16.- Donovan and Santuli - Gastric and duodenal ulcer in childhood.
Am.J. Dis. Child. 69: 176 - 1946

17.- Dubarry J. Duodenal ulcer and pseudo-ulcerous bulbitis in the second infancy.
Arch. Mal. app. digest. No. 9-10 : 178 - 1944
No 10-11 : 782 - 1948

18.- Foshee - Chronic gastric ulcer in infancy.
J.A.M.A. 44: 1336 - 1932

19.- Franklin A.W.-Perforation of duodenal ulcers.
Arch. Dis. Child. 17: 95 - 1942

20.- Gillespie J.B., Dukes R.E.- Duodenitis in childhood.
Ped. 6: 601 - 1950

21.- Girdany B.R. - Peptic Ulcer in childhood.
Ped 12:56 - 1953

22.- Goldberg H.M.- Duodenal ulcer in children.
Brit. Med. Jour. June 29, 1957

23.- Guthrie K. Peptic ulcer in infancy and childhood with a review of the literature.
Arch. Dis. Child. 17:82 - 1942

24.- Henderson W.F.- Duodenal ulcer in infancy.
New Orleans Med. and Surg. Jour. 83: 295 -1930

25.- Huguenin A., Bacquere P.- Infantilism and pyloric stenosis of ulcerous origin.
Algerie Med. 60: 336 (4) - 1956

26.- Ivy A.C., Grossman M.I., and Bachrach W.H.
Peptic Ulcer, 1950

27.- Kempton J. and Bodian M. - Duodenal ulcer with extensive liver damage in infant twins.
Arch. Dis. Child. 28: 471 - December 1953

28.- Kennedy R.L. - Ulcers in infancy.
J. Pediat. 2: 641 - 1933

29.- Klein H. -Personality study of 100 unselected cases attending a gastrointestinal clinic.
Am. J. Psych. 104: 433 - 1948

30.- Ladd W.E. and Gross R.E. -Surgery in Infancy and childhood, 1953

31.- Lee W.E. and Wells J.R. - Report of a case of Perforation of a gastric ulcer in utero.
Ann. Surg. 78: 36 - 1923

32.- Levrat, Brette and Richard - Gastroduodenal ulcers of known etiology in man.
Arch. mal. app. digest. 42:532 (4) - 1953

33.- Lust J.F. - Roentgenological findings in gastric and duodenal ulcer in children.
Am. J. Digest. Dis. 22: 184 - (7) - 1955

34.- Marshall J.M. - Gastrojejunal ulcers.
A.M.A. arch. Surg. 67: 490 - Sept 1953

35.- McAleese J.J. and Sieber W.K. - The surgical problem presented by peptic ulcer of stomach and duodenum in infancy and childhood.
Ann. Surg. 13: 334 - 1953

36.- Michaelson F. - A case of jejunal ulcer in an infant.
Acta Chir. Scand. 39: 139 - 1925

37.- Miller R.A.- Observations on the gastric acidity during the first month of life.
Arch. Dis. Child. 16: 22 - 1941

38.- Morin M, Mouchet A. and Gautier M- Stenosing duodenal ulcer, 2 cases.
Arch. Mal. App. digest. 43: 481 - May 1954

39.- Neilson J.R., and Black J.H. - Massive bleeding from duodenal ulcer in infancy, treated by gastrectomy.
Ped. 15 - April 1955

40.- Peluffo E, Bazzano H, Martinez Prado G., Achard L.
Las ulceras duodenales y duodenitis en la infancia.
Arch. Pediatria Uruguay 25: 659 - October 1954
25:738 - November 1954
25:844 - December 1954
26:550 - May 1955
26:637 - June 1955
26:702 - July 1955

41.- Proctor - Chronic peptic ulcer in children
Surg. Gyn. and Obs. 41: 63 - 1925
41: 176- 1945

42.- Reyderman J. - Duodenal ulcer in children.
Revue Francaise de Pediatrie, 1936

43.-Strenger - Gastrectomy for peptic ulcer in children.
N.Y. State J.M. 55: 2802 - 1955

