

likely to encounter, and that the term "essential hypertension" should be limited to those cases in which every available function test has proved normal.

As to the urea concentration test I believe it possesses some merit. From the above observations, as shown in the table, it would seem that in high blood-pressure cases beginning kidney dysfunction may be noted at an earlier date with this test than with the function tests commonly used.

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**BILIARY TRACT DISEASE: SOME LESSONS LEARNED FROM  
DUODENOBILIARY DRAINAGE. FUTURE PROBLEMS.  
CITATION OF CASES.**

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(Continued from January, 1922)

*Comment.* This case illustrates biliary migraine in its purest form and the hope of relief which can be offered by this method of treatment. This case also illustrates how conditions of this sort, if unrecognized and untreated, inevitably lead later into the final states of gall-bladder pathology and calculus formation in the presence of a "masked" or unsuspected infection, especially when associated with catarrhal exfoliation. Even at this stage it could be repeatedly demonstrated that she was in the precalcus formation period by the finding of cholesterol crystals thrown out by a bile incapable of holding them in solution. We had in our series 19 cases which can be placed in this group. Only 1 other of these was in the pure form of biliary migraine represented in the case reported above. Seventeen had definite migraine sick headaches, with usually terminal biliary vomiting, but showed, in addition, different disturbances of function or pathological states of the biliary or gastro-intestinal tract. Of these, as a result of treatment, 13 showed complete arrest of the migraine, 3 partial arrest, that is, a lessening in the intensity and frequency of the attack, and 1 case made absolutely no improvement in this particular, although improved otherwise. In addition, 9 other patients exhibited severe headaches but not of the migraine cyclic type, and all 9 of them showed complete arrest of this complaint as a result of treatment. It has appeared to us that this group associated with headaches, biliousness and "masked" infection are in earlier stages of gall-tract

disease and often amenable to this form of treatment. Conversely we have frequently noted that in the group whose diagnoses of biliary disease can be made quite clearly on analysis of history and physical findings *alone* the patient gave us histories of having these severe migraine or migranoid headaches one to ten years previously, but are no longer complaining of them in their present account of their illness. Apparently, then, when they have passed through this phase spontaneously they are in a later stage of gall-tract pathology.

Mr. J. D. E., aged forty-two years, was referred to us on April 10, 1920. For eight years he has had recurring attacks of pain or distress and a sense of gnawing and weight-discomfort in the epigastrium, and bloating with belching. The pain was referred to the back when severe and occurred one to three hours p. e., and was relieved by eating or vomiting. The attacks were always in the spring of the year.

*Examination.* Asthenic. Pulse, 72. Two dead molars. Gums clean. Tongue clean. Tonsils red and retracted. Heart muscle was weak. The abdomen showed no rigidity but tenderness on deep pressure over the gall-bladder point and pressure over McBurney's point elicited pain referred to the epigastrium. "Tuning-fork auscultation" suggested adhesions of the stomach to the gall-bladder region. Spinal tenderness, 3d to 6th thoracic and 10th thoracic to the left. Hemoglobin, 90 per cent. Technical findings: Marked catarrhal duodenitis; catarrhal exfoliative cholecystitis with stasis and atony. Green-black "B" bile and pure culture recovery of *Streptococcus hemolyticus*. Upon removal of tonsils the culture recovered only the *Streptococcus hemolyticus*. Vaccines of both were prepared and have been used alternately, with weekly drainage of gall-bladder. The gall-bladder atony has cleared up and general systemic improvement has followed. *Streptococci* are no longer recoverable from the bile by culture nor found in fresh or stained spreads, and the other abnormal findings in his bile have entirely disappeared.

*Comment.* This case suggested ulcer, based on the history, but biliary drainage proved the gall-bladder to be the seat of trouble, associated with duodenitis, and the subsequent response to treatment confirmed the diagnosis of "masked" infection of the gall-bladder with complete arrest of presenting symptoms, and final inability to recover the pathogenic infecting organisms on repeated culturation.

