Congenital Absence of the Gallbladder and Cystic Duct: *

Report of Six Cases

WALTER H. GERWIG, JR., M.D.,** L. KENNETH COUNTRYMAN, M.D.,***
CAPT. ALFONSE C. GOMEZ, M.C., U.S.A. †

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TWO CASES of agenesis of the gallbladder and cystic duct, encountered during one year, prompted a study of this unusual developmental anomaly. A ten-year review of the clinical and autopsy records of the George Washington University and Walter Reed Army Hospitals has revealed four additional patients in whom there was demonstrable complete congenital absence of the gallbladder and cystic duct. None of these individuals showed any other abnormalities of the extrahepatic biliary system. Those patients who possessed a rudimentary gallbladder, extreme malformations incompatible with live birth, or prematurity below the birth weight of 1,500 Gm. were excluded from this report.

Embryology

Prior to the appreciation of the embryonic development of the biliary system, infectious agents were generally held responsible for the congenitally absent gallbladder and cystic duct. Arey,[1] however, demonstrated that the primordium of the liver and biliary system begins in the 3-mm. human embryo as a hepatic diverticulum from the area of the future duodenum. From this diverticulum a ventrocaudal sacculation forms the future gallbladder and its duct. The lumen is later obliterated but is again re-established by the end of the 15-millimeter stage. Thus, from an embryological standpoint, two mechanisms exist for agenesis of the gallbladder. There may be failure to form the ventrocaudal sacculation, or failure to recannulize after becoming solid. Complete failure of the primordial tissue to sacculate at the 3-mm. stage is most probably the cause of complete absence or true agenesis of the gallbladder and its duct. This is in contrast to reports in the literature of hypoplasia or atresia of the organ. In hypoplasia the anlogen, after becoming solid, probably fails to recannulize. Thus, a completely different condition from agenesis is created —a vestigial or rudimentary structure which persists in the adult. Nonfunctioning, solid-tissue remnants of other endodermal structures, such as esophagus and intestine, may also have a development analogous to hypoplasia of the gallbladder.

The following new clinical and autopsy cases embody most of the features mentioned in the literature.

Case Reports

Case 1. H. W. H. A 4-day-old, white male infant delivered at term who, at birth, exhibited an atresia of both the anal and right external auditory canals. The mother's health during pregnancy was good and there was no history of familial or contagious diseases.

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** Clinical Associate Professor of Surgery, West Virginia University; Chief of Surgery, Veterans Hospital, Clarksburg, West Virginia.

*** Surgical Resident, Veterans Hospital, Martinsburg, West Virginia.

† Formerly Surgical Resident, Walter Reed General Hospital, Washington, D. C.; now on Surgical Service, 2nd General Hospital, APO 180, c/o Postmaster, New York, N. Y.

Within a few hours after birth, a diagnosis of tracheoesophageal fistula was made. The patient underwent closure of this defect with an end-to-end esophageal anastomosis. A pull-through procedure was then performed to correct the anorectal anomaly. Three days postoperatively, after a relatively uncomplicated course, the infant suddenly became cyanotic during one of his feedings and expired within two hours despite vigorous resuscitative measures.

At autopsy, the operative sites appeared grossly intact. A large interventricular septal defect, stenosis of the pulmonary valve, aortic dextraposition and patent ductus arteriosus were encountered, along with complete agenesis of the gallbladder. The bile duct "was patent and received the hepatic ducts without evidence of a cystic duct being present." Sectioning of the liver revealed no intrahepatic gallbladder.

Immediate cause of death was attributed to aspiration pneumonitis complicated by bronchopneumonia.

Case 2. C. R. A 3-week-old, colored female infant was delivered at term following a short labor period. Mother's health was found good during pregnancy. There was no history of familial or contagious illnesses. Lethargy and difficulty in swallowing was noted on the second day when feedings were attempted. Neurological examination revealed right facial paralysis, absence of gag and sucking reflexes and positive Babinski signs. Lack of response to painful stimuli was striking. A loud systolic precordial murmur was present. Diagnostic studies including subdural taps and lumbar punctures were unrewarding. At the age of 3 weeks, shortly after a gavage feeding, the infant was found lifeless after apparent aspiration of vomited formula. Strenuous resuscitative measures failed to revive the patient.