44.- Strode J.E. - Gastrojejunal ulcers in childhood.
Am. J. Surg. 21: 240 - 1933

45.- Theile P. Concerning duodenal ulcer in Children.
Deutsche Ztschr. f. Chir. 150: 275 - 1919

46.- Thevenard J. - Duodenal ulcer in an 11 year old boy.
Paris Chir. 14: 590 - 1922

47.- Tudor R.B. - Peptic ulcer problem in infancy and childhood.
Journal Lancet 74: 189 - May 1954

48.- Warson S.R., Turkel S. and Schiele H.S. - Pseudo-peptic ulcer syndromes in childhood.
J. Pediat 35: 215, 1949

49.- Twenty years of Psychoanalysis - edited by Franz Alexander and Helen Ross.
Psychoanalysis and the Biological Sciences,
I.A. Mirsky M.D.

PRESENTATION OF CASES

Case Number 1 Unit No. B33318
Male
Born: 8/31/42
Died:10/7 /42

K.R. was the first born of 2 twins born to a 32 year old healthy, grava II, Kahn negative mother. The pregnancy and delivery had been uneventful, and birth weight was 2080 grams, the child breathed immediately and had a vigorous cry.

At the age of 5 weeks he was readmitted to the hospital because of grossly bloody diarrhea of 3 weeks duration and failure to regain birth weight. There was abdominal distention, but no vomiting. An exploratory laparotomy revealed the peritoneal cavity containing bile and blood, and a perforated ulcer was seen in the second part of the duodenum. The child expired during a second operative procedure, performed to relieve pressure and abdominal distention.

He is presented as a case of a 5 week old infant who died due to massive hemorrhage and peritonitis following a perforation of a duodenal ulcer. There were no associated diseases.

Case Number 2 Unit No.420338
Male
Born: 12/26/54
Died: 2/23/55

Baby K was the first child of a 22 year old, white, Rh positive female, born after an uneventful pregnancy and delivery. At birth the child had a good cry, and good color. Weight was 2455 grams. An apical systolic murmur was heard, and it was noticed that the child became cyanotic on crying. At the age of three and a half months he was admitted because of a bowel movement containing dark red blood, followed by two tarry stools. A Gastrointestinal series and a barium enema were negative, but the child suddenly expired.

At autopsy in addition to tricuspid atresia, there was a sharply demarcated punched out ulcer o.5 cm. from the pylorus, in the first portion of the duodenum. There was no free blood in the bowel.

He is presented as a case of congenital heart disease, and a duodenal ulcer which bled massively on one occasion.

Case number 3
female
Born: 6/10/56

Unit No. A67671
Middlesex Memorial Hospital

G.A. did well until the age of 4 months when it was noted that she was very irritable, and that her sleep was disturbed by frequent attacks of colic. She refused food but did not vomit, and failed to gain weight properly. At this time she was found to have a hemoglobin of 5.4 gms.% and guaiac positive stools.

A gastrointestinal series at the age of 6 months showed spasm in the region of the duodenal bulb; and on some films there was a suggestion of a small ulcer crater.

On her first birthday she was still quite irritable, ate poorly, and gained very little weight; there was a history of occasional guaiac positive stools, and one episode of bloody vomitus. A repeat gastrointestinal series showed inadequate filling of the duodenum, and an irritable duodenum.

She is presented as a case of a young infant with a duodenal ulcer which manifested itself by chronic bleeding and by such symptoms as irritability and lack of weight gain.

Case number 4
male
Born: 5/19/52

Unit No. 385556

R.M. after a normal, spontaneous delivery did well until the seventh day when he started vomiting every feeding. He also had a lot of undigested material in the stools, which were bulky and foul smelling. A diagnosis of chalasia of the esophagus was made and the child was started on thickened feedings, restricted fluids, and the child was kept upright after meals, but his weight gain continued to be inadequate. At the age of 9 months he was still on a solid regimen, but a slow dribbling of food starting at the end of every feeding persisted. A gastrointestinal series revealed a deformed duodenal cap, and regurgitation of barium up the esophagus when lying flat. The child slowly improved on thickened feedings sitting up.

