

GENERAL STAFF MEETING
 UNIVERSITY HOSPITALS
 UNIVERSITY OF MINNESOTA

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CASE REPORTCHRONIC CHOLECYSTITIS WITH PYLORIC OBSTRUCTION, ACUTE BRONCHOPNEUMONIA.

Path. Pearson.

The case is that of a white male, 64 years of age, admitted to the University Hospitals 1-21-32 and died 2-14-32 (24 days).

Thanksgiving Dinner (sudden distress)

11-?-31 - Belched a great deal of gas, especially after pork and sauer kraut. Came on about five minutes after eating. Continued for about a week when he began to have rolling pains in his epigastrium. This was a dull, aching pain which became gradually worse.

Vomiting - pain

12--31 - Began to vomit once every three or four days. Developed pain in epigastrium every time he ate, so that he could often go without food. Pain would develop immediately after eating and would last until 2 or 3 o'clock in morning. Taking a cathartic would relieve it. Lost thirty pounds in weight from beginning of illness.

Pyloric stenosis

1-15-32 - Dispensary. X-ray - colon, gastro-intestinal study - The colon appears entirely normal. The appendix was fairly well visualized and appeared normal. Gas inflation was done and showed no abnormality. The stomach is slightly dilated and shows a very marked obstruction at the pylorus. There is about 80% retention at 6 hours and so little of the barium can be forced through the pylorus that the duodenal bulb is visualized with great difficulty. A large amount of food and fluid is present in the stomach on each examination. The extent of the foreign material present in the stomach is so great that it resembles diffuse polyposis very closely. Excellent peristalsis can be made out throughout the stomach and there is no evidence whatever of malignancy. The appearance suggests most strongly a pyloric or duodenal ulcer of extreme grade with marked pyloric obstruction secondary to it. Conclusions: Negative colon. Pyloric obstruction probably from pyloric or duodenal ulcer. Marked retention in stomach. Blood - Hb. 85%. Feces - nega-

tive for blood. Gastric analysis - no free Hcl.

Hospital (2 mo.)

1-21-32 - Admitted to University Hospitals. Physical examination reveals elderly, white male, 64 years of age, who is poorly nourished and seems to have lost much weight. Thorax - there is depression about 4 inches by 2 inches over lower one-third of the sternum which is covered by scar tissue.

Abdomen

Appears sunken, no bulging or distension, no retractions or scars, no tenderness or rigidity, no masses palpated, liver and spleen palpable but not enlarged.

Sippy Diet (1 week)

Progress: Pulse and temperature normal. Patient is put on a Sippy diet with 1 oz. of milk and cream every hour from 7 to 9. Patient complains of no pain. Laboratory: Blood - Hb. 89%, wbc's 6,225, Pmn's 69%, L 30%. NPN - 28.9 mgs. Blood Wassermann - negative. Gastric analysis - no free Hcl. Urine - specific gravity 1.020. PSB - total 65%.

Erysipelas

1-28-32 - Medical note: Developed temperature of 102.4 at 8 A.M. Throat and tonsils inflamed. Slight erythema of nose and cheeks. The erythematous areas became raised and sharply bordered. Area of erythema was of a butterfly distribution over bridge of nose. Nose greatly swollen. Magnesium sulphate (cold) packs to nose, three times daily. Aspirin gargle, every four hours. Saline gargle, every four hours. Pyramidon gr. v, three times daily. Complains of some pain and tenderness in abdomen. Seen by Skin Dept. - diagnosis of mild erysipelas. Suggested lamp treatments.

Lamp Treatments (12 days)

2-1-32 - Patient complains of sharp pain in feet and hands. Temperature 100. Pulse 100. Respirations 20. Cold Burrow's solution packs to nose continuously. 6 ultra violet treatments given over a period of 12 days. Stool - negative for benzidene. Blood - wbc's 12,800, Pmn's 82%, L 10%, M 8%. Urine negative.

2-5-32 - Emesis of brownish fluid. Unseated. Temperature 99.8. Pulse 90. Respirations 22.

Course

2-9-32 - Continuous cold Burrow's packs to face. Left ear cleansed with peroxide. Sent to physio-therapy. Seems to be very confused. Talks irrationally and is very weak. Pulse to 100. Temperature to 99.8.

2-10-32 - Patient has incontinence of urination. Very confused and irrational. 1000 cc. hypodermoclysis given. Luminal gr. i, pyramidon gr. x given. Blood - Wbc's 12,900, Pmn's 85%, L 11%, B 4%. Pulse 108. Temperature 99.8. Respirations 24.

Pneumonia - Exitus

2-14-32 - Involuntary stool and urination. Very confused. 12 noon - labored respirations. Pulse very rapid. Hyperventilated 15 minutes. Medical note: Subnormal temperature. Respirations 36. Pulse 88. Rather dyspneic. Chest has many moist rales throughout. Over left apex, breathing sounds are long and blowing on expiration. X-ray - chest - shows bronchopneumonia in both bases. 6 P.M. - pulse is very thready. Respirations labored. 6:15 P.M. - patient expired.

Autopsy

The body is that of a well-developed and poorly nourished, white male, 64 years of age, measuring 156 cm. in length and weighing approximately 125 lbs. Rigor is very slight. Hypostasis is purplish and posterior. There is no edema or jaundice. There is very slight cyanosis of finger-nails and lips. Pupils measure 4 mm. each and are regular. There is an old scar over the lower part of sternum, 5x5 inches.

Peritoneal Cavity. Normal and glistening. No evidence of fluid or infection can be found. The Appendix is subcecal and free. The stomach is very markedly dilated as well as the large and small bowel.

The Pleural Cavities are free of fluid. The lungs show anthracosis. There are pleural adhesions on posterior surface on right side and also to diaphragms.

The Heart weighs 350 grams. The valve edges are free and normal. The chambers are normal. The Root of the Aorta shows a minimal amount of sclerosis. The coronaries show minimal amount of sclerosis.