This case also illustrates the primary focus of infection in the tonsils transplanted to the gall-bladder, producing a secondary focus. It would therefore be fallacious to attempt to limit the treatment to the removal of the latter focus if the primary source of infection is ignored, unsearched for, and if found allowed to remain.

Dr. H. F. E., aged thirty-nine years, to whom we are indebted for giving us the following account of his personal experience with non-surgical biliary drainage in the treatment of acute cholecystitis complicating typhoid fever.

He was taken sick in April, 1920, with walking typhoid, during which period blood cultures were negative. He collapsed after the third week and was taken to a hospital, where he ran a typhoid course for ten weeks. He suffered a relapse after the fourth week. For three or four days previous to this relapse he had had considerable gas after meals and abdominal distention which previously had been relieved by enema. Enemas no longer removed the gas and suddenly one evening the patient was taken with acute distention in the region of the gall-bladder, at the left edge of the right hypochondrium, preceded at seven in the evening with a slight chill. There was no appreciable rise in the leukocytes. Gradually the pain became so severe that at 1 A.M.  $\frac{1}{2}$  grain of morphine was given, followed by  $\frac{1}{4}$  grain, without relief. The pain increased and another  $\frac{1}{4}$  grain was given. The pain became so excruciating that the patient screamed loudly and begged to be put under anesthesia. Dr. Doyle was called and washed his stomach, with no relief. A duodenal tube was then passed. No relief was experienced when the tube entered the duodenum, but instant relief came within five to ten minutes after magnesium sulphate was introduced and bile began to flow. In half an hour he was perfectly comfortable. From a subnormal temperature before his attack the temperature rose abruptly during the attack to  $106\frac{2}{3}^{\circ}$  F. and dropped again to  $100^{\circ}$  F. immediately after biliary drainage was established. Dr. E. went to sleep with the tube in place within half an hour. The tube remained in the duodenum overnight. The bile was very dark, very tenacious, cloudy and was a deep green-black. The next day he was fairly comfortable and the tube was kept in until 8 or 9 A.M. About 18 ounces of mixed bile was recovered during the night. The tube was inserted again in the evening without washing the stomach. Bile flowed immediately after introduction of magnesium sulphate, but was not so dark. The bile was at first viscid but became progressively thinner and lighter in color as the drainage was repeated daily for four or five days, then every other day. The bile always gave positive cultures for typhoid bacilli, even up to Dr. E.'s discharge from the hospital, about six weeks later. The total number of drainages given in the hospital was about twenty-two. He went to Atlantic City immediately after his discharge, where his nurse gave him a drainage treatment two or three times a week for three weeks. Thereafter during that summer, in the White Mountains, he gave himself a treatment on three occasions. No final cultures were made from his bile. He has remained well for eight months, has been in active practice and says he feels perfectly well.

His history previous to typhoid fever was briefly as follows: He

had had no infections, except that in Pittsburgh, in 1912, when he was a hospital resident, he had two gall-bladder attacks preceded by conjunctival jaundice. Roentgen-ray examination was negative. He was in bed for ten days each time. Between 1903 and 1907 he had recurrent attacks of follicular tonsillitis, but the tonsils were not removed.

*Comment.* This is a most important type of case in which this method of treatment has great promise. We all know how serious operative interference may be for acute conditions arising as complications during the acute and prostrating infectious diseases. Surgery has successfully managed some of these cases but the mortality has been high. But surgery, until recently, has been the sole choice and the risk taken was warrantable. Now we have a alternative choice, which can be more safely tried, and, if successful, the operative risk is avoided.

Secondly, this case teaches the lesson of the importance of the detection and treatment of typhoid carriers, as commented on in a previous paper.<sup>8</sup> This has been emphasized, too, by Nichols and others<sup>9</sup> and later by Henes.<sup>10</sup> Dr. E. is not yet safely out of the woods and should be reexamined for residual infection both for the sake of himself and of others.