At autopsy, no gross or microscopic abnormalities of the central nervous system were noted. However, tricuspid atresia, interventricular septal defect, patent foramen ovale, patent ductus arteriosus, and complete absence of the gallbladder and cystic duct were noted. The extrahepatic biliary system was not dilated and revealed no abnormalities.

The cause of death was attributed to aspiration of food and no explanation of the central nervous system disturbances could be found.

Case 3. M. S. A 4-month-old, white male infant, delivered at term, appeared cyanotic since birth. Except for intermittent vaginal bleeding during the second trimester, the mother's health was good. There were no familial illnesses.

Diffuse cyanosis, a loud precordial systolic murmur without a thrill, and enlarged right ventrical were the significant findings on examination and diagnostic studies. The patient was maintained constantly in an oxygen environment for three months; thereafter, its use was occasional. Following one of the patient's feedings, increased dyspnea was observed. Improvement followed oxygen; however, the patient ceased breathing three hours later without responding to resuscitation measures.

At autopsy, multiple congenital anomalies were found: Cor bilatrium triloculare, patent foramen ovale and pulmonic stenosis. There was dextra-position of the pancreas, esophagus and stomach, and dextra-rotation of the foregut. Congenital absence of the spleen and gallbladder was present, though the normal-sized hepatic ducts "come together and form a single common duct which is patent and is seen to enter the second portion of the duodenum where there is a well-formed and patent ampulla." No intrahepatic gallbladder was present on section of the liver.

Immediate cause of death was aspiration and interstitial pneumonia.

Case 4.* J. E. F. A 70-year-old, white man was admitted to the hospital with chief complaint of constant abdominal pain and soreness in the pit of the stomach of six weeks' duration.

Past history was remarkable in that duodenal ulcers were diagnosed in 1920 and 1930. Multiple gallbladder x-ray series failed to visualize the organ. On the last admission the patient described a dull, aching, constant, mid-epigastric pain which was associated with eructation and occasionally with vomiting. There was a recent 17-pound weight loss.

Physical examination was negative. Excretory urogram was consistent with bilateral polycystic kidney disease. Gastro-intestinal series was unremarkable.

Course in Hospital: Following admission the tentative diagnosis was peptic ulcer with a gastrointestinal malignancy to be ruled out. In the course of his workup, he developed a migratory type of phlebitis. Mid-epigastric pain continued unrelentingly. An exploratory laparotomy was performed during which metastatic disease to the liver was encountered with the primary lesion probably located in the body of the pancreas, since a palpable mass was found in this region. The patient expired from the terminal effects of

* Previously reported by Zimmerman [2] as a case of asymptomatic bilateral polycystic kidney disease.

advanced pancreatic carcinoma a month following operation.

At autopsy, the primary tumor in the pancreas was confirmed, as were the distant metastases. Bilateral congenital polycystic kidneys were noted, as well as congenital absence of the gallbladder with slightly dilated hepatic ducts. There was no intrahepatic gallbladder or cystic duct present.

Case 5. N. R. S. A 39-year-old, white man complained of recurrent, gnawing, mid-epigastric pain. Eleven years prior to admission he experienced a similar episode, associated with intermittent vomiting. Complete evaluation at that time revealed "nonfunctioning gallbladder." Low fat diet and intermittent use of antispasmodics controlled the symptoms. Repeated gallbladder studies through the years, including intravenous cholangiograms, failed to visualize the organ. Because of markedly increased symptoms, the patient was hospitalized.

Family history, review of systems and other past medical history were noncontributory. No abnormalities were found on physical examination.