The Right Lung weighs 450 grams, Left 420 grams. The bases of both lungs are consolidated and reddish and have appearance of an early bronchopneumonia. The rest of the lung shows some edema. On right side, there are very firm adhesions to posterior portion of chest and also to diaphragm.

The Spleen weighs 150 grams. The capsule is grayish. On cut section, the pulp is of a rather pale red and the trabeculae are prominent.

The Liver weighs 830 grams. On cut section, it shows a moderate amount of cloudy swelling. The first thing that drew our attention was the fact that the stomach was very markedly dilated and the pylorus was pulled over to the region of the gall-bladder. There was a very sharp angulation of the pylorus and the duodenum. The cause of the angulation was the very firm, fibrous adhesions to the entire free surface of the gall-bladder. In fact on first inspection, it was difficult to see if there was any gall-bladder present. Pylorus was carefully dissected away from the gall-bladder. It was found that the gall-bladder was about 2.5 cm. in length and very whitish with thick fibrous wall, containing 3 or 4 stones. The stomach was then opened, as well as the duodenum, and no ulcers could be found. In fact, no evidence of disease could be made out grossly. It is our impression that the obstruction is due to old adhesions and old, chronic cholecystitis.

The Pancreas weighs 100 grams, and is normal.

The Adrenals are normal.

The Kidneys each weigh 135 grams. The capsules strip easily, revealing smooth surfaces. No evidence of infection in Bladder, ureters and kidneys was found.

There is a moderate hypertrophy of the prostate.

Diagnoses:

1. Chronic cholecystitis with marked contraction of gall-bladder.
2. Cholelithiasis.
3. Pyloric obstruction due to angulation of pylorus, caused by marked adhesions to gall-bladder.
4. Beginning bilateral bronchopneumonia.
5. Diaphragmatic adhesions, left.
6. Pleural adhesions, left.
7. Anthracosis of lungs.

8. Gaseous distension of stomach and small and large intestines (marked).
9. Mild prostatic hypertrophy.
10. Minimal arteriosclerosis.
11. Old healed scar of sternum.
12. Cloudy swelling of liver and kidneys.

I. ABSTRACT

ON PYLORIC STENOSIS AS A COMPLICATION IN CHOLELITHIASIS.

Abstr. Koucky.

Ref. Trell, A. Ann. Surg. LXXXVI: 758-765 (Nov.) 1927.

Author (Stockholm, Surg. Clinic of Serafimerlasarett) points out that vomiting and pain play important part in symptomatology of gall-stone disease. Unlike gastric ulcer, vomiting in gall-bladder disease does not usually occur at climax of regularly recurrent pains, temporarily ceasing them, but rather coincides with them in a disorderly manner without bringing much relief. Besides this (in rare instances) vomiting and pain of the type seen in pyloric stenosis may be seen.

French authors report the complication more often than any other group. (Note: A survey of the Index Medicus and Quarterly Cumulative from 1927 to date reveals the same state of affairs. Other observers may record it but certainly not under the above title. It is important to remember that the condition has been seen by us on several occasions. In fact Bell (Textbook of Pathology 1930) classifies it (page 462, 1st edition) with carcinoma, ulcer and benign tumor as one of the four main causes of pyloric stenosis in adults).

Clinical picture is to a certain extent characteristic: (1) Usually no prolonged or typical history of gall stones. May be very short (1 week to 7 months) - our case is 2 months. (2) Age of patient generally advanced and with debilitated condition from vomiting suggests malignancy. (3) All gastric signs point to pyloric obstruction. The pathological changes are either chronic inflammatory (adhesions) or fistulous union (sometimes with a large stone blocking lumen of gut).

Treatment should be first directed to the obstruction. Gastro-enterostomy is the operation of choice. In some instances the true nature of the obstruction is revealed and the gall bladder and stones removed; in others ulcer or carci-

noma is diagnosed at operation. The outlook is serious although recovery is recorded in some. Note: It is to be remembered that true intestinal obstruction due to erosion of gall bladder wall by stone (and passage of stone down gut) usually occurs in the ileum (size factor). It is also a serious condition with a high mortality.

Author reports fatal post-operative case in 67 year old woman. Cause of obstruction not recognized and gastro-enterostomy done. Death due to abscess and perforation of wall of gall bladder. Total pre-operative course - 3 weeks. Second case is 63 year old woman who first had gall bladder attack 15 years before. Complete relief until 6 months before present illness, when pyloric stenosis developed. Cancer was suspected. Gall bladder and stones (fistulas) removed and gastro-enterostomy done (no cancer found). Recovery resulted. Author feels that second case is more often encountered and the first is very rare (our case was like first).

Question: Will we diagnose and handle condition correctly if we encounter it again? The absence of acid in stomach and blood in stools threw doubt on diagnosis of ulcer in our case for a time! But Bell states acid may disappear in pyloric obstruction due to any cause.

Syndrome of pyloric stenosis may show a tumor, almost always pain and vomiting of increasing severity decreasing when atony develops (gastric decompensations); increased peristalsis, loss of weight and strength, constipation, anorexia and sometimes tetany.

Cause: (Infants)

1. Congenital atresia (usually duodenal).
2. Hypertrophic pyloric stenosis (congenital). (Any period of life).
3. Carcinoma.
4. Benign tumors.
5. Peptic ulcer.
6. Chronic cholecystitis and lithiasis.
7. Foreign bodies.
8. Pylorospasm - primary or due to ulcer, gall bladder disease, pyelitis, pelvic disease, etc.
9. Other causes - chemicals, syphilis, tuberculosis, adhesions, extrinsic masses, etc. Note: pylorospasm is probably associated in all types.

Experimental paraffin tumors of pylorus (dogs). Cause deep peristaltic waves but stomach seems to empty in spite of this.