Third, this case is similar in its acute picture to 2 cases, within the past two years, of acute empyema of the gall-bladder which were successfully treated by this method: One in a man who, for business reasons, positively refused the operative course advised him and the other in a woman who had such a severe cardio-renal disease as to imperatively contraindicate surgery if there was any other acceptable alternative.

If the gall tract in any given case can be made to successfully drain by this method the patient may be safely tided over the acute phases. If it cannot be successfully drained, surgery become imperative. Naturally this method should not be advocated if there are no surgical contraindications, since otherwise surgery becomes the absolute choice of procedure providing *safe* surgical skill is available.

Mrs. R., aged thirty-three years, referred to us on August 6, 1920, was operated upon eight years ago for empyema of the gall-bladder. A cholecystostomy was done but a biliary fistula developed through which she was drained constantly for *eight years*, with the exception of several weeks, when the sinus remained closed following cauterization. She has worn a dressing pad constantly, and during this period has not remained pain free for longer than a month, and usually has had recurrent attacks of the upper right quadrant pain referred around the costal margin to the right shoulder-blade every four to twelve days. Five years ago, for the relief of pain, she began to use a small silver catheter, which was introduced into her

gall-bladder every night and morning by her husband, who had become most expert with it. It was noticed that she was more liable to be pain-free when bile was recovered by the catheter, but when thick white mucus and no bile was aspirated a pain attack very quickly followed. This suggested that the cystic duct became blocked by mucus secreted by the racemose glands at the neck of the gall-bladder and a hydrops of the gall-bladder would probably have followed if this mucus could not find an exit by way of the fistula. During these pain attacks there was frequently associated chills and fever for a day or two, with stiffening of the upper right rectus. Another surgeon (who referred the case to us) had watched the patient through many such attacks for three years and had made several attempts to close the sinus tract by cauterization, but with no permanent success.

When she first presented at our office we catheterized the gall-bladder, and by means of a small syringe obtained a greenish-brown bile (with much mucopus flocculations in it) for culture and cytological examinations. The latter showed most beautifully the type of tall columnar bile-stained epithelium which we had previously seen in many other cases, and had, we think, learned to correctly classify as gall-bladder epithelium on account of its height and its tendency to break off from the basement membrane at the reticulated folds of the rugæ and to become arranged in fan-shaped masses. With this epithelium was found much inflammatory débris, pus cells and many colonies of heavily bile-stained bacteria. The following day we checked up our findings by duodenobiliary drainage and recovered the *same type bile*, with the *same cytological picture* of the mucopus floccules, and Dr. Richardson recovered from our cultures from both sources the *same bacteria* (and only them), namely, a hemolytic streptococcus and the *Bacillus coli communis*.

A gall-tract drainage was given every fifth day and each one was followed by an attack of upper right quadrant pain. This we have noted very frequently in our series of the more acute cases of gall-bladder inflammation and perhaps more frequently with those infected with streptococci. This seems a natural result of making the inflamed viscus empty itself, but in all of our cases, except one thus far, the pain following such drainage has become less severe until none is felt. After the third drainage and injection of vaccine, the sinus closed and *has remained closed since* (now eight months) but two days later an acute attack of pain occurred, with moderate fever, chills and leukocytosis and a surgical type of the upper right quadrant. There were no untoward developments after one week's hospital observation, and treatment was then resumed on the following basis: A duodenobiliary drainage daily for three days, then twice a week for four weeks, every seven to ten days for another month and thereafter every three weeks. An autogenous vaccine

was made and administered every fifth day, and at first gave rise to a definite focalizing gall-bladder pain, and after four months the streptococcus disappeared from our cultures and since then on seven cultures made every third week only the *Bacillus coli* has been recovered. We have seen this disappearance of streptococci following autogenous vaccination and drainage in twelve cases of our series. Her pain attacks persisted after each drainage for the first month, but for the past seven months she has had none. Not only has she had a complete arrest of symptoms, but there has been a general systemic improvement in endurance, in color, in bowel function, appetite, sleep and general sense of well-being. In addition, and this is the important point which we wish to stress, there has been a steady though gradual disappearance of all the abnormal cytological findings from her bile. Her gall-bladder drains readily in response to magnesium sulphate and apparently continues to function normally between treatments, and we believe now that her focus of infection has been permanently eradicated. She sailed for Italy last month, taking with her a duodenobiliary drainage outfit, and will continue to give herself a treatment (as many patients have been taught to do) once a month. They find it very easy to do. We believe it to be a good prophylactic policy for them to follow and will guard against relapses.