Diagnostic studies, particularly concerning the gastro-intestinal tract, were unrewarding. Repeat gallbladder series failed to visualize the organ. Since the patient developed considerable anxiety concerning the abnormal x-ray findings of his gallbladder, an elective exploratory laparotomy was agreed upon, the patient being forewarned that congenital absence of the organ was a possibility. Exploratory laparotomy revealed the complete absence of gallbladder and cystic duct. Operative cholangiogram confirmed the absence of an intrahepatic organ. Patient's postoperative course was uneventful. He was asymptomatic one month after operation.

Case 6. G. H. A 72-year-old, white man with chief complaint of jaundice of seven weeks' duration. There were no other signs or symptoms. He had remained afebrile and experienced no pain.

On admission to the hospital, the only significant physical finding was jaundice. Preoperative diagnosis was carcinoma of the pancreas or biliary tract. Exploratory laparotomy revealed an enlarged common bile duct which was obstructed near the ampulla of vater. A 2×3 cm. calculus was removed by a transduodenal approach. As an incidental finding, complete absence of the gallbladder and cystic duct was noted. The postoperative course was uneventful with gradual subsidence of the clinical icterus over a 2-week period. Three weeks post-operatively, he developed a wound dehiscence which required closure under general anesthesia. The patient failed to rally from this complication. A limited autopsy was performed, corroborating the absence of the gallbladder and the fact that there was no intrahepatic gallbladder.

Review of Literature

Latimer, Mendez and Hage [3] reviewed the literature in 1947 and reported a total of 74 cases in which congenital absence of the gallbladder was the only abnormality of the extrahepatic biliary system. In six of the autopsied cases, however, the cystic duct was present. This reduces the total number of cases of congenital absence of the gallbladder and cystic duct to 68. In reviewing the earlier cases, Latimer noted that many were incomplete and the many facets of this condition could not be satisfactorily studied. Including the six new cases in this report, there has been a total of 55 cases of congenital absence of the gallbladder and cystic duct reported in the world literature since 1947. This brings the total number of reported cases to 123. This uniform completeness of the case reviews in the last 12 years has permitted a significant new evaluation of the problem (Table 1).

During the past 12 years there has been a striking decrease in this condition being diagnosed for the first time at postmortem examination. Latimer [3] reported 38 of the 68 cases to be unsuspected prior to postmortem examination. In the present review of 55 cases, ten were diagnosed for the first time at autopsy—five (including Cases 1, 2 and 3 of our survey) being asymptomatic in babies.[21, 32] Two cases were in adults [5, 27] who had been admitted to the hospital anticipating biliary tract surgery but who had expired before a surgical procedure could establish the diagnosis. There are only three adult cases reported [32] (6%) in which there were no symptoms referable to the biliary tract and which were diagnosed for the first time at autopsy. Excluding the five pediatric cases, the average age at the time