III. CASE REPORT

PERFORATED DUODENAL ULCER, CORONARY DISEASE, ACUTE BRONCHO- PNEUMONIA.

Path. Koucky.

The case is that of a white male, 50 years of age, admitted to University Hospitals 6-25-31 and discharged 7-15-31 (20 days); readmitted 1-29-32 and expired 2-28-32 (30 days). Total stay -- 50 days.

Posterior urethritis (5 yr.)

1927 - First made appearance at University Clinic. Gave history of nocturia, frequency, burning and pain over kidney regions. Had a K.U.B., prostatic massage and cystoscopy done which revealed inflammation of posterior urethra.

Bladder Irrigations (3 yr.)

1929 - Dispensary. Reappeared, complaining of weakness, headache, frequency, and loss of weight. Was referred to Department of Neurology where no special diagnosis was made. Was then referred to Department of Urology where he continued with bladder irrigations.

Soda (1 yr.)

5- -31 - Dispensary. Returned, complaining of inflammation of nasal passages. Was seen in Eye, Ear, Nose and Throat Clinic, Department of Urology, and Dentistry. Was given soda bicarbonate by mouth and bladder irrigations continued.

Hospital (1st time).

6-25-31 - Admitted to University Hospitals. Tonsillectomy under local anesthesia and following this a cystoscopy during convalescence. No difficulty in introducing scope. Bladder was seat of slight chronic inflammation. Prostate not enlarged nor obstructing, but some inflammation in posterior region. Diagnosis: Mild cystitis, possible prostatitis.

Gastric Distress (6 mo.)

7-15-31 - Discharged, but to continue treatment in Out-patient Department. At this time there is some indefinite

abdominal pain with nausea and vomiting, but this is not of any definite type and unassociated with intake of food.

Three-year History Now

1-27-32 - Dispensary. Patient returned to Urology. Had been vomiting at night from time to time for period of approximately three years. This however had not been of great significance until present date. Through the past year, he had occasional slight pains in stomach and pain in back as described previously. In last two years, there has been approximately 75 lbs. weight loss. In November 1927, patient noted tarry stools. The pain at no time had been very severe. Vomiting gave relief. Since January 1932 patient observed vomiting after meals, previously the vomiting had been entirely at night.

Hospital (2nd time.)

1-29-32 - Readmitted to University Hospitals. Past History: Infectious diseases - measles, mumps, pertussis and chicken pox. Operations - tonsillectomy 1931. Had all teeth extracted (1931). Ears - right - deaf as result of being struck by lightning (1897). Occasional coughing spells. Heart - occasional pounding with sharp pains in region of heart when working hard. Genito-urinary frequency, nocturia and burning since 1927.

Perforation

Was referred to X-ray for examination of stomach. While waiting in the waiting room at about 9:30 A.M., he began to have a dull, aching pain in the stomach, which gradually became worse. Became so severe that he could not stand up. Soon became sharp, crampy, and colicky in nature. Was given some barium to drink, but soon this was vomited up. X-ray was taken - the fluoroscopic examination showed perforation of stomach or duodenum with extravasation of barium into peritoneal cavity. Was immediately admitted to Hospital. Physical examination: Patient very apprehensive, apparently in severe agony, complains of crampy, colicky pain in abdomen. Legs are flexed upon the abdomen. Head and neck - blindness in right eye and deafness in right ear. Lungs - negative. Blood pressure 122/84. Pulse 88 and regular. Heart - borders do not seem

enlarged, heart tones are of good quality, no murmurs or friction rubs.

Abdomen

Considerable board-like rigidity, spasm and rebound tenderness over entire abdomen most marked in upper half, tenderness so severe that nothing could be palpated. Rectal - prostate soft and slightly enlarged.

Laboratory

Urine - specific gravity 1.023, no sugar or albumen, negative sediment. Blood - wbc's 7,200, Hb. 89%; later in day wbc's were 14,950.

Operation

Progress: Admitted to Hospitals at 11:30 A.M. Taken to operating room at 12:30 P.M. Under spinal naesthesia, peritoneal cavity is opened. A small amount of barium is immediately seen on the pyloric end of the stomach and considerable brownish fluid exudes from over liver. A small perforation on anterior surface of duodenum just distal to the pylorus about 1 mm. in diameter is seen. This perforation is closed using a small purse-string and three interrupted sutures. The omentum is sutured down to closure and abdomen is closed without drainage using chromic catgut for all buried sutures, interrupted linen for skin and two silkworm retention sutures. On return to room, condition is good. Intra-venous glucose given.

1-30-32 - Blood pressure 112/72. Temperature up to 100. Fluids given paraorally. Urine output is good. Pulse ranges around 120.

Suction

2-1-32 - Appears to be in good condition. Nasal suction instituted immediately following operation and continued since. Temperature up to 100.8. Condition appears to be quite good.

Infected

2-4-32 - Considerable thick, yellow drainage from wound. Condition appears slightly worse. Pulse irregular. Very listless. Nasal suction continued. Pulse around 120. Temperature 99 to 100.6.

Eviscerated

2-6-32 - Alternate sutures removed. One retention suture slipped out, wound opened and patient eviscerated. Taken to opera-

ting room in his own bed. Skin clips used to approximate wound, and long parallel adhesive strapping applied.

2-8-32 - Very tired and listless, does not want to be disturbed. Nasal suction discontinued. Temperature now shows only slight rises up to 99.4.

Second time

2-12-32 - Skin clips removed because of sloughing. Wound reopened and viscera again exposed. Profuse drainage from wound. Adhesive straps applied to approximate edges.

Coughs

2-13-32 Slight cough. Elixir terpin hydrate and codeine given.

2-14-32 - Pulse weak and irregular at times.

2-15-32 - Coughs considerably. Temperature has been a little irregular, rising as high as 102 at times. Seems weaker. At times there is extreme dyspnea. Pulse irregular and weak at times.

Cardiac?

