TWO CASES OF CIRRHOSIS OF THE LIVER IN INFANCY IN CONNECTION WITH CONGENITAL OBSTRUCTION OF THE BILE DUCTS.

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CASE I. Martha R. was born Nov. 22, 1905. The parents and one other child were well. There had been no miscarriages and no history of syphilis. She was apparently normal at birth, although the abdomen was a little and the umbilical cord unusually large. Her weight was not known. She never passed any colored meconium, the movements from the first being whitish in color. The skin was not yellow at birth, but became so when she was ten or twelve days old. The parents were not sure as to the color of the urine in the beginning, but a few days later it was greenish, and so continued. She was breast-fed from the beginning, being given from the time she was two weeks old until the first of February a mixture of one part of milk and two parts of water in addition. She had seemed pretty well on the whole, but had vomited occasionally, and had had two loose, white movements daily. The urine stained the napkins green. The parents thought that she had had a little fever from time to time. She entered the Infants' Hospital, March 8, 1906, when three and one-half months old.

PHYSICAL EXAMINATION.

She was fairly developed and nourished. There was pretty marked jaundice of the skin, mucous membranes and conjunctivæ. The fontanelle was 4 cm. in diameter and level. She was perfectly intelligent. Her tongue was covered with thrush but the rest of the mouth was clean. There was no rosary or other evidences of rickets. The heart area and sounds were normal, the action slightly irregular, the rate 120. The lungs were normal. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line. The lower border of the liver ran from the right anterior superior spine to the left costal border in the nipple line. The notch was indistinctly palpable in the median line. The surface was smooth and the edge a little rounded especially in the left lobe. The gall bladder was not felt. The spleen was palpable, running out from beneath the costal border in the anterior axillary line, downward to the level of the navel, and backward and upward under the ribs in the post-axillary line. The greatest width was 6 cm., and it extended 4 cm. below the costal border. There was no fluid in the abdomen and no masses were felt. There was a moderate sized umbilical hernia. The cervical glands were slightly enlarged; the inguinal and axillary were not. There was a slight intertrigo about the buttocks and genitals. There were no mucous patches about the mouth or anus. There were no lesions of scratching and no scars of any old eruption. The bones were normal. Rectal examination was negative.

She ran a perfectly normal temperature during her stay in the hospital. The pulse ranged between 100 and 140, usually being about 120, while the respiration ranged between 25 and 50, usually being about 35. She was fed partly on the breast and partly on pasteurized buttermilk. She took the breast well, but the buttermilk only fairly. She did not vomit. She had one or two movements daily, white or grayish-white in color but smooth and homogeneous; occasionally they contained a very little mucus. Her weight at entrance was 4410 gm. and on March 19, 5270 gm.

She was contented, comfortable and happy.

Blood. — Hemoglobin, 100%; red corpuscles, 4,816,000; white corpuscles, 18,900. On March 17, fibrin shreds appeared in the blood as soon as in the drop taken from a normal infant for comparison.

Urine. — Slightly green; 1009; acid; no albumin; considerable bile.

Feces. — Chemical examination showed no bile in the feces.

OPERATION.

March 19, under ether. The abdomen was opened by an incision about 3½ inches long through the right rectus muscle. There was a considerable quantity of serous fluid in the abdomen. The liver presented in the operation wound with the lower border a finger's breadth above the navel. The enlargement was uniform, the color a greenish-bronze, the consistency elastic. The surface was dimpled in places but was not roughened to the touch. The edge was rounded and the notch at the fissure unusually deep. The gall bladder was about the size of the distal phalanx of a child's finger and lay where the cystic duct would normally be found. The under surface of the liver showed no evidence of a gall bladder having developed in the normal position. The common bile duct was isolated and followed up through the hepatic duct to the under surface of the liver, but nowhere was there any evidence of a dilatation from obstruction to the flow of bile. Several small glands were found about the common duct in the gastro-hepatic omentum but they were not causing pressure. The spleen was markedly enlarged and elastic. The stomach and intestines were normal. The kidneys were normal to palpation. The abdomen was closed with catgut in the peritoneum and silkworm gut through the skin, muscle and fascia, and a dry dressing applied.