TABLE 1

Author	Date	Age & Sex	Symptoms	Duration	Preop. Diagnosis	Findings at Surgery & Comments	T-Tube Cholangiogram
Acebal[4]	1953	67 F	Epigastric and R.U.Q. pain after fatty foods. Occasional dark urine and scleral Icteris.	12 yrs.	Cholecystitis and cholelithiasis.	Normal common duct. No fossa. Cholangiogram neg. except for spasm of sphincter of Oddi with very small passage of dye into duodenum.	Yes—neg.
Andrade[5]	1949	45 F	Dyspepsia after meals. Acute onset of R.U.Q. pain, nausea, vomiting and jaundice.	1 yr.	Cholecystitis	Died suddenly preop. At autopsy 2,000 cc. bile-stained yellow ascitic fluid. Perforated common duct from stone.	No
Atay[6]	1947	37 F	R.U.Q. pain. Jaundice 3 days.	15 yrs.	Common duct obstruction.	Stones in dilated common duct. Fissure present. No obstruction at ampulla.	Yes—neg.
Bellosa[7]	1951	56 F	R.U.Q. colicky pain after fatty food. Intermittent jaundice 1½ yrs.	30 yrs.	Cholecystitis and cholelithiasis.	Common duct normal. Rt. hepatic duct fusaform dilated. No expl. of ducts. Mild hepatitis.	No
Carnevali[8]	1959	29 M	Upper abdomen discomfort with bloating.	1 yr.	Cholecystitis.	Neg. expl. One year later improved but symptoms still present. Fossa present.	Yes—neg.
Castro[9]	1948	48 F	Recur. R.U.Q. and epigastric colicky pain. Neg. abd. exploration 2 yrs previous. No gallbladder seen.	4 yrs.	Biliary tract dis.	Common duct normal. Cholangiogram dye emptied normal.	Yes—neg.
Caylor[10]	1952	45 F	Epigastic pain assoc. with tachycardia.	3 yrs.	Nonfunctioning gallbladder.	Neg. expl. No fossa.	Yes—neg.
Ceraci[11]	1959	36 M	Epigastric pain. Increasing 1 mo.	15 yrs.	Cholecystitis.	Neg. expl.	Yes—neg.
Cottini[12]	1949	56 M	R.U.Q. colicky pain. Acute episode with jaundice 20 days.	24 yrs.	Cholelithiasis.	Normal common duct. Jaundice believed from Giardia infestation in biliary duct. Two yrs. post-op. no pain. No common duct. expl. done. Treated for Giardia.	No
DeYoe[13]	1950	68 F	Intermit R.U.Q. colicky pain. Jaundice 2 days.	1 yr.	Cholecystitis and common duct stone.	Stone in dilated common duct. Continues some preop. pain but decreasing.	Yes—neg.

TABLE 1—(*Continued*)

Author	Date	Age & Sex	Symptoms	Duration	Preop. Diagnosis	Findings at Surgery & Comments	T-Tube Cholangiogram
Echegary[14]	1954	65 M	Epigastric pain. Jaundice 1 week	9 mo.	Cholelithiasis.	Stone in dilated common duct.	Yes—neg.
Echegaray	1954	44 F	R.U.Q. dyspepsia. Acute episode R.U.Q. and R.L.Q. pain.	5 yrs.	Cholecystitis	No fossa	No
Fasce[15]	1954	48 M	R.U.Q. colicky pain, chills, fever and jaundice.	Unkn.	Cholelithiasis 2nd to hemolytic jaundice.	Stone in dilated common duct. No fossa.	Yes—neg.
Gawinska[16] Ostrowska	1954	Unkn. F	Rt. subcost. pain with intermit. jaundice.	1 yr.	Common duct stone.	Stone in dilated common duct. 4½ mo. post-op. continued jaundice. 1 yr. no jaundice or complaints.	Yes—neg.
Gerwig	1960	4 da. M	None. Tracheo-esophageal fistual and imperf. anus surg. corrected. Uneventful until suddenly died 3 das. p.o.	—	—	Necropsy—op. sites intact. Large interventricular septal defect, stenosis of pulmonary valve, aortic dextraposition and patent ductus arteriosus.	—
Gerwig	1960	3 wk. F	None.	—	—	Necropsy—tricuspid atresia, interventricular septal defect, patent foramen ovale, patent ductus arteriosus.	—
Gerwig	1960	4 mo. M	None.	—	—	Necropsy—cor bilatrium triloculare, patent foramen ovale and pulmonic stenosis; dextraposition of pancreas, esophagus and stomach; dextra-rotation of foregut; absent spleen.	No
Gerwig	1960	70 M	Constant epigastric pain. Duodenal ulcers for 30 yrs.	6 wks.	Carcinoma of pancreas.	Carcinoma of pancreas and bilateral congenital polycystic kidney	No
Gerwig	1960	39 M	Gnawing epigastric pain.	11 yrs.	Cholecystitis.	Expl. neg.	Yes—neg.
Gerwig	1960	72 M	Painless jaundice.	7 wks.	Carcinoma of pancreas.	Stone in dilated common duct.	No
Grossi[18]	1949	39 M	Epigastric and R.U.Q. pain radiating into rt. subscap. region	19 yrs.	Cholecystitis.	Mod. dil. com. duct. No fossa, palp. stones. Com. duct not expl. Pancreas norm. Continued some pain p.o.	No