2-17-32 - Patient coughing, irrational, restless, complains of pain in region of chest. 3:45 - Pulse suddenly became weak and irregular. Cyanotic. Respirations slow and irregular. Put on serious. 4:30 P.M. - Seen by Medical consultant - Blood pressure 110/90. Heart enlarged slightly to left and boot shaped. Arrhythmia probably due to dropped beat but could be fibrillation. Treatment - 4 cc. digitalis intravenously and intramuscularly, morphine sulphate gr, 1/16 (H).

Fibrillating

2-18-32 - Electrocardiogram - Auricular fibrillation. Small complexes. Blood pressure 128/72. Responds poorly. Involuntary urination. Stuporous. Tried to get out of bed. Pulse still irregular and weak.

Better

2-19-32 - Condition very much improved. Pulse strong and regular, rate 80. Rational and hungry. Moderate drainage from wound. Still coughs. Temperature between 99 and 100.6.

2-22-32 - Somewhat stuporous with periods of rational behavior.

Erysipelas

2-23-32 - Temperature to 103. Much weaker and stuporous most of time. Red swollen area about nose is observed. Isolated for erysipelas. Irrational, very restless. Pulse rapid. Lesion of face rapidly spreading.

2-24-32 - Area on face is same. Takes fluids poorly. Left eye is swollen shut. Irrational. Temperature 102.2.

2-25-32 - Condition is apparently worse. Patient involuntary and incontinent. Area on face is about same. Is listless and irrational. Temperature slightly lower. Complains of pain in chest.

Bleeding

2-26-32 - Condition same. 10 A.M. - Emesis of bright red blood (about 100 c.c.) Condition of face improving. 1:30 P.M. - Expelled large amount of bright red blood, (approximately 500 c.c.) per rectum. Pulse rapid but fairly strong.

Pneumonia

2-27-32 - Temperature to 102.8. Condition weaker. Passed large clots of blood per rectum. Medical transfusion of 800 c.c. of citrated blood. Put in oxygen tent. Pulse rapid but of good quality. Stuporous. X-ray - chest - shows bilateral hypostatic pneumonia. X-ray - abdomen - plates not satisfactory but there is a small amount of gas in stomach and colon.

Exitus

2-28-32 - Condition now critical. Cannot be aroused. Pulse weak. Body rigid and cold. Twitchings about lower part of face. Temperature 103.6. Breathing labored. 10:05 P.M. - expired.

Autopsy

The body is that of a well-developed, poorly nourished, white male, 50 years of age, measuring 165 cm. in length, weighing approximately 100 lbs. Rigor present. Hypostasis purplish and posterior. No edema or cyanosis. Jaundice marked, approximately 3+. Right pupil measures 6 mm. and left 3 mm. Scar 15 cm. in length (gaping to extent of 3 cm.) in left upper rectus muscle. Floor of wound is made of abdominal viscera. Sloughing, red patch in right antecubital space.

Peritoneal Cavity. Colon and omentum and stomach plastered to depth of

separated wound. Draining sinus full of purulent material which extends through wound along the duodenum into right kidney area. Bowel is entirely empty of gas, blood or intestinal content. Small bowel is perfectly free. Cecum is free of exudate. The Appendix is out. Entire upper portion of peritoneal cavity is filled with fairly well-organized, plastic exudate. Upper surface of liver bound to diaphragm. The organized exudate can be easily broken down. Spleen is bound down in same manner. Process extends under surface of liver and involves pyloric end of stomach and duodenum.

The right diaphragm is at 4th rib, left at 5th rib.

The Left Pleural Cavity contains approximately 300 c.c. of clear fluid, the Right 100 c.c. The Pericardial Sac is normal.

The Heart weighs 350 grams. Surface of heart shows several grayish irregular patches. When heart is opened, it is seen that these fibrous patches consist of fibrous tissue infiltrating muscle. In these areas, myocardium is definitely thinned. At one point (at apex of right ventricle) is fibrotic patch where thickness of ventricle is only about 2 or 3 mm. Endocardium shows these fibrotic patches also. Valves and valve orifices are quite normal. Root of the Aorta: Mild atheromatous process extending down into region of aortic valve. The coronaries show 3+ sclerosis on both sides. The sclerosis is so extensive that vessel cuts with knife only with difficulty. The lumen, on cross section, is practically obliterated in areas. Entire vessel is tortuous on surface of heart.

The Right Lung weighs 750 grams, Left 875 grams. There is an extensive bronchopneumonia of both lower lobes which is practically lobar in distribution. The upper lobes are fairly normal. On cross section, the involved area is of a very dark red and is lumpy in appearance, and the bronchi appear to be surrounded by a heaped-up area of infiltrated lung parenchyma. In the lower lobe of the right lung was a wedge-shaped, firm, dry area extending out to the periphery of the lung where it measured 4 cm. in diameter which appeared to be a hemorrhage infarct.

The Spleen weighs 225 grams, is very soft, and has a marked excess of pulp which comes away with the knife.

The Liver weighs 1050 grams. It appears definitely small, the surface smooth, but there are irregular markings on surface. On cross section, the normal markings of the liver seem to have disappeared. In place of this, there are irregular lobulations as though there were strands of fibrous tissue running through it.

The Gall-bladder is normal.

The Gastro-Intestinal Tract. The stomach itself appears to be negative. In the duodenum, 2.0 cm. beyond the pylorus on anterior surface, there is a small, reddish spot which when the duodenum is opened corresponds to a chronic ulcer of mucosa. The ulcer shows no tendency to healing and extends through the mucosa and muscles down to the serous layer. Trauma of removal, etc. has apparently punctured the serosa. No leakage had occurred prior to manipulation. No other ulcers are found.

The Pancreas and Adrenals are normal.

The Right Kidney weighs 250 grams, Left 225 grams. The capsule strips easily and the surface is smooth. The demarcation in the cortex and pyramids is well outlined. There is some exaggeration of the vascular line. No other gross pathology is observed.