He is presented as a case of a child who developed a duodenal ulcer during a prolonged hospitalization for chalasia of the esophagus. There was prompt healing of the ulcer.

Case Number 5 Unit No. 379911
Male
Born: 11/14/52

M.K. at age 2 started refusing foods, and began to vomit 2-3 hours after meals and at bedtime. Four months later he had the onset of periumbilical pain, and a feeling of faintness, and passed some black, tarry stools. His hemoglobin was found to be 5.1 gms.%. He was put on a soft diet with marked improvement. A gastrointestinal series revealed a small ulcer niche in the duodenum.

The patient was last seen at age 5. He was doing well except for occasional post-prandial vomiting and frequent bouts of anorexia. He always feels much better in the summer. His mother had colitis in the past so the whole family is on a rather bland diet. The problem is complex because he lives with a grandmother who is not well balanced mentally, and the child has been frightened by her on many occasions.

He is presented as a case of a young child who has had one massive bleeding episode from a duodenal ulcer, and no recurrence in a 2 year follow up.

Case Number 6 Unit No. A 49417
male Middlesex Memorial Hospital
Born: 1/29/52

M.B.A. was first seen at age 2½ with a chief complaint of one tarry stool that his mother associated with a cut lip. Six months later he had a soft, tarry bowel movement followed by vomiting of red material. That evening he passed several black stools and was admitted to the hospital with a hemoglobin of 6 gms %. The patient pointed to the right upper quadrant of the abdomen saying "it's hot here". He had had no epigastric distress and no allergic history. A gastrointestinal series showed inflammatory disease of the duodenum with a constant irregularity. He was put on an ulcer regimen but had to be operated on due to inability to keep up with the bleeding. At operation the duodenum was slightly thickened, erythematous, and adherent, the mucosa was friable; one bleeding point around which there was an area of inflammation and edema was seen and sutured. Recovery was uneventful. The patient was discharged on an ulcer regimen.

A gastrointestinal series one month after the operation showed coarsening of the mucosa extending well into the second part of the duodenum without an ulcer crater. 5 months later the child was again admitted with a chief complaint of blood in the stools. At this time his hemoglobin was 9.5 gms. %. He had been on a bland IV diet without any other medication. There had been no vomiting, diarrhea, constipation or abdominal pain. His stools were Guaiac positive for 2 days, then reverted to negative.

It was noted at this time that the child bruised easily, and had ecchymoses on various parts of the body; a history of aspirin intake prior to every bleeding episode could be elicited. 6 months later X-ray studies showed a duodenal deformity compatible with an old healed ulcer.

When last seen the boy was 5½, he was of normal size and weight for his age, and had no gastrointestinal complaints, but took Aluminum Hydroxide, Donnatal, and he was on a strict diet.

It is remarkable that his father has an ulcer that has bled once, his uncle has an ulcer, and his maternal grandfather was a repeated gastrointestinal bleeder.

He is presented as a case of duodenal ulcer in a boy with a strong family history of ulcer, and who bled three times within a year, requiring surgery to stop the bleeding on one occasion. He has shown a good response to therapy, and is doing well at present.

Case Number 7 Unit No.445258
Male
Born: 2/17/54

J.M.'s disease started in March, 1956, when albuminuria led to a diagnosis of nephrosis. He was started on steroids on 4/2/56 and maintained on doses of up to 40 mgm. of meticorten. He was also on Achromycin and on a low salt, high protein diet. Over the next year his dosage of steroids varied from 10 to 40 mgms. of Meticorten and a few courses of 100 units of ACTH were also given.