The baby stood the exploration very badly. It was pale and practically pulseless when put to bed, but the pulse improved after 2 oz. of salt solution had been given subcutaneously. The color improved and food was taken two hours after the operation. The baby continued to take its food, both breast and bottle, but its condition did not become satisfactory. Stimulation improved the character of the pulse, but toward midnight it became restless, and died suddenly, just after its 2 A.M. feeding.

AUTOPSY.

Unfortunately, the only examination which could be made was through the wound of operation. The peritoneal cavity was found filled with bloody fluid and blood clots and the hemorrhage had evidently been sufficient to cause death. The same sero-sanguineous fluid was also found between the edges of the incision. The liver was markedly enlarged, running across the abdomen just above the level of the anterior superior spine of the ileum to a finger's breadth above the navel. The dimpled surface, the greenish color, the deep notch and the marked elasticity of the tissue were the same as noted at the operation.

The gall bladder, the size of a bean, lay at the base of the normal fissure. From this small gall bladder ran a minute cystic duct which connected with the common duct. The common bile duct was isolated and traced from the duodenum up to the liver. In no place was there any evidence of obstruction. Both the common and hepatic ducts were normal in size and appearance. Unfortunately, no effort was made to pass a probe through the duct, as it was assumed from its appearance that it was patent.

The spleen was enlarged to three or four times its normal size.

Further examination of the abdominal contents merely confirmed the normal findings at the operation.

PATHOLOGICAL REPORT.*

Liver. — The liver showed a moderate and irregular increase of connective tissue, most marked in the region of the portal vessels, but occurring also to some extent diffusely within the lobules. In some areas involving several lobules nearly every liver cell was surrounded by newly formed connective tissue, and the limits of the lobules could not be made out. In other areas the increase of connective tissue was slight or absent and the lobules were distinctly recognizable.

In the more normal areas the liver cells were arranged in orderly trabeculae and the bile capillaries, often a little dilated, could be made out distinctly between them. Occasionally the bile capillaries were much distended and contained masses of greenish yellow inspissated bile. Sometimes masses of bile pigment lay in vacuoles in more or less enlarged liver cells.

In the areas where the connective tissue was increased in amount, the orderly arrangement of the liver trabeculae was partly or completely lost, and many of the liver cells were apparently much increased in size and contained many nuclei, often a dozen or more. The protoplasm of these cells usually contained many small masses and granules of bile pigment. The nuclei in these giant cells varied in their location but were most often grouped in the center. These large multinucleated cells seemed to be due to fusion of liver cells; traces of cell membrane and of the bile capillaries could often be made out in them after certain stains. The many nuclei were apparently due, in part, at least, to direct division of the liver cell nuclei.

In the areas where the connective tissue was increased, branching double rows of cells resembling bile ducts were numerous. All gradations between them and normal rows of liver cells could be found.

The connective tissue showed a moderate infiltration with lymphocytes. (Fig. 1.)

Spleen. — The spleen was somewhat congested. The reticulum seemed to be slightly increased in amount. The lymph nodules contained numerous large pale cells scattered fairly evenly throughout. These cells were the endothelial cells of the reticulum, increased in number and showing marked phagocytic properties. They contained numerous more or less digested fragments of cells. A few contained yellow pigment and red blood corpuscles.

The blood sinuses of the pulp contained a few phagocytic cells. (Fig. 2.)

ANATOMICAL DIAGNOSIS.

Cirrhosis of the liver (biliary cirrhosis?). Retention and inspissation of bile pigment and dilatation of bile capillaries. Chronic splenitis (slight).