TABLE 1—(*Continued*)

Author	Date	Age & Sex	Symptoms	Duration	Preop. Diagnosis	Findings at Surgery & Comments	T-Tube Cholangiogram
Goldenberg[17]	1954	37 F	R.U.Q. pain.	30 yrs.	—	Norm. com. duct to palp. and probe. T-tube in place; no cholangiogram	No
Hillemand[19]	1949	38 M	R.U.Q. pain with nausea and vomiting	3 yrs.	Cholecystitis.	Accessory lobe of liver where gallbladder should be.	No
Iovetz[20] Tereschenko	1956	49 M	R.U.Q. cramping pain acutely worse 24 hrs.	2 yrs.	Perforated peptic ulcer.	Normal bile ducts. Postop. course had jaundice.	No
Jutras[21]	1956	6 mo. F	None.	—	—	Died from dehydration after severe diarrhea. Autopsy neg. except for absent gallbladder. No fossa.	No
Kobacker[22]	1950	43 F	Bloating and epigastric pressure.	Unkn.	—	Common duct neg.	Yes—neg.
Kobacker	1950	Unkn. F	R.U.Q. pain with history of jaundice at 18 yrs. of age.	14 yrs.	—	Abd. expl. neg.	No
Lamprecht[23]	1949	29 F	Postprandile epigastric pressure with nausea and vomiting.	14 yrs.	Cholecystitis and cholelithiasis.	Neg. abd. expl. confirmed by autopsy after sudden unexpl. death. No fossa. Normal pancreas.	No
Lima[24]	1953	38 F	R.U.Q. pain radiating into back. Jaundice 10 days.	10 yrs.	Cholecystitis with stone.	Stone in dilated common duct.	Yes—neg.
Lima	1953	35 F	R.U.Q. pain with nausea and vomiting. Jaundice 4 days.	2 yrs.	Choleperitoneum with stone.	Stone in dilated common duct. Bile peritonitis.	Yes—neg.
Lima	1953	48 M	R.U.Q. colicky pain. Jaundice 8 days.	4 yrs.	Common duct stone.	Stone in dilated common duct.	Yes—neg.
Malmstrom[25]	1953	62 M	R.U.Q. and rt. subscap. pain. 3½ yrs. previously abd. exploration revealed absence of G.B.; operation terminated prematurely because of pt's. cond.	Unkn.	—	Dilated and tortuous common duct. No stones. Pancreas firm. 4 mo. postop persistent pain and one episode of jaundice.	Yes—neg.

TABLE 1—(*Continued*)

Author	Date	Age & Sex	Symptoms	Duration	Preop. Diagnosis	Findings at Surgery & Comments	T-Tube Cholangiogram
Mann[26]	1957	69 M	Intermittent chills, fever, jaundice and abd. pain. Abd. oper. prev. term. prematurely when pt's. cond. became worse. Absence of G.B. noted.	6 yrs.	Common duct obstructed by stone.	Stone in dilated common duct. Sphincterotomy done.	Yes—neg.
Monroe[27]	1956	46 M	Epigastric pain and tenderness.	1 yr.	—	Died suddenly before operation. Common duct nomral. No stone.	No
Mouzas[28]	1953	64 F	Recurring R.U.Q. abd. pain assoc. interm. jaundice.	5 mos.	—	Stone in dilated common duct. Small cirrhotic liver. No fossa.	Yes—neg.
Nelson[29]	1949	30 F	Epigastric pain that is severe after fatty foods.	2 mos.	Cholecystitis.	Neg. expl. No fossa. Postop epigastric discomfort after fatty foods.	No
Nevill[30]	1954	23 M	R.U.Q. gnawing pain.	8 yrs.	Cholecystitis.	Common duct norm. Head of pancreas thickened. Common duct expl. not done. Postop decolyn produced same pain as preop.	No
Pascual[31]	1951	42 F	Epigastric pain radiating into back. Frequent vomiting and wieght loss. Jaundice 10 days.	1 mos.	Common duct obstruction from neoplasm.	Hard large liver. Common duct slightly dilated. Autopsy 1 mo. later no stones. Hepatoma. No fossa.	No
Pascual	1951	70 F	Vague R.U.Q. complaints without pain or fever assoc. with jaundice.	4 mo.	Carcinoma head of pancreas.	No autopsy. Hepatoma.	No
Pines[32]	1958	74 M	Epigastric pain. Jaundice 1 wk.	1 yr.	Cholecystitis and cholelithiasis.	Common duct widened and contained thick bile sludge. Dilators passed into duodenum easily.	Yes—neg.
Pines	1958	22 mo. M	None.	—	—	Necropsy revealed no other abnormalities.	No
Pines	1958	32 M	None.	—	—	Necropsy revealed wide spread metas from melanoblastoma of skin, cyst of rt. kidney and patent foramen ovale.	No