In June 1957 it was noticed that in addition to a fall in hematocrit to 22, he had guaiac positive stools; a gastrointestinal series showed a gastric ulcer on the lesser curvature and irritability and deformity of the cap. His appetite was poor, and he vomited frequently, on one occasion having vomited some blood, but he had no other gastrointestinal symptomatology. His steroids were tapered, he was put on an ulcer regimen, and after a few days in the hospital the school guaiacs gave negative results. In August X-ray studies were negative. His nephrosis has remained unchanged, and he is now on 40 mg. of meticorten every day, and an anti-ulcer therapy.

He is presented as a case of steroid-induced gastric ulcer, that responded very well to the usual therapeutic measures.

Case Number 8 Unit No. 395779
Male
Born: 10/1/1935

P.T. had the first symptoms of an ulcer at age 5 in Spain when he started crying, vomiting and doubling over with severe epigastric pain. An appendectomy was performed, but his pain remained unchanged.

During the next few years he had a few bouts of vomiting and abdominal pain, for which he had to be hospitalized on 3 occasions. These bouts would usually coincide with trips to Europe or South America or back to the United States. At age 7 he developed asthma, that would get worse pari passu with his gastrointestinal symptoms. Eructation, heartburn, an "acid feeling" and vague pain before meals persisted in spite of dietary and medical therapy.

His first gastrointestinal series was done at age 9 to evaluate his cyclic vomiting, but nothing was found. At age 13 an ulcer crater in the duodenum was demonstrated, and at age 15 an active stenosing duodenal ulcer was shown, and there was 50 % retention of barium in the stomach after one hour.

At age 17, sixteen days after starting college he started complaining of an acid sensation in the stomach, of some abdominal discomfort, and he had a black, watery bowel movement, followed by some bright red blood. He had no hematemesis and no pain. He has always had a good appetite. He gave no family history of duodenal ulcer.

Since then the patient has had no further bleeding, but at age 21 he had a recurrence of his typical ulcer pain, relieved by milk and alkali. He had not been on a diet at the time, but following the attack he went on a modified ulcer diet for 6 months, and up to date has continued taking antispasmodics and antacids. He reports fairly frequent bouts of indigestion lasting for a period of 2-10 days. They consist of epigastric distress and a feeling of fullness. They seem to come mostly after alcoholic beverages, smoking and heavy meals. For a year now he has had no further hunger pain, and he hasn't been awakened at night.

He is presented as a case of a duodenal ulcer that has caused symptoms on and off for 16 years, has bled once and has caused some degree of pyloric stenosis.

Case Number 9
Male
Born: 2/2/50

Unit No. A 72139
Middlesex Memorial Hospital

D.K. was first seen at age 5½ when he presented as a lean, pale, anorectic young boy complaining of generalized malaise, muscle aches, diarrhea and vomiting to the point of dehydration. He was irritable and constantly whining because of a headache and a "tummy" ache. He had a high fever which subsided with penicillin.

Six months later he had a recurrence of the abdominal pain, worse on arising and after eating. X-ray studies at the time showed an irregular duodenal bulb which at no time filled completely. Spot films showed a 3 mm.

diameter ulcer crater. Hypermotility of the small intestine was also noticed. His symptoms subsided on therapy. Four months later a second gastrointestinal series showed a minute ulcer crater in the mid portion of the bulb.

He was last seen 10 months after his second X-ray study, almost a year an a half after the onset of his symptomatology; he still complained of occasional abdominal pain, usually with upper respiratory infections. No family history of ulcer was elicited.

He is presented as a case of duodenal ulcer that became symptomatic concomitantly with upper respiratory infections.

Case number 10 Unit No. 40-90-46
Male
Born: 8/21/47

F.D. presented as a 6 year old boy with a 4 year history of abdominal pain that had recently increased in frequency and severity. The pain is epigastric and most severe in the early morning as well as before meals; it lasts 5-10 minutes. He never gets the pain more than once a day, and never in the evening. Usually he is sitting down when he gets the pain, and lying down has brought quick relief on occasions. He has a lot of gas, and passes it more by rectum than by mouth, this and bowel movements have on occasions relieved his pain. He has no anorexia, nausea, diarrhea, vomiting, no allergies, no family history of ulcer.
For the past month he had each week 3-4 bouts of pain; they are always less frequent in the summer months than during the school year.