The Bladder and internal Genitalia are removed en masse. The bladder is trabeculated and somewhat thin. The Prostate bulges into bladder as a small projection posterior to the urethra. The prostate itself is found to be small and soft. The posterior urethra is reddened.

The Aorta shows a surprisingly small amount of atheromatous change throughout. This is in contrast to the extreme involvement of the coronary vessels.

Lymph Nodes of no particular interest.

The Organs of the Head and Neck are not examined.

Diagnoses:

1. Perforated duodenal ulcer with operative repair. (Clinical).
2. Erysipelas of face. (Clinical)
3. Fibrillation of heart. (Clinical)
4. Pathological diagnoses:
 1. Chronic, unhealed duodenal ulcer.
 2. Coronary sclerosis.
 3. Fibrosis of heart.
 4. Bilateral, massive broncho-pneumonia.

5. Chronic, plastic peritonitis
6. Chronic prostatitis.
7. Bilateral, pleural effusion.
8. Infarctions of lung.
9. Chronic impetigo.

Acute Perforation of Peptic Ulcer

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1. General Statement: (Review of 2917 perforated peptic ulcers)

U. S. authors base studies on groups of acute perforation of peptic ulcers, totaling 1281 cases. Series by Blackford and Baker consists of 933 cases collected from literature (includes Gibson's series). Series of Olson and Robitshek overlap to some extent so that total number of individual cases is about 1150. Bager collected 1,767 cases of perforated gastric and duodenal ulcers from some 50 hospitals in Sweden, and operated upon by about 100 surgeons during period 1911-1925. Author himself has operated upon 28 cases (cures). He further subdivides 15 year period into 3 sub-periods of 5 years each for purposes of comparison.

2. Historical:

Mikulicz (1889) is given credit for first suture of perforated ulcer. Kriege's patient (1892) was first to recover after closure. Braun (1897) did first primary gastro-enterostomy in perforated ulcer.

3. Age:

U.S. No significant feature regarding age incidence is found. About 65% of cases occur between 30 and 50 years. Regarding prognosis, it appears that cases in advanced years have poorer outlook. Note: It is suggested that ulcers at any age may perforate because distribution of perforation and incidence of ulcers appear to be about same.

Sweden. Bager - Age incidence for maximum frequency is about 30 years (men) and about 45 years (women). The increase in frequency in recent years has been found chiefly in men in the age period 21 to 40.

Mortality shows steady increase with increasing age (same as U.S.) Author quotes Martin who states that 69% of all ulcers (perforated and non-perforated) occur from 20 to 50 years. Note: 65% of perforated ulcers occur in U.S. between 30 and 50 years. The average age of non-perforated group in women is 27, in men 37.

4. Sex:

U.S. Incidence all peptic ulcer (women compared to men) is about 1 to 4 or 5. Incidence of perforated ulcer is much different. In group reviewed (1150 cases) ratio was 1 woman to 25 men (96% males) M.G.H. series, 46 cases (exclusively men).

Sweden. Perforated ulcers have increased considerably course of years but this increase is most noticeable among men. It is particularly since 1919 that men showed marked increase in frequency. Out of total number of cases, 27% are women. If only last five year period is considered this figure is reduced to 20%. Note: Difference between U.S. and Swedish reports as to total number of women involved, ratio 1 to 3-4 approximately same as ulcer distribution in our country (non-perforated and perforated).

Author reviews other reports of sex incidence involving 55 to 387 cases as follows: (55, 59, 60, 62, 88, 100, 105, 126, 200, 387 cases) (years 1899 to 1927) Variability of incidence in females is 0, 2, 2, 2, 6, 8, 12, 20, 21, 40, 48 %. The larger series do not necessarily show higher female incidence. Note: It is suggested that larger series reported by Bager represent true sex frequency because of number of cases involved and their distribution over large number of surgical services, but conditions may differ in two countries.

5. Seasonal variation:U.S.

Hinton found 25 % of his cases occurred in April and November; i.e., one-fourth of cases in one-sixth of time; by adding March, April, October and November together 48% of perforations are included.

Sweden:

Maximum incidence in October (160), June (140), December (135), May (130) and November (125), the other months being relatively lower. (Total 48%).

Note: Both series are much alike suggesting spring and fall factor in peptic ulcer symptomatology.

6. Clinical history:

U.S. There is some slight division of opinion regarding previous history of ulcer. Apparently, it is rather generally accepted that perforation occurs in chronic ulcers. As suggested by one author, failure to obtain a history of ulcer may be due to the inability of the patient to give an adequate history because of extreme mental anguish and critical condition. The statistics are quoted:

Hinton	69%
Robitshek	75%
Deaver	(80%) ?
Moynihan	96%

Note: Many people with ulcers (like our patient) may have condition so long that they become more or less accustomed to its presence. If you will look over our record, you will see hints that this patient had ulcer symptoms long before he was considered to have disease. Note for instance that he was given soda but no reason is given for medication. When he is asked to consider this in particular, he gives a fairly adequate history of ulcer extending over some period of time, and should not be classified as an acute case.

Sweden: Perforated ulcer - no previous history, (127). Symptoms - one week (80) one month (107), one month to one year, (175), over one year (497). Periodic symptoms through several years (202.) Percentage: 67%.

In the first group of 127 patients, there were suggestions of premonitory signs of perforation in 11% i.e. pain, obstipation, slight bleeding, nausea and vomiting (partial perforation?). Author

notes that others have reported 80 to 90% giving histories of previous ulcer.

7. Factors predisposing to perforation:

U.S.