TABLE 1—(*Continued*)

Author	Date	Age & Sex	Symptoms	Duration	Preop. Diagnosis	Findings at Surgery & Comments	T-Tube Cholangiogram
Pines	1958	83 M	None. Died shortly after admission from perforated ulcer.	—	—	Necropsy revealed generalized peritonitis and hematoma of rt. kidney.	No
Pines	1958	55 M	None. Died 2 days after admission from acute coronary occlusion.	—	—	Necropsy confirmed.	—
Polivy[33]	1954	70 M	Intermit. R.U.Q. pain, nausea, vomiting. Jaundice 2 wks.	1 yr.	Cholecystitis and cholelithiasis.	Stones in dilated common duct. T-tube removed 4 mo. postop.	Yes—neg.
Rains[34]	1951	61 F	Intermit. R.U.Q. pain, nausea, vomiting. Ac. onset of jaundice.	14 yrs.	Acute cholecystitis with common duct stone.	Stone and sludge in dilated common duct. Fossa present.	Yes—neg.
Rheinlander[35]	1957	57 F	Recurrent epigastric pain, chills and jaundice. Operated upon 5 yrs. before for same complaints but oper. term after sev. hem. No material removed.	8 yrs.	Common duct stone.	At reop. choledocal cyst secondary to common duct stricture. Small calculi in left hepatic duct. Also had hemicolectomy for adenocarcinoma.	Yes—neg.
Rodda[36]	1957	32 F	Bloating and fatty food intolerated.	3 yrs.	Nonfunctioning gallbladder.	Normal common duct. Continued same preop. complaints. One year p.o. cholangiogram showed norm. com. duct.	Yes—neg.
Santos[37] Gugugas	1947	60 M	Painless jaundice assoc. with chills, fever, pruritus and weight loss.	6 mos.	Common duct obstructed by stone.	Stones in dilated common duct. Common duct expl. but T-tube removed accidentally before cholangiography.	No
Schmorell[38]	1950	44 F	R.U.Q. pain with jaundice.	1 mo.	Common duct stone.	Stone in dilated common duct. Enlarged yellow liver.	No
Sherbini[39]	1949	20 F	R.U.Q. and epigastric pain.	10 yrs.	Cholecystitis.	Neg. expl. No fossa.	No

TABLE—1 (*Continued*)

Author	Date	Age & Sex	Symptoms	Duration	Preop. Diagnosis	Findings at Surgery & Comments	T-Tube Cholangiogram
Smyth[40]	1949	72 F	R.U.Q. and epigastric pain assoc. with intermittent jaundice.	3 yrs.	Chronic cholecystitis with common duct stone.	Cholest. stone in dilated com. duct. During cholangiogram M.S. to contract spinct. Oddi to fill ducts with dye. No fossa.	Yes—neg.
Timoney[41]	1948	70 F	Intermittent severe episodes of R.U.Q. colicky pain.	Unkn.	Acute cholecystitis with cholelithiasis.	Neg. abd. expl. Jaundice developed immediately after operation and reop. reveals stone in dilated common duct.	Yes—neg.
Villareal[42]	1948	41 F	R.U.Q. cramps, fever, chills, jaundice and 20 lb. weight loss.	4 mos.	Cholecystitis with common duct obst.	Stone in dilated common duct. Pancreas hard. Catheter slipped through ampulla easily. No fossa.	Yes—neg.
Weiner[43]	1958	64 F	Epigastric pain and bloating.	Unkn.	Cholelithiasis.	Normal common duct and pancreas. Dye passes easily into duodenum.	Yes—neg.