CASE II. Mildred M. was born Jan. 2, 1906. The parents and one other child were well. There had been no other children or miscarriages and there was no history of syphilis. She was normal at birth and weighed nine pounds. The first movements from the bowels consisted of meconium. The history as to the movements was very unsatisfactory, but the mother was certain that the baby had green movements when it was eleven days old, and thought that they did not begin to be white until she was ten weeks old. (The findings at the operation and the autopsy make this history very improbable.) The mother said that the urine stained the napkins green from the first. Deep jaundice was noted at six weeks. It is certain, however,

that the baby had been yellow for some time before. It was breast-fed for two months, after which it was given condensed milk. It did not vomit, but there was a slight tendency to constipation. It had lost weight steadily since birth. It entered the Infants' Hospital April 9, 1906, when fourteen weeks old.

PHYSICAL EXAMINATION.

It was small and poorly nourished. The skin was in good condition and there were no lesions of scratching. There was deep jaundice of the conjunctivæ, skin and mucous membranes. It was perfectly intelligent. The anterior fontanelle was 2 cm. in diameter and slightly depressed. There was a slight tendency of the bones of the skull to overlap. The head was long and narrow. The mouth was clean and the throat normal. The heart and lungs were normal. The abdomen was full but not tense. There were no evidences of fluid and no masses were felt. The upper border of the liver flatness was at the upper border of the fifth rib. The surface was smooth. The lower border was palpable $1\frac{1}{2}$ cm. below the costal border in the right nipple line and half the distance from the ensiform cartilage to the navel in the median line. The surface was smooth, the edge sharp. The notch was felt distinctly in the right parasternal line. The gall bladder was not made out. The spleen was not palpable. There were no evidences of rickets. There was a slight general enlargement of the peripheral lymph nodes. The weight was $7\frac{1}{2}$ pounds.

Blood. — White corpuscles 17,900. The coagulation time of the blood, estimated by the Brodie-Russell apparatus, on May 11, was six minutes. The baby was given 10 cc. of a gelatin solution at each feeding, and 2 gr. of calcium chloride four times a day up to the time of operation, three days later, when the coagulation time, estimated with the same apparatus, was one minute.

Urine. — High colored; cloudy; 1022; acid; no albumin or sugar; much bile.

Fæces. — The movements from the bowels were about the color of white lead, formed and perfectly smooth. Chemical examination showed no bile.

The baby was put on pasteurized buttermilk, which it took readily. In the beginning it vomited after about half of the feedings, but later vomited much less. The movements continued to be white in color. They were sometimes loose and sometimes constipated, but always smooth and rarely contained either mucus or curds. The odor was at times foul, at others not. The weight increased slowly for about a week, but then gradually diminished, at the time of operation being somewhat less than at entrance. The temperature was normal or subnormal. The jaundice did not increase. The liver increased in size for about a week and then returned to its original condition. The spleen was never palpable. The general condition grew slowly worse.

OPERATION.

The operation was performed under ether May 14. The abdomen was opened by an incision at the outer border of the right rectus muscle, extending from the costal margin to the level of the navel. There was no fluid in the peritoneal cavity. The liver extended about 1 cm. below the costal border in the right nipple line and 4 cm. below the ensiform in the median line. It was dark in color and elastic and resistant to the touch. The surface appeared granular and was very slightly roughened. The fissures were normal. The gall bladder could not be found. No attempt was made to dissect out the common duct as there was no evidence of pressure or obstruction at any point. The spleen was not enlarged. The other abdominal organs

* We are indebted to Dr. F. B. Mallory of the Department of Pathology of the Harvard Medical School for the report of the microscopical findings in these cases.

were normal. The abdomen was closed with through-and-through sutures of silkworm gut and a dry dressing applied. There was no evidence of delayed coagulation during the operation.

There was but slight shock from the operation. Food was taken and retained during the following day and night. The temperature became subnormal the next day. Stimulation was without effect and the child died without, however, showing any symptoms of hemorrhage.

AUTOPSY.

Unfortunately, in this case also, the only examination which could be made was through the wound of operation. The size of the liver and the character of the surface were as noted at the operation. The other abdominal organs were normal. A very careful dissection of the gastro-hepatic omentum was made, but no common bile duct could be found. The duodenum was opened and the papilla identified, but a probe could not be made to pass into a duct. The gall bladder was represented by a pea-sized cyst at the base of the normal fissure. It had no demonstrable connection with a bile duct.