Perforation may occur anytime, even during sleep. No special factors are apparent. Olson and Cable believe that upper respiratory tract infection has a definite relation. Effect of barium: Robitshek reviews this phase, and found several reported cases where barium was apparently a factor. He feels that the relationship is significant enough so that a close observation by a physician following such an examination is indicated. Note: In our case, perforation apparently occurred before the barium was given. Relation to "Ulcer Management" is discussed by Blackford and Baker who state "any reasonable medical care is excellent assurance against acute perforation at any subsequent time". This statement is not substantiated by the other authors. Hinton records "6 cases of acute perforated ulcers in patients under medical care".

Sweden Most perforations occur between 4 and 8 P.M. and least number from midnight to 8 A.M. 8 A.M. to 8 P.M. (67%) 8 P.M. to 8 A.M. (33%) (One third at night and two-thirds in daytime). In spite of apparent frequency in daytime, there is no uniformity of agreement as to relationship between full stomach and perforation. (Although author suggests this may be a possibility). The author also studied the mortality and time of perforation. Note: 4 to 8 P.M., mortality 20%; 12 to 4 A.M., 35%.

8. Frequency of Perforation:

U.S.

Incidence varies from 7 to 30% with about 12% favored as the average figure. Figures quoted (Robitshek) are:

Welch	7%
Burton	13%
Deaver	20%
Musser	28%
Finney	28%
Fenwick	29%

Note: Inasmuch as surgical reports and hospital cases are involved, these figures may not be a true statement of the actual condition of affairs.

Year	<u>Sweden</u>		Non	
	<u>Perforated</u>	<u>Perforated</u>	<u>Total</u>	<u>Percentage</u>
1911-15	390	1,821	2,211	18%
1916-20	545	2,796	3,341	16%
1921-25	781	3,141	3,922	20%

Note: Average 18% as compared with 12% average quoted in U.S. series.

Other figures quoted by author, Mayo, 1918 5%. Bircher 1919, 10-11%. Lohr 1916, 14%. Kott 1926, 23%.

9. Site and number of perforations

U.S.

Blackford and Baker report 5 out of 21 cases occurring in stomach. Robitshek found 22 gastric perforations in his series, (40%). Hinton wishes to refute statement that gastric or corporic ulcers do not perforate. Perforation may be multiple (practically all authors). The occurrence is frequent enough so that the possibility must be kept in mind. In no less than 20% of some series there may be more than one perforation.

Sweden

Two-thirds occurred in stomach and one-third in duodenum. If duodenal and juxtapyloric ulcers are taken together (distal perforations) they make up about two-thirds of all the cases, and proximal group in stomach one-third. In proximal perforations, approximately same number of men and women are represented; while in distal perforations, there is a marked preference for men. Age incidence of maximum frequency of proximal ulcer perforation is about the same for both sexes (45 years). Distal perforations are approximately same for women (45 years) but in men much younger. (30 years). It is this group of distal perforations especially in men which is responsible for marked increase in frequency during recent years. As a general rule, women show long histories in either site--but in men, the proximal perforations show more prolonged history than those located distally. As a general rule, cases with short histories are becoming more frequent as years go by. The author suggests the possible increased use of tobacco as an important etiological factor in increased frequency of perforated ulcers found among men of younger age (?).

10. Diagnosis: U.S.

Hinton's series: 3 cases, diagnosis was not made until death: "There were not enough symptoms referable to gastro-intestinal tract to suspect a perforated ulcer". Olson and Cable report, 1 missed diagnosis in 46 cases. Robitshek records 5 out of 53 cases in which pre-operative diagnosis is not made. In entire series, however, definite impression could not be obtained either as to the number diagnosed preoperatively or those simply opened and suspected of having "acute abdomen". The impression gained however, was that in early cases the diagnosis as a rule is quite clear but after several hours more difficulty is encountered.

Vaughan and Singer state value of x-ray as aid in diagnosis of perforated peptic ulcers was first suggested August 1915 by Popper. He found in perforated ulcer cases during fluoroscopy a sickle-shaped zone of radio-lucence interpreted as air which had escaped between right diaphragm and the upper surface of liver. He noted that it occurred in perforated gastric, duodenal and intestinal ulcers, perforative appendicitis and after injury to intestines. The authors report 72 cases of perforated ulcer with diagnosis made radiologically by presence of pneumoperitoneum at time of admission to hospital. In 63 of 72 patients, the diagnosis of perforated ulcer was definitely established. Of these 54 or 86% had free peritoneal air determined fluoroscopically. In the remaining 9, perforated ulcer was not evident as pneumoperitoneum was absent. Laparotomy was not performed. Autopsies precluded by recovery of all the patients. Clinical picture in 9 improved cases corresponds to that seen in perforations which become spontaneously sealed following escape of limited amount of gastric or duodenal content. The reason for lesser frequency of pneumoperitoneum in these formes frustes cases is probably some which explains mildest of course, i.e. small leak and trifling leakage. During period in which perforated ulcer cases were observed, spontaneous pneumoperitoneum due to other causes, exclusive of trauma, was encountered 9 times. In all but 2 of 9 cases, correct diagnosis as to cause of perforation was rendered clear by history and clinical observation. Note: We were not able to find any dis-

tinctions in literature reviewed as to the type of ulcer and evidence of pneumoperitoneum. It probably means that many cases without pneumoperitoneum would get well without operation as indicated in Vaughan and Singer's cases. To separate the cases into 2 groups is another problem and will probably mean correction in mortality figures. Vaughan and Singer's series: 72 cases, 54 had free gas (49 at operation had ulcer, 5 by subsequent history and examination) 9 had ulcer at operation (no gas) 9 had no gas, no operation.

11. Early Operation: U.S.

All writers are agreed that immediate operation is indicated. Statistics regarding relationship between mortality and time elapsed from onset to operation are rather uniform. Under 12 hours (321 cases - 15% mortality)
12 to 24 hours 32% "
After 24 hours 70% "
These figures are repeated in most series of considerable number of cases.