*Comment.* We have recited this case in some detail because it has been one of great interest and instruction to us: First, because we were able to obtain bile by direct catheterization from the gall-bladder for microscopic examination and culturation, and, secondly, because of our recovery by the duodenal route of the same type bile with identical cytology and bacteriology we have again satisfied ourselves that this method of diagnosis and treatment (as one of us has previously presented it) is fundamentally correct, and is, moreover, a practical and efficient procedure; and, third, that a bacterium thus isolated in pure culture, and given as a vaccine, has a definite and specific therapeutic value in closing a sinus and overcoming a focus of infection in the gall tract; and, finally, that the possibility of the specificity of the bacterium is enhanced if it gives rise to a focalizing reaction which reproduces one or more of the presenting symptoms.

During the past year we have closed successfully by this method one other case of persistent biliary fistula of months' duration, this second case being infected with *Staphylococcus aureus* and *Bacillus coli*.

Mr. M. R. E., aged twenty-nine years was referred to us on August 5, 1920. He presented historically a mixed syndrome of a gnawing pain-distress in the epigastrium, occurring two or three hours after meals, relieved by eating or alkalies, but followed by post meal-belching and upper abdominal distress. These symptoms first

appeared about one year ago and have been featured by their intermittent appearance and spontaneous total remission.

His past history brought out the following important points: He was a "blue baby" for several months, but apparently recovered without serious damage to his heart. He had been subject to recurrent attacks of tonsillitis every winter for several years. In 1918 he had a severe attack of pandemic influenza, with chiefly intestinal focalization. In 1902 and again in 1906 he had suffered attacks of typhoid fever, both apparently genuine, but not accompanied by relapse or complication. Furthermore, his story suggested there was a possible typhoid carrier in his family, inasmuch as he said that his mother had had typhoid fever three times, and one brother and sister each had had one attack. He, himself, had been subject to bronchitis for years.

On physical examination the positive findings were as follows: Two dead and many decayed teeth requiring fillings, but no root abscesses. His tonsils were badly diseased and infected. He had chronic bronchitis with musical dry rales. There was slight rigidity of the upper right rectus, but no tenderness. The gall-bladder was not palpable. By "tuning-fork auscultation" there was definite transmission of the gastric note to the left edge of the right costal margin, but not transmitted through the liver. This we have learned to interpret as being very suggestive of adhesions between the pylorus or duodenum and the gall-bladder. When the gastric note is clearly transmitted through the liver the adhesions are more liable to be denser and attached to the under surface of the liver itself.

As a result of technical examination we found that Mr. E.'s stomach had escaped organic damage, but showed a fractional curve of hyperchlorhydria, with the suggestive extragastric terminal elevation. He gave evidence of an exfoliative duodenitis and a catarrhal and infected cholecystodochitis, with pericholecystic adhesions obstructing the cystic duct. Cultures from this bile recovered a hemolytic streptococcus and *Bacillus coli*. The roentgen-ray study of his gastro-intestinal tract was reported summarized as follows: "Duodenal ulcer with periduodenal adhesions. The gall-bladder is not visualized." We, however, were unable to develop clinical or laboratory evidence to support this diagnosis of duodenal ulcer and felt that we had to deal primarily with an infected gall tract with periduodenal-cholecystic adhesions.

As a preliminary plan of treatment following our usual custom he was referred for the necessary dental work, and his tonsils were taken out, 50 per cent of the crypts were cultured, and a pure culture of hemolytic streptococci, like that isolated from his bile, was recovered and the two were mixed and used as a vaccine.