of discovery was 50.7 years, with an average duration of biliary tract symptoms of 6.6 years. The almost equal incidence of male to female (25 to 30) does not follow the usual clinical distribution of other biliary tract diseases which are usually more frequent in females.

Jaundice as a presenting sign was seen in 26 of the 47 patients (55%) who had symptoms of biliary tract disease. In each instance the causative agent for the formation of jaundice was determined. A common duct stone was found in 20 instances, hepatoma in two cases,[31] and one each of biliary tract infestation with Giardia[12] x-ray evidence of spasm of the sphincter of Oddi,[4] hepatitis,[7] and thick sludge.[32] There is only one instance in the literature of painless jaundice associated with a common duct stone.[37] This report presents another such case; the patient happens to be the oldest (age 72) in all the literature, in whom this condition was discovered at operation.

At least one common duct stone was seen in 20 of the 47 symptomatic cases (43%) and in each instance jaundice was present and the common duct was dilated. Postoperative follow up has not been done routinely. In ten of the cases, however, it is mentioned that the patient continued experiencing the same complaints after surgery that had been present before the initial operation. In six instances jaundice developed for the first time after operation and necessitated re-operation in four cases.

Discussion

Four of the six cases in this report were taken from a ten-year review of 2,585 autopsies (1,756 men and 829 women) and accounted for the unusually high autopsy incidence of 0.155 per cent. Stotkind[45] also reported a high incidence of 0.37 per cent. His study, however, includes the more common group of cases in which congenital absence of the gallbladder was associated

with other congenital anomalies of the biliary tract. This actually constitutes another problem and is not under consideration at this time. Probably a closer approximation to the true occurrence of this condition in the over all population is given by Malmstrom [25] as 0.042 per cent.

Congenital anomalies are frequently multiple and two or more anomalies are seen in four of the six cases in this study. In all of the pediatric cases, major congenital anomalies, particularly cardiac, prevented normal extra-uterine life and prompted referral to a hospital center. For this reason, the incidence of agenesis is unusually high in this series. In each of the postmortem examinations of the children unsuspected absence of the gallbladder and cystic duct was discovered. It is interesting to note that in the 5 to 10-mm. stage of development, when the tissue of the future gallbladder and cystic duct sacculate, all major organ systems are also going through their formation. The anomalies of heart, gastro-intestinal tract, kidneys, spleen and external ear found in this study involve all three primordial germ layers; and the abnormal developmental defects all have their genesis at the same embryological period. In none of the histories, which in the pediatric cases were particularly detailed, was there a suggestion as to the agent responsible for the congenital defects seen. Kobacker [22] studied one family in which several members had evidence of congenital absence of the gallbladder, and he postulated a hereditary defect.

Congenital absence of the gallbladder and cystic duct is practically an impossible diagnosis to make prior to laparotomy, since differentiation from a radiologically nonfunctioning gallbladder is impossible. There are no characteristics signs or symptoms that differentiate it from the more common aspects of biliary tract disease. Case 5 presented upper abdominal complaints that were not typical of any organ system. Because of the nonconformity of his symptoms, operation was delayed and preoperatively it was actually suggested to the patient that he might have a congenitally absent gallbladder.

Other authors [3, 21, 32] have particularly noted the asymptomatic course in infants and children, and it is again demonstrated in this report. The almost uniform occurrence of symptoms referable to the biliary tract in adults with congenital absence of the gallbladder suggests that the normal functioning of the gallbladder has some protective influence to prevent the formation of common duct stones and the symptoms of biliary tract disease; and its congenital absence causes an additional functional alteration of the biliary tract which predisposes to a pathologic state.