Sweden

0 to 6 hours, mortality, (15%)
6 to 12 hours, (27%), 12 to 24 hours, (47%), over 24 hours, (66%), all cases (33%). Note: Similarity in American and Swedish figures. Sex factor is also important. Men 29%, women 43%. By hours, 0 to 6, men, (13%) women, (21%); 6 to 12, men (27%) women (24%); 12 to 24, men (44%), women (53%); over 24, men (61%) women (71%). Explanation offered: When the man gets sick, he quits work and goes to doctor. When the woman gets sick, she waits for her man to come home to take her in the evening. (2/3 of cases). Note: But this does not explain difference when time factor is considered?

12. Choice of operation:

U.S.

From study of references, ^{no} definite, final decision could be made. The chief controversy is whether or not gastro-enterostomy should be done routinely, done whenever conditions indicate, or not done at all. Pyloroplasty, excision of ulcer and gastric resection are recorded in some cases in series. In local series (chiefly in Minneapolis General Hospital and few from University Hospitals) the type of operation was as follows:

Simple closure	23
Enterostomy with closure or excision	17
Excision or cauterization	7
Pyloroplasty	5
Resection	1

Note: It is interesting that the local series comprises the work of 7 surgeons and is one of most varied of all those reported in literature.

In collected series of 892 cases by Blackford and Baker, there were 218 gastro-enterostomies done. In series by 5 authors advocating doing gastro-enterostomy whenever feasible, procedure was done in 48% of 350 cases.

Sweden

1,495 cases included in main group. Merely suture of perforation done in 684 patients, 36% dead; 616 cases suture of perforation and gastro-enterostomy, mortality 23%. 84 cases resected, mortality 25%. Only tamponade or drainage 111 cases, mortality 69%. A comparison between simple suture and gastro-enterostomy shows that worse results are obtained by former method (suture). It is undoubtedly due to worse patients having been treated by that method. Results of suture group are not likely to have been bettered by gastro-enterostomy but one could probably have expected a somewhat lower mortality for gastro-enterostomy groups than had the more lenient suture methods have been adopted. Cases operated by resection with low mortality are probably due to better general condition. There is reason to believe that mortality for these cases would have been much less had not this radical measure been chosen. In addition, 31 cases of perforated jejunal and gastro-jejunal ulcers are reported. Key adopted special operative method which has been used for last 10 to 15 years (Maria Hospital, Stockholm). Ulcer excised lengthwise, sutured crosswise, abdominal cavity irrigated, gastro-stomy and primary closure without drainage or tamponade. 78 cases thus operated, mortality 12%. 48 cases operated on within first 6 hours, no one died. Irrigation of abdominal cavity does not seem to contribute to good results, judged by investigation of whole material. Out of cases which were solely sponged dry, 24% died; of irrigated cases, 41% died. Even grouping by time interval shows worse results for cases irrigated. When primary suture of abdomen was done,

mortality 21%. When cases were drained, mortality 39%. However, easier and earlier cases were more frequently closed late cases with widespread peritonitis drained. But in all interval groups same difference can be demonstrated to disadvantage of drainage.

13. Arguments against primary gastro-enterostomy are:

U.S.

1. Unnecessary - perforation healing the ulcer.
2. Adds to mortality
3. Danger of spreading infection
4. Danger of subsequent gastro-jejunal ulcer
5. Lavage and duodenal tube give sufficient rest and quiet to stomach.

Arguments for gastro-enterostomy Are:

1. Direct contra-indication to statements 1, 2, and 3 listed above.
2. Suturing narrows lumen and gastro-enterostomy is safeguard against stenosis.
3. Relieves tension on closure.
4. Changes chemistry of stomach and has beneficial effect.
5. Administration of food can be started earlier.

Note: The possibility of re-perforation of the ulcer at later date must be kept in mind, necessitating repeated closures. This has happened in several instances in our experience.

14. Mortality:

U.S.

350 cases, 167 gastro-enterostomies (48%) mortality 19%.
542 cases, 49 gastro-enterostomies (9%) mortality 23%.

Note: There is not very much difference in the two figures.

Sweden:

Mortality age factor: 0 - 10, (50%); 11 - 20, (16%); 21 - 30, (16%); 31 - 40, (26%); 41 - 50, (38%); 51 - 60 (48%); 61 - 70, (55%); over 70, (63%). Number of cases well - 1,005, died - 490, total - 1,495, mortality - 33%. Note: Only 4 cases involved in group 0 - 10 years. Starting with 11 to 20 age group, age becomes more important factor in outcome. There were 43 cases over 70 years, all of other groups contained sufficient number to make statistics accurate. (See next paragraph)

15. End Results:

U.S.

By this is meant absence or comparative relief of symptoms following procedure. Closure only (269 cases), more or less permanent relief 66%. Gastro-enterostomy (42 cases), relief 83%.

In Hinton's series of 43 cases which were followed, there were 28% in which primary gastro-enterostomies or pyloroplastic operations were done. 5 returned for secondary operations 4 of these 5 had had only simple closure.

Sweden

684 patients sent questionnaire after at least one year had elapsed since operation. From cases operated upon by simple suture, 318 answers were received; gastro-enterostomy, 325 answers; resected cases, 41. It has been found that primary gastro-enterostomy had given best late results with 81% recoveries or improved. The next best results by resection, 80%. Least favorable are simple sutures with only 54% recovered or improved. If one follows further stage of severe cases of recurrences, it will be found however that ultimate results of suture method are considerably better. A greater number recover completely or are rendered much better by fresh operation. Risk of re-laparotomy is not greater than in case of ordinary ulcer patients without previous perforation. Among severe recurrences of gastro-enterostomy cases, relatively few improved by further treatment and a fresh operation is associated with very much greater risk - no less than 29% die in close connection with a new operation. This greater risk is also evident by fact that surgeons are less prone to operate in cases of gastro-enterostomy recurrences as compared with suture recurrences. Prognosis in severe resection recurrences is still worse and the mortality greater.