A gastrointestinal series at age 4 was read as indeterminate with a questionable duodenal deformity. Fried foods and rich foods were eliminated from his diet. At age 6 a filling defect was consistently seen in the duodenum, together with some irritability of the cap. He had a Blood pepsin level of 560 units. (Normal Pepsin levels in this laboratory are 200-450)

He is a nervous, hyperactive boy, and he feels that he gets the pain when he is worried.

He is presented as a case of a 6 year old boy with a duodenal ulcer that manifests itself by frequent bouts of epigastric pain.

Case number 11 Unit No.C27819
Male
Born: 1/1/47

W.M was first seen at age 7 when he gave a history of severe mid-abdominal pain, once a year for 3 years. This last bout had awakened him at 5 a.m., and the pain had lasted a whole day. As far as he could tell, he had no allergies or food intolerances.

Two months later he was readmitted to the hospital because of several pain episodes, three in the last week. His tendency was to stop eating, and that would make the pain worse. At this time a gastrointestinal series showed a duodenal ulcer at the apex of the bulb.

It was also at this time that a brother was born with severe brain injury, and who was very sick for a long time. Over the next year he had various episodes of pain, related to visits to his brother, and his school work was also very poor, at this time. He took antacids, but he would have pain at least once a month, at times very severe, lasting 2-3 days. He was restless and started having occasional tension headaches. The problem was complex, since he would refuse to stick to a strict diet.

When next seen, 5 months later, he was doing a lot better, and he was glad that he was going to have another brother. He was adhering to his diet and taking antacids, but he hates to diet and when he is well he feels that the pain he gets makes it worth his while to eat everything and take a chance. When he is sick he is miserable and unhappy.

He was last seen 2 years after this, when he reported that he had been entirely asymptomatic except for one episode of severe pain, which lasted all night, since he refused to take any medication, He had gained 60 lbs in the two years, and he was doing better at school.

He defined two types of pain: his "ulcer pain", which is severe, accompanied by anorexia and vomiting, and his "gas pain" which is less severe, and relieved by burping. Both pains are always in one spot, right above the umbilicus. He is still bothered by frequent headaches, especially at school, with good relief from aspirin.

No family history of ulcer was elicited, but both his mother and his father have brothers witha duodenal ulcer.

He is presented as another case of duodenal ulcer manifested mostly by severe pain episodes, and anorexia.

Case Number 12 Unit No. 448800
Female
Born: 2/18/47

J.W. was first admitted to the Grace New Haven Hospital at age 9 because of recurrent abdominal pain, malaise and a low grade fever. She had been in her usual state of good health until 2-3 months before admission when her mother noticed that she was restless and cranky. She started complaining of an exquisite "pinching", abdominal pain in the right upper quadrant, always in the early morning, accompanied by nausea; all her symptoms would be relieved by vomiting. The pain would sometimes return in the late afternoon. There was no relationship to anything she ate, she knew of nothing that would make the pain better or worse, and the pain did not radiate. Appetite was not affected. A gastrointestinal series showed an irritable duodenal bulb with a consistent constriction in the midportion, suggestive of a small ulcer crater.

In the hospital she vomited several times, mostly in the morning, but was extremely unconcerned about this, in contrast to the mother who was very worrisome. It was felt that there was a strong psychological overlay. The girl would generally be sick on school days, felt better on weekends, and in the summer would feel very well. There was no family history of ulcer.

When next seen, fifteen months later, she had had no further pain and had been entirely asymptomatic except for the fact that whenever she knew she had to go somewhere she would be nauseated, and sometimes also vomit. She had been on a diet for 6 months, but since then has been eating everything. Her mother has been forcing milk on her, which she likes, but feels that it does nothing for her nausea.

She is presented as a case of morning nausea and cyclic vomiting, and a probable duodenal ulcer that may not be responsible for the symptomatology.