After several therapeutic duodenobiliary drainages had been given him we noted the fact that only one out of five recovered "B" or

gall-bladder bile, and increased our conviction that the cystic duct was obstructed and, although he had made some improvement, we referred him for operation. At operation our diagnostic conception of the case was verified. He was found to have no evidence of duodenal ulcer, but running from the lateral and anterior surface of the second portion of the duodenum to the mid-region, and to the neck of the gall-bladder were fine bands of adhesions which angulated the gall-bladder at two points. The gall-bladder was long and distended and could not be emptied by digital pressure. The gall-bladder was opened and a culture taken from which the hemolytic streptococcus was alone recovered. The mucosa was reddened and granular but not of the strawberry type. The cystic duct was probed and found obstructed just below the neck of the gall-bladder at a point where the adhesions were attached. In freeing the adhesions the gall-bladder was so badly traumatized that it seemed wise to remove it. The patient made a good postoperative recovery for two months, but then partially relapsed, and, on reculturing his bile, the *Streptococcus hemolyticus* was again recovered, together with *Bacillus coli*, and the duct bile microscopically still showed the inflammatory findings of a residual duct infection. Postoperative duodenobiliary drainage was then instituted at weekly intervals and the new vaccine administered with prompt symptomatic response, and at the end of ten treatments the streptococcus disappeared from the cultures, and a month later the bile was reported sterile and has remained so since. The positive cytological picture of residual duct catarrh also cleared up by degrees and is now normal, although he has had no treatment for two months, and the patient is perfectly well and fifteen pounds heavier. It is interesting to note that the typhoid bacillus was not recovered from his bile by tube drainage or at operation.

*Comment.* This case again illustrates the importance of realizing that the so-called duodenal ulcer syndrome, based largely upon the history when unsupported by other clinical or laboratory data, bears an unreliable reputation and will trap the unwary or careless diagnostician. We must learn that the one- to three-hour postmeal epigastric empty distress, or so-called hunger pain, does not necessarily mean ulcer even when the pain is relieved by eating or the use of alkalis or antispasmodics, but should rather be thought of as a *mixed syndrome* in which duodenal irritation short of ulcer, with or without adhesions, cholecystitis and appendicitis, or combinations of them, must be differentially proved. Rarely, as Eusterman points out,\* benign gastric tumors may simulate the so-called duodenal ulcer syndrome.

The second diagnostic lesson this case teaches is that the roentgen-ray diagnosis of duodenal ulcer cannot always be separated clearly

\* Dr. Eusterman's paper has not yet been published.



from duodenal adhesions and that the final diagnosis should be made by adjusting a proper balance between the history, physical findings and the data obtained from laboratory studies.

The third diagnostic lesson taught us by this and other cases is that when we fail to recover "B" or gall-bladder bile after several attempted drainages it is strong evidence in favor of an obstructed cystic duct or a fibrous, atrophic functionless gall-bladder or one filled with stones and containing no bile. This is diagnostic evidence of great value to the surgeon when preoperatively secured.

The therapeutic lessons we learned from this case and others similar to it are:

First. That the great primary essential in the treatment of these cases, whether medically or surgically managed, is to first remove all foci of infection higher up which may have caused (or may retard the healing of) the lesion in the upper right quadrant.

Second. That this method of non-surgical biliary drainage is not therapeutically applicable to *gall-bladder* disease in which the cystic duct is obstructed in such a way that the gall-bladder is unable to discharge its fluid contents.

Third. That this method of non-surgical biliary drainage has a very large and important field of usefulness in postoperatively continuing the surgical principles of free drainage in such cases in which surgery alone has failed to eradicate all residual infection. Duodenobiliary drainage, together with the use of autogenous vaccines, will prevent many of these cases from relapsing and will relieve both the surgeon and the patient from the vexatious and dangerous necessity of reoperation.

Mrs. E. R., aged forty years, was referred to us on August 19, 1920.

*Chief Complaint.* Pain in the right upper abdomen radiating to the back.