It is generally thought that stones are formed in the gallbladder in the presence of gallbladder mucin and then migrate into the common duct. The presence of a common duct stone with congenital absence of the gallbladder, as seen in Case 6 and associated with jaundice, therefore appears to be a theoretical impossibility, but a stone is found in 43 per cent of the cases with biliary tract symptoms. The presence of a common duct stone in congenital absence of the gallbladder and cystic duct is certainly conclusive proof that a stone can be formed outside of the gallbladder and without gallbladder mucin. In the postcholecystectomy patient, common duct stones do not form as a rule, possibly because of the relatively short interval of time from removal of the gallbladder until death occurs. In congenital absence of the gallbladder, an average of 56 years is necessary to produce symptomatic common duct stones. A common duct stone found in the patient who has had the gallbladder previously removed may not always be a stone overlooked at operation, as is generally believed, but rather one formed primarily in the common duct at a later time.

The occurrence of signs and symptoms

of both pancreatic disease (6%) and biliary tract disease (94%) points to the sphincter of Oddi as a possible etiological factor. As bile is secreted, it is retained in the biliary ducts by the normal contraction of the sphincter of Oddi. If there is a common outlet for both the pancreatic and biliary secretions, there may be reflux into the pancreatic duct.

The antemortem diagnosis of congenital absence of gallbladder and cystic duct depends upon the findings at abdominal exploration and direct cholangiography. Negative findings for practical purposes generally exclude a nonfunctioning or intrahepatic gallbladder. Needling of the liver is not diagnostic since bile found on aspiration may come from a large intrahepatic biliary duct as well as an intrahepatic gallbladder. The complications of a persistent biliary fistula following needle aspiration has been reported by Robertson.[44]

Common duct exploration and operative cholangiography is indicated in all cases with presumptive evidence of congenital absence of the gallbladder and cystic duct. Cholangiography is not only important to establish the diagnosis of agenesis and to exclude the possibility of an intrahepatic gallbladder, but it is essential because of the high preoperative incidence of jaundice (55%) and a common duct stone (43%) and the frequent postoperative occurrence of jaundice and/or pain (26%).

The insertion of a T-tube not only permits adequate postoperative biliary drainage but, through cholangiography, aids in the postoperative recognition and diagnosis of some of the frequent postoperative complications of agenesis.

If a stone is removed from the common duct or a negative exploration of common duct is done and a T-tube is inserted, nothing permanent has been done to alter the pathologic physiology of the extrabiliary system that predisposed before surgery to biliary tract complications. During common duct exploration, patency of the sphincter of Oddi can be determined. If indicated, serious consideration should be given to sphincterotomy as a definitive procedure designed to favorably alter the physiology of the common duct. This may aid in preventing the recurrence of these common complications of agenesis of the gallbladder and cystic duct.

Summary

This report is based on the study of six new patients and a review of 49 cases in the world literature since 1947 in whom, complete, congenital absence of the gallbladder and cystic duct was demonstrable. None of these individuals showed any other abnormality of the extrabiliary system.

This review of both clinical and autopsy records includes most of the clinical features mentioned in the literature and, in addition, suggests several new aspects of surgical interest. The concomitant development of multiple congenital anomalies, as was noted in four of the cases, is discussed in relationship to the embryological defect of absence of the gallbladder.

Certain implications dealing with the formation of common duct stones causing obstructive jaundice, as observed in one case, are presented for consideration. A plan is outlined for diagnostic procedures and surgical management of patients with presumptive evidence of congenital absence of the gallbladder and cystic duct.

Addendum

Subsequent to the present statistical analysis of the cases published in the world literature since 1947, five articles [46-50] have been found in which a total of six new cases are reported. In reviewing the world literature before 1947, a total of ten [51-59] cases were discovered that are not included in the review by Latimer. This brings the total number of reported cases of congenital absence of the gallbladder and cystic duct to 139.

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