Case Number 13
Male
Born:2/47

P.G. presented as an 11 year old boy who had had the first symptoms at age 9 when he complained of right lower quadrant pain, that would come on mostly in the mornings, and would very seldom bother him after that. His mother thought that the pain was just because he didn't want to go to school. X-ray studies showed a duodenal ulcer, and an attempt was made to put the boy on a diet. He reported his pain as one finger in the epigastrium, and he said that it is always in one spot. The pain has awakened him at 6 a.m. on one occasion, and has kept him awake all night.

He does not eat any breakfast. He drinks a lot of milk but it does not give him any relief, however Malaax has on occasions made the pain go away. He has noticed sometimes that overeating may bring on the pain, as well as feeling frustrated or depressed.

His paternal grandfather and grandmother both had an ulcer. His parents have to travel a lot, and he has had to spend a lot of time alone. He has never vomited. He is a strong, healthy boy with minimal epigastric tenderness to deep pressure.

He is presented as a case of duodenal ulcer which illustrates that in children milk does not always give relief, and that morning pain is a common occurrence.

Case Number 14 Unit No 436983
female
Born: 9/6/44

M.M. was first seen at age 9 for shortness of stature, frequent upper respiratory infections, and a long history of cough, diarrhea, nausea, abdominal cramps, and sharp mid-epigastric pain not related to eating. An operation was performed and

"45 cm. of terminal ileum, cecum, and ascending colon were removed because of acute and chronic terminal ileitis, appendicitis with diverticulum, periappendiceal abscess, and follicular hyperplasia of mesenteric lymph nodes, and intususception of the terminal ileum."

At age 11 she was again hospitalized because of dagger-like early morning abdominal pains associated with a desire to defecate. She would strain at stools, and then be pale and uncomfortable until lunch. She reported having this for a few days every month since age 4. X-ray studies revealed an ulcer crater in the duodenum and an abnormally large filling capacity in the large intestine. Sweat and stool studies revealed the diagnosis of cystic fibrosis and she was started on therapy. 4 months later her symptoms had improved. She is in the 50% for height and in the 25% for weight.

She is presented as a girl with cystic fibrosis who developed both regional ileitis, and a duodenal ulcer.

Case Number 15 Unit No. B88530
Male
Born: 9/17/43

V.C. was admitted at age 11 because of nausea and post-prandial pain relieved by milk, and because he had noted that his stools had been dark and mushy for about two months before admission. He gave a history of abdominal pain on awakening in the morning, and on occasions before meals. This pain always improved on eating. On physical examination he had some tenderness to deep pressure in the mid epigastrium.

His father has a sensitive stomach, but no ulcer. No history of allergies. X-ray studies were negative. Stools were positive guaiac.

He weighed 90 lbs. at the time of his ulcer trouble, and when last seen at age 14 he weighed 140 lbs, ate better and felt better. He had been kep back one grade, because of difficulty in learning to read, but he was doing better. He had had one or two episodes of pain, but no black stools and he has done well without any diet or medications.

He is presented as a probable duodenal ulcer with the characteristic early morning pain, and a failure to gain weight. He had one long bleeding episode, and no others since therapy has been started, even though the therapy has been discontinued.

Case Number 16 Unit No. B 37712
male
Born: 4/13/40

W.C. was first seen at age 13 with a 7 week history of non-radiating, dull, hunger pain in the epigastrium coming on in the late afternoon, and relieved by the evening meal.

On occasions he has had similar pain in the early morning and before going to bed. The pain would be relieved by food, and especially by milk, but not always. He had no nausea, vomiting or anorexia, no diarrhea or constipation. He had had one asthmatic attack 2 years prior to this, but no others. A gastrointestinal series at this time showed a markedly deformed duodenal cap and a penetrating ulcer crater, and antacids and antispasmodics were started.

Two months later he was readmitted because of painless vomiting during meals, severe periumbilical pain, and a trace of blood in the stools. The gastrointestinal series again showed a marked duodenal deformity.

One year later he was doing well on antacids, having had only one bout of mid epigastric distress, relieved by milk, and not as severe as the previous ones. He had been following a diet, avoiding all fried foods. He complained now of frequent headaches, relieved by aspirin.