Impression;

It may be generally said that there are more recurrences after suture method than after others but importance of recurrence is different, being far less serious. Ultimate results as to further treatment of severe recurrences are not as a whole worse for patients when suture only has been performed. Patients who had no ulcer symptoms before perforation have a still greater chance to remain well even after simple suture (about 80%). Risk of recurrence is increased in proportion to duration of previous ulcer symptoms

but even many patients with long history of severe ulceration remain perfectly well after only suture for perforation. Such recurrences after all operative methods usually appear during first few weeks or months after perforation. Longer time elapses after perforation and operation, less is risk of recurrence and greater the chance of lasting health. Author concludes that simple suture, preferably after excision of ulcer, sponging dry abdomen, gastrostomy and primary suture of abdomen ought to be the routine method of operation and perforated ulcers. The risk of fresh perforation or cancer is too small to need consideration in the choice of operation and is not in any way greater than the risk of peptic jejunal ulcers after gastro-enterostomy or resection.

16. CAUSE OF DEATH

Shock, peritonitis, pulmonary complications (after suppuration). Late deaths often due to residual abscess.

IV. IMPRESSIONS:

1. An abstract is made of review of 2,917 cases of acute perforated peptic ulcers.
2. United States group 1,150 cases; Sweden 1,767 cases (15 years, 50 hospitals, 100 surgeons).
3. First suture done (1889) successfully (1892), with gastroenterostomy (1897). Many large series are now reported.
4. About 65% of all peptic ulcers occur between 30 and 50 years; 69% of all perforated ulcers between 20 and 50 years.
5. Average age of non-perforated group in women (27 years), men (37 years); maximum frequency of perforated group, men (30 years), women (45 years) (the reverse).
6. The very young and those of advanced years have poorest outlook.
7. Perforated ulcers are definitely on increase especially in men from 21 to 40 (better diagnosed, actual increase?).
8. In United States perforated ulcers in men are apparently more frequent than ratio justifies; in Sweden they are same as ratio of ulcers in general. This factor shows marked variation in various series.

9. Ulcers are more apt to perforate in spring and fall (early winter), corresponding to seasonal variation in symptoms.
10. From 67 to 95% of perforated cases give history of previous ulcer symptoms. Premonitory signs (partial perforation) are also present in some.
 1. Failure to obtain correct history may be factor in some cases considered to be acute ulcers. (clinical)
 2. Perforation may occur at any time. Two-thirds occur from 8 A.M. to 8 P.M., one-third from 8 P.M. to 8 A.M.
 3. Upper respiratory tract infections, increased use of tobacco, barium, and full stomach are thought to be factors. Any type of reasonable medical care is apparently not protective in itself.
 4. Frequency of perforation varies from 5% (Mayo) to 29%. Average from 12 to 18%. Difficult to evaluate accurately unless type of service is known.
 5. Distal juxtapyloric ulcers make up 2/3 of group; proximal corporic gastric 1/3. Distal perforations in men are on increase (young men, shorter history)
 6. Women as a rule give long histories before perforations; men give long histories in proximal group only.
 7. Shorter histories of previous disease are becoming common.
 8. Diagnoses may be made with fair degree of certainty in earliest stages-- apparently with more difficulty in later, i.e. as to exact cause of acute abdominal condition.
 9. Mortality and time factors are intimately related, i.e. under 12 hours to over 24 hours (15 - 32 - 70%), (15 - 27 - 47 - 66%). Total surgical mortality (19 - 23 - 33%).
 10. Mortality is apparently greater in women, total and most "time periods".
 11. Choice of operation is an individual matter in each case. As a general rule one might expect simpler procedures in severe cases and vice versa. But this may not be true if surgical experience is also a factor.
 12. Simple suture, mortality 36%, recovery or improvement after 1 year 54% (poorest), best results from new surgical approach to recurrence.
 13. Suture and gastroenterostomy, mortality 23% (lowest), best 1 year or more result 81%, greater risk and poorer results from surgical retreatment for recurrences than simple suture.
24. Resection, mortality 25% (about same as foregoing), 1 year or more results 80% (same), greatest risk and poorest results from surgical retreatment for recurrence (worse than foregoing).
25. Bager wonders if mortality in (23 and 24) would not have been less if simpler procedure had been done.
26. Tamponade and drainage, mortality 69% (worst result and worst cases). Irrigation of abdominal cavity seems to increase mortality (24 to 41%). This is true even by time interval grouping.
27. Persons who had no ulcer symptoms before perforation (acute cases?) have best chances to remain well after simple suture.
28. Recurrence risk is increased in proportion to duration of symptoms although many chronic have no further trouble.
29. Recurrences after all operative methods usually appear in few weeks or months after accident (see our case ?). Longer the patient goes, less the chance for recurrence.
30. Arguments for and against gastroenterostomy are offered.
31. Primary abdominal closure gives better results than drainage (type of case ?).
32. Key excises ulcer lengthwise, sutures crosswise, irrigates abdominal cavity, does gastrostomy, uses primary closure, no drainage. Results; Mortality 12%; in first six hours (no deaths).
33. Bager suggests as result of study that simple suture preferably after excision of ulcer, gastroenterostomy, sponging abdomen dry, and simple closure of abdomen should be routine treatment whenever possible.
34. Risk of reperforation on secondary jejunal ulceration and malignancy should not determine type of operation.
35. Usual cause of death is primary shock, peritonitis, pulmonary complications, and residual abscesses.

COMMENT:

Again as in the review last year on the treatment of empyema, certain factors seem to be outstanding. They are age, probably sex (females worse), apparently time factor. The results of different types of treatment must certainly be

influenced by the type of case. Only Vaughan and Singer (in our search) made an attempt to quantitatively study degree of process which after all must be the most important factor. It is well-known that perforated ulcers may get well without surgical treatment. It is apparent that routine procedures could be adopted for certain types of cases. The development of this standard is probably the next step in the solution of the perforated ulcer problem.