*Family History.* Father dead; renal, aged fiftythree; mother dead, cancer of breast, aged fifty-six years.

*Present Illness.* Attacks of acute epigastric pains, stabbing and grinding for six years; vomiting of undigested food two or three times a week, but during the past six months the picture changed and she had had about once a month severe attacks of nocturnal colicky pain in the right hypochondrium, radiating around the right costal margin. No jaundice but sallowness at times. Frontal headache and at times occipital. Eggs and beef disagreed. She became easily tired and was drowsy most of the time. There was epigastric bloating relieved by belching and epigastric pressure gave slight relief. The pain is generally nocturnal and unrelieved by food-taking. Vomiting of food as eaten, with bile and mucus. Constipation was obstinate. Mouth negative, except coated tongue. The abdomen was diffusely tender at McBurney's point and under the right costal margin, but the gall-bladder was not palpable.

In two attempted successive biliary drainages the gall-bladder failed to drain at first, and in the second only 32 cc of dark green turbid bile were recovered. At the same time the patient had an attack of pain similar to the previous attacks. Many cholesterol crystals were found in the bile and much amorphous bile salts. Culture: *Bacillus coli* (heavy growth).

Urine: Negative; 90 per cent elimination of phthalein in three hours (80 per cent in two hours). Blood: Hemoglobin, 85 per cent; white blood count, 7100.

*Comment.* An operative decision was made for this patient on the following grounds: She presented a clear-cut picture of gall-stone colic with increasingly frequent attacks. Her diagnostic drainage suggested a partially obstructed cystic duct and showed an infected bile microscopically suggestive of cholelithiasis. We believe all definitely proved gall-stone cases with irritable gall-bladders and infection should be operated upon unless there are operative contraindications present which may jeopardize the life of the patient. We are still in doubt as to the wisdom of routinely insisting that definitely proved gall-stones, when quiescent and with no history of previous activity, is, *per se*, an operative necessity. We believe there is no cure for gall-stones except the knife when skilfully used, and that the presence of calculi increases the likelihood of cancer of the gall-bladder. We believe that gall-stones in the presence of active infection make the gall-bladder more irritable and increase the tendency to colic attacks and to traumatization of gall-bladder tissue which may accelerate cancerous growth. Therefore such cases more imperatively require operation. But we further believe that preoperative diagnostic drainage will be of great service to the surgeon in suggesting what may be found at operation; that the fact that obstruction of the cystic duct preoperatively ascertained will be advantageous to know; that the determination preoperatively of the presence and the nature of the infection by cultural identification (to be checked up during operation) will be information of great importance to the surgeon in guiding him in what operative procedure to adopt, and especially will this be true if the preoperative study suggests the presence of duct infection in addition to bladder infection, calculous formation or obstruction of the cystic duct.

We are especially gratified to see the publication of an article by a surgeon (Dr. Whipple<sup>16</sup>) endorsing these views.

Finally, we believe that no case falling in this group should fail to have a postoperative study within two months after operation, and if catarrh or infection is still demonstrable duodenobiliary drainages should be instituted and continued until normal findings are secured. Indeed, prophylactic drainage might well be given once each month to forestall a relapse even in a surgical case apparently cured. It is true that in a number of instances we have

recovered very small stones through the tube and larger stones from the sieved stool following a diagnostic drainage; but there are doubtless others left behind, especially so if faceted stones are recovered; yet we do not advocate this method in the treatment of cholelithiasis, because we see the possible danger of perforating a cystic or common duct with a stone impacted in it.

To continue: Operation on this patient early in September, 1920, disclosed a gall-bladder containing thirty-two stones, brown, hard, faceted, pea to marble size. One stone in the cystic duct partially occluded it. A cholecystostomy only was done. Culture at operation, direct from the gall-bladder, recovered *Bacillus coli* only.

Postoperative study, ten weeks after operation: Gall-bladder drainage gave 50 cc golden-brown, viscid bile, flowing intermittently. Microscopically: Cholesterin crystals and some amorphous salts. Culture: *Bacillus coli*.