He was last seen 2 years later and his chief complaints were the headaches. He'd had some mild hunger pain, but only when he was too busy to eat.

He is presented as a case of duodenal ulcer with prompt healing and good response to therapy.

Case Number 17 Unit No.416938
Male
Born 4/2/38

D.C.C. reported some epigastric distress since age 4, but it was at age 13 that he started complaining of heartburn, of mid epigastric pain a few hours after meals, and of frequent vomiting. The pain would often be relieved by food. The next year a duodenal ulcer was demonstrated radiologically. He was placed on the usual anti-ulcer regimen but he continued to have an acute episode about once every month, especially in the fall, and usually following dietary indiscretions. A repeat gastrointestinal series at age 15 showed no healing, and two months later, following a meal consisting of fried foods, he had his first massive bleeding episode. The bleeding promptly subsided, and he complained of constant nausea and a lot of epigastric pain, relieved by medication only occasionally. Two and a half years later he had his second bleeding episode. In the interim he had done well except for several episodes of pain on awakening in the early morning, relieved by milk, and some hunger pain. At this time he was just getting ready to start on a new job, since he never worked during the fall, his ulcer season.

One year later he bled a third time, was admitted at another hospital, and a gastrectomy was performed.

At the time of his second admission his blood pepsin level was determined and values of 480 and 545 units were found, both consistent with hyperchlorhydria. Blood pepsin levels on his mother, father, 3 brothers and a sister were all within normal range except for one brother who had a pepsin of 540 units.

He is presented as a case of duodenal ulcer with hyperchlorhydria, which led to a subtotal gastrectomy at

the early age of 20, because of three massive bleeding episodes.

Case Number 18 Unit No.C47683
Female
Born: 6/6/39

J.D. was admitted at age 14 because of persistent nausea and vomiting of 4 days duration, accompanied with a feeling of weakness. A gastrointestinal series showed a deformity of the duodenum with scarring from an old ulcer. She gave a history of occasional early morning abdominal pain, for the past two years, but nevere severe enough to bother her.

She has been asymptomatic since then, except for occasional early morning mild abdominal pain. She has not been on a diet nor on medication.

She is presented as a case of a relatively asymptomatic duodenal ulcer.

Case Number 19
Male
Born: 2/1913

At age 14 B.B. had the onset of epigastric pain relieved by milk and food, occuring in the late afternoon, and waking him up at night. A gastrointestinal series at the time showed a duodenal ulcer. He went on a strict diet for a year and then slowly abandoned it, until he was eating everything, and was asymptomatic.

The same type of pain recurred when he was 35 years old, and again there was a good response to a soft diet and Malaax. After that he was almost without symptoms except for occasional bouts of mild pain until he was 43 when he had a recrudescence of his epigastric pain, associated with anorexia to the point that he took nothing but milk by mouth. At age 45 he was admitted to the hospital because of an incomplete pyloric obstruction, and decompressed medically and discharged on a soft diet.

He is presented as an example of a long term follow up of a duodenal ulcer that ran a relatively benign course for 30 years, but finally obstructed.

Case Number 20 Unit No. B8178
Male
Born: 1/20/35

R.N's first symptoms were eructation and a feeling of having a lot of gas in the stomach. He doesn't remember any vomiting or any pain until the age of 16 when he had his first bleeding episode consisting of hematemesis and dark stools. Since then he has been very intestine conscious, and always watches his stools carefully, and he reports that they were black again for 2 nights, two

years later. He has been followed for 7 years, and he has had no tarry stools since then. His ulcer is seasonal, and usually during the summer months he is completely asymptomatic. During the season he has the onset of epigastric pain, moving down to the lower abdomen, and if unrelieved radiating also to the back. It is a sharp steady ache that always stays until he takes something, but responds readily to milk and antacids. This pain comes on 3 hours after eating, and is sharpest at 3 a.m., waking him up every night during the ulcer season. He reports no heartburn and no vomiting.