PATHOLOGICAL REPORT.

Liver. — The liver showed an older cirrhotic process than the first case. There was considerable increase of connective tissue, chiefly in the region of the portal vessels. It was old and dense, and showed almost no infiltration with lymphocytes. In places it had cut the liver tissue up into small islands. In the connective tissue were atrophied trabeculae of liver cells.

In places the bile capillaries were much distended by homogeneous inspissated greenish masses of bile pigment. Some of the atrophied columns of liver cells in the areas of increased connective tissue also contained masses of inspissated bile. (Fig. 3.)

Spleen. — The spleen showed a slight general increase of connective tissue. In the blood sinuses were occasional phagocytic cells, some of which contained yellowish pigment.

The endothelial cells in the centers of the lymph nodules were a little more prominent than normally and were often phagocytic.

ANATOMICAL DIAGNOSES.

Cirrhosis of liver (biliary cirrhosis?). Retention and inspissation of bile pigment and dilatation of bile capillaries. Chronic splenitis (slight).

These cases are reported both because of the rarity of the condition, only about eighty cases being on record, and because of the still greater rarity of pathological and microscopical examinations. The findings in our cases agree pretty well with those in other cases, among the more recent of which are those of Griffith, Hobhouse, Cattaneo, Hédert, Parker and Wollstein. As is always the case, no evidences of syphilis were found. The changes in the liver are not such as to warrant any conclusions as to whether the principal or earliest cause was an irritant reaching the liver through the circulation or biliary retention from obstruction to the large ducts. They are certainly different, however, from those generally described as occurring after sudden obstruction to the flow of bile. The liver and spleen were enlarged in the first case, but not in the second, in which the pathological process was apparently of longer duration. Neither organ

is enlarged in uncomplicated biliary obstruction in later life. The apparent patency of the common and hepatic ducts (probe unfortunately not passed) in Case I also goes to show, as is now generally believed, that the primary condition in these cases is certainly not always, and perhaps almost never, obstruction to or absence of the larger ducts.

There was a moderate leucocytosis, as in the other cases in which the blood has been examined. It was surprising how well the general condition was retained in the first case, which not only did not lose, but gained in weight during its stay in the hospital. Another interesting point was the absence of itching in both cases in spite of the marked jaundice.

The hemorrhage which followed the operation in Case I emphasizes the fact that the determination of the coagulation time of the blood by a crude method in which the blood is exposed to the air is not accurate. On account of the apparent normal coagulability of the blood as judged by the time of the appearance of the fibrin shreds no calcium chloride or gelatin was given, and without doubt hemorrhage was the immediate cause of death. In Case II the coagulation time of six minutes measured with the Brodie-Russell apparatus indicated a slight delay, and this delay was efficiently overcome by the use of calcium chloride and gelatin.

Although the diagnosis was almost certain in these cases, the absolutely hopeless prognosis, no patient having lived longer than eight months, seemed to us to justify exploration on the chances that the diagnosis might be wrong and that some remediable condition, such as obstruction of the larger ducts from pressure of glands or by inspissated bile, or a congenital stricture, might be found. The lesions found were, of course, of the sort expected and irremediable in character, and the exploration undoubtedly shortened the life of both babies. We feel, nevertheless, that in all similar cases exploration should be performed on the chance of occasionally finding some remediable condition.

THE PROFESSIONAL TRAINER'S THEORY OF TRAINING.*

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DURING the past summer it became my duty to examine and talk with a number of professional trainers, with a view to engaging a man to train the members of the Harvard football and baseball teams. A large number of trainers came up for consideration, and of that number I personally interviewed ten. A series of general questions was asked, in order to determine, as far as possible, the candidates' fitness for the task. The answers to the questions were interesting as displaying the point of view and the lack of accurate basis for training, and it is for that reason that I ven-

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