*Further Comment.* We are presenting this case to illustrate the points that symptomatic relief is not always a cure. The removal of the stones gave symptomatic relief, but the subsequent finding of the same organism, and the same inability of the bile to hold its salts in solution, is far from a cure of the condition. All the factors that are theoretically necessary for the production of stones are still present, and there is no assurance that they will not reform. In this group of cases postoperative biliary drainage by this method, from time to time, has served to clear up the remaining evidence of disturbed physiological chemistry and bacteriology in a number of cases.

Mr. M. H. A., aged twenty-five years, was referred to us on October 25, 1920. He is by occupation a draughtsman, and his most important personal complaint was that he was afraid he would lose his position because of an overpowering drowsiness that made him fall asleep at his work. His drowsiness was so great that he could not stay awake during the most exciting play or "moving picture." With this drowsiness was a progressive sense of fatigue, noticed during the past year, and a gradual loss of mental keenness during the preceding five years. Prior to this he had considered himself in robust health until he first began to notice dizziness and mental hebetude. In March, 1917, and again a year later, he had attacks of jaundice, with no other symptom except loss of appetite, furred tongue, headache, drowsiness and constipation. Both of these attacks suggested at the time a simple catarrhal jaundice, and the cloudy urine and light colored stools cleared up in several weeks, yet he continued to have dizziness, increasing drowsiness, increasing fatigue, cloudy urine after excess of sweets and bimonthly attacks of frontal headaches and more or less slight jaundice of the scleræ. About a year ago he became more positively jaundiced, with cloudy,

reddish-brown urine, but no noticeable absence of bile in his stools. During this year he says he has grown very melancholic and pessimistic, although he has nothing to account for it. He has lost twelve pounds during the past year and now weighs 158 pounds.

Except for belching immediately after meals and avoidance of sweets, onions and coffee he had no gastro-intestinal complaints. Other than recited he had had no previous infection except recurrent tonsillitis during childhood, for which his tonsils were removed when he was seven. From the ages of fifteen to nineteen he had acne vulgaris very badly.

The salient points in his physical findings were as follows: Large frame, good musculature. The face is broad, forehead narrow and low and heavy lower jaw somewhat of the acromegalic type. The lids are puffed, the hair grows low on forehead and temples and is thick and stiff. The fingers are slender, however, with thumb moons only. The skin is quite markedly jaundiced and shows acne pustules and old scars. The sclera and roof of the mouth are also jaundiced. Hypertrophic rhinitis and catarrhal pharyngitis. Tonsils are out and tonsillar fossæ are clean. Tongue slightly coated but firm. Gums clean. Teeth regular except one non-erupted wisdom. Posterior cervical and left epitrochlear glands are palpable. Reflexes normal. Lungs and heart normal.

*Abdomen.* Distinct upper abdominal fulness. No tenderness, muscle rigidity or spasm. Liver enlarged downward, the hard, rounded edge being palpable to 10 cm. below the costal margin. The spleen is greatly enlarged and hard and extends into the left abdomen to the navel. The edge is rounded rather than sharp. Splenic dulness is enlarged in its percussion area well back into the left flank.

*Technical Examination:* Blood Wassermann negative. Hemoglobin, 93 per cent; red blood cells, 4,740,000; white blood cells, 9500.

Polymorphonuclears, 65 per cent; lymphocytes, 25 per cent; large mononuclears and transitionals, 6 per cent; basophils, 3 per cent; eosinophils, 1 per cent. There was no change in shape of the red blood cells, but a noticeable microcytosis (common in hemolytic jaundice—Crawford). There was also an increase in skinned or reticulated red cells to 3 or 4 per cent. Coagulation time, five and a half minutes (slide and horsehair). A fragility test of his blood by Dr. E. B. Krumbhaar showed complete hemolysis up to 0.40 per cent NaCl, and partial hemolysis up to 0.60 per cent NaCl. This is a distinct lessening of both maximal and minimal resistance and points to a hemolytic factor in the production of his jaundice. This type of jaundice was also suggested in the absence of bile findings in his *urine* and its presence in the *stools*, both of which were otherwise negative.