His father had a "nervous stomach", requiring a gastrectomy for incontrollable bleeding, 3 years before the patient bled. One brother had an ulcer diagnosed in 1950 at age 26, but his symptoms have been very mild.

He is presented as a case of duodenal ulcer with a strong family history, one moderate bleeding episode, and a very marked seasonal distribution of symptoms. X-ray studies have demonstrated a typical ulcer crater and an irritable duodenum.

Case Number 21 Unit No. C36484
Male
Born: 6/29/33

B.A. was a 15 year old colored boy who gave a history of several weeks of weakness and dizziness, anorexia, nausea, and occasional vomiting. He also had some abdominal discomfort: a vague tightness without any real pain, relieved by vomiting.

He was then well for about a year until he had the gradual onset of fatigue, anorexia, lightheadedness, fainting spells, and severe frontal headaches. Once he vomited about 200cc. of bright red blood, his stools were found to be guaiac positive, and his hematocrit was found to be 13. Sickle cell tests were all negative. A gastrointestinal series at the time showed a typical duodenal deformity, and delayed emptying of the stomach.

4 months later he was asymptomatic, and had no abdominal distress. He was on a diet and on antacids. 2 years later, when he was last seen, he had no gastrointestinal complaints, in spite of occasional dietary indiscretions.

He is presented as a case of duodenal ulcer that manifested itself by prolonged minimal bleeding, and that responded very well to therapy.

Case Number 22 Unit No. B82892
Male
Born: 7/19/39
Died: 8/3/56

W.P. presented as a 16 year old colored boy who had had mild anorexia for one year, and a lump in the throat and severe anorexia for one week, when one night at 4 a.m. he awoke nauseated, drank some water and vomited one cupful of red blood, followed by some black material. He had had a "gnawing, hungry feeling in the epigastrium, but no real pain", usually one hour after eating, relieved by milk or food. The pain would often awake him at night and force him to get up and get something to eat. He stated that if he didn't eat anything the pain would stay for a while, and then go away. He had had no previous episodes of vomiting.

A gastrointestinal series was negative, and his stools soon became negative. The patient committed suicide a year later.

He is presented as a case with a history very suggestive of an ulcer, but no X-ray findings.

Case Number 23 Unit No.44099
Male
Born;1/15/56

W.B. presented as a 4 months old cyanotic infant with hepatosplenomegaly and mental retardation. He was thoroughly studied at the hospital, and the diagnosis of an interventricular septal defect was made. A gastrointestinal series revealed a pre-pyloric ulcer crater. The child was markedly anemic, but he had a hypoplastic marrow with a marked diminution of erythroid forms, and it was concluded that the anemia was not secondary to bleeding from the ulcer. No follow up has been obtained.

He is presented as a case of an asymptomatic gastric ulcer in an infant with congenital heart disease.

Case Number 24 Unit No. 380440
Male
Born: 1/26/46

G.S. presented as a 6 year old boy with a history of epigastric pain relieved by bowel movements, and nausea of 4 days duration. His bowel movements were perfectly normal. This was followed by the vomiting of dark brown material, and then of bright red blood with clots.

A gastrointestinal series showed an ulcer on the lesser curvature. X-rays after 2 weeks showed incomplete healing, and in 2 months the stomach looked normal. He had been completely asymptomatic on a one year follow up.

He was a very tense boy, prone to temper tantrums, and he used to get very upset at the fact that his younger brother could eat things that he was not allowed to eat.
No family history of ulcer was elicited.

He is presented as a case of a gastric ulcer that bled once, and responded well to therapy, in a tense child.

YALE MEDICAL LIBRARY

Manuscript Theses

Unpublished theses submitted for the Master's and Doctor's degrees and deposited in the Yale Medical Library are to be used only with due regard to the rights of the authors. Bibliographical references may be noted, but passages must not be copied without permission of the authors, and without proper credit being given in subsequent written or published work.

This thesis by has been used by the following persons, whose signatures attest their acceptance of the above restrictions.

_____

_____

NAME AND ADDRESS DATE