*Stomach.* The fractional curve was one of hyperacidity, reaching its maximum of 110 total acidity and 80 free HCl at from seventy-five to one hundred and five minutes. No occult blood. Slight biliary regurgitation at seventy-five minutes. Normal amount of mucus. Motility normal. Fasting residuum: Study suggested an infective exfoliative gastritis.

*Duodenal Examination.* Disclosed an infective exfoliative duodenitis.—

*Biliary Drainage.* When we came to an observation of his biliary drainage we encountered a type of "B" and "C" biles that we have never seen before in over 4000 examinations. The common duct was closed but opened promptly in response to magnesium sulphate. The "A" bile was a brownish-red, turbid, with increased mucus and viscosity. The transition to "B" bile was very prompt and the gall-bladder appeared to be under tension and discharged 320 cc of a greasy, thickish, paint-like bile of a deep reddish-brown color, turbid and containing many mucopus flocculations. It was delivered with a steady flow as though under pressure. Toward the end of the drainage there could be seen through the glass window in the tube two currents of bile, the most dependent one of heavier gall-bladder bile being of the color and consistency of red-brown paint and the upper current a transparent thinner bile, almost Burgundy red in color, similar to but darker than a hemolyzed blood Wassermann tube. This was the "C" or liver bile and also flowed rapidly. Over twelve ounces were recovered in less than an hour.

The microscopical examination of the mucopus floccules from the "B" bile showed many bile-stained oval and cuboidal cells in masses and strands and appearing to have a tubular architecture. Occasional masses of heavily bile-stained tall columnar epithelium were seen. The whole microscopic field was swarming with bacteria in masses and colony formation and the bacteria seemed to be entirely cocci. Culture from this bile gave a pure recovery of a very hemolytic streptococcus from which a vaccine was prepared.

*Comment.* This case was classified as a hemolytic jaundice with splenomegaly, catarrhal infective cholecystodochitis and biliary cirrhosis. After eleven drainages he had made remarkable progress, with a marked subsidence of his presenting symptoms. He was markedly improved in his mental state and in endurance, was keen and alert and no longer falling asleep at his work, and the jaundice was very much lessened. His liver had decreased in size so that its edge was just palpable at the costal margin and, to our surprise, his spleen was so much smaller as to be difficult of demonstration.

Dr. Krumbhaar had told us that in his opinion this was the type of case for which no medical plan of treatment had in the past proved effective and for whom a splenectomy offered the only hope. He urged our persistence in the plan of non-surgical drainage and

use of vaccines to see what might be accomplished. Up to date this man has been given about twenty-five drainages with *progressive improvement*. His skin is no longer jaundiced and there is only a subicteroidal tinging of scleræ and roof of the mouth. His biles are nearly normal in their gross appearance and the cytological picture is much improved. The liver is again of normal size, and although the splenic area to percussion is still enlarged the spleen itself is no longer palpable within the abdomen.

We are extremely interested in the outcome of this case. If the clinical improvement so far secured can be increased or made permanent over an extent of one or two years it will open up an enlarged field of usefulness of this method. While we are at present engaged upon some physiological and chemical studies on this patient a great deal of further work must be carried through before we can understand thoroughly the underlying factors concerned in producing this condition. We believe that continual duodenobiliary drainage day and night, over a period of two or three weeks, with an interruption of a like period, (after our manner of treating chronic arthritis)<sup>12</sup> might accomplish a prompter and more conspicuous improvement. This plan was suggested to this patient, but declined on the grounds that he was feeling so well that he did not feel justified in absenting himself from his work.

This is one of the problem diseases of internal medicine that may be in the future succesfully combated by this method. Pernicious anemia, Banti's disease, biliary cirrhosis, toxic cholecystodochitis and hepatitis may be benefited by this plan. Diabetes has already been treated with some success.

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