Hydrops of the Gallbladder Associated With Kawasaki Syndrome

By Edwin A. Suddleson, Barbara Reid, Morton M. Woolley, and Masato Takahashi
Los Angeles, California

● **Hydrops of the gallbladder is recognized as a major component of the abdominal crisis occurring in children with Kawasaki syndrome. Sixteen patients with hydrops of the gallbladder secondary to Kawasaki syndrome have been diagnosed and treated at the Childrens Hospital of Los Angeles. One patient was treated by cholecystectomy and 15 nonoperatively without untoward sequelae. Nonoperative management with serial ultrasonic evaluation and close clinical monitoring is a safe method of treatment for this entity. Pathologic and clinical data are presented and discussed. Review of diagnosis and treatment of 41 reported cases of hydrops of the gallbladder in Kawasaki syndrome from the English language literature is also presented.**

INDEX WORDS: Kawasaki syndrome; mucocutaneous lymph node syndrome; hydrops of the gallbladder.

SINCE ACCURATE DIAGNOSIS of gallbladder enlargement has been facilitated by the advent of the gray-scale ultrasound, hydrops of the gallbladder has been recognized as a major component of the abdominal crisis occurring in children with Kawasaki syndrome.[1,2] Hydrops of the gallbladder in Kawasaki syndrome appears to differ from other childhood forms of acute acalculous cholecystitis in etiology, histopathology, and prognosis.[3]

Mucocutaneous lymph node syndrome was first described in Japan in 1967 by Kawasaki et al.[4] It is characterized by fever, conjunctival injection, erythematous skin rash, oral manifestations including red cracked lips, swelling of the palms and soles with desquamation of the fingertips, and enlarged lymph node masses, usually in the neck. Symptoms usually appear serially and the syndrome has indeed presented initially as an acute abdominal crisis.[5]

In this report, we present our experience at the Childrens Hospital of Los Angeles in the diagnosis and management of 16 cases of hydrops of the gallbladder complicating Kawasaki syndrome.

MATERIALS AND METHODS

Two hundred thirty-two (232) children with a diagnosis of Kawasaki syndrome at the Childrens Hospital of Los Angeles were examined by two-dimensional echocardiography from 1979 through June 1985. During this examination, the gallbladder was specifically identified and measured in 117 patients. Ultrasonographic examinations were performed in patients with clinical or laboratory evidence of hepatomegaly, gallbladder enlargement, abdominal mass, or jaundice. Ultrasound and two-dimensional echocardiogram studies of children in the acute or convalescent phase of the syndrome were reviewed and the diagnosis of acute hydrops of the gallbladder established. The diagnosis was established by measuring the long axis of the gallbladder and comparing these with normals using the criteria described by Slovis et al.[2] Serial examinations were performed until resolution of the hydropic gallbladder was documented.

RESULTS

Sixteen patients with hydrops of the gallbladder were identified, making up 13.7% of the patients with Kawasaki syndrome in whom the gallbladder was examined. They ranged in age from 1 to 10 years. Eleven were boys and five were girls. Although only two patients presented with abdominal complaints, 14 of the 16 had abdominal distress or gastrointestinal complaints during their early course (Table 1). Four patients had palpable gallbladders, ten complained of abdominal pain, ten had a palpable hepatomegaly, and eight had been vomiting. Liver function tests were abnormal in 12 patients, but the total bilirubin was elevated in only three. Elevation of the erythrocyte sedimentation rate (ESR) was found in all 14 patients in which it was measured.

Ultrasound examinations were performed in the postprandial state in five patients where a clinical suspicion of gallbladder enlargement was present. Eleven cases were clinically silent and diagnosed by routine echocardiographic study. Enlarged acalculous gallbladders without dilated bile ducts were seen in all cases (Figs 1A and B). The largest gallbladder was 10 cm in its long axis. Repeat ultrasonographic study demonstrated resolution of the gallbladder hydrops in all patients restudied, although one gallbladder remained dilated for 60 days from the time of initial diagnosis.

Cholecystectomy was performed on one child who presented with abdominal pain, jaundice, abnormal liver function tests, and hydrops of the gallbladder by ultrasound. The gallbladder was tense with bile at surgery. An operative cholangiogram performed through the cystic duct stump was normal. Although the mucosa of the gallbladder and cystic duct were intact microscopically, the submucosal, muscular, and adventitial layers showed a suppurative cholecystitis

From the Departments of Surgery, Radiology, and Cardiology, Childrens Hospital of Los Angeles.
Address reprint requests to Edwin A. Suddleson, MD, Department of Medical Education, Huntington Memorial Hospital, 100 W Congress St, Pasadena, CA 91109-7013.

0022-3468/87/2210-0018$03.00/0

Table 1. Clinical Findings in 16 Patients With Kawasaki Syndrome and Hydrops of the Gallbladder

Patient	Age	Sex	Abdominal Pain	Vomiting	Palpable Gallbladder	Hepatomegaly	Total Bilirubin*	SGOT†	SGPT‡
1	6	M	+	+	+	+	0.6	56	92
2	7	F	−	+	−	+	0.4	79	317
3	2	M	+	−	+	+	0.4	32	247
4	3	F	+	−	−	+	3.3	463	625
5	5	M	+	−	+	+	5.2	171	189
6	2	M	−	−	−	−	0.5	31	132
7	3	M	+	+	−	+	0.3	24	18
8	2	M	−	+	−	−	0.4	24	26
9	10	M	−	+	−	+	0.3	81	70
10	4	F	+	+	+	+	9.1	87	108
11	1	M	−	−	−	−	0.6	35	28
12	2	F	+	−	−	+	0.5	46	173
13	1	F	−	−	−	−	0.6	30	22
14	2	M	+	+	−	+	0.8	68	75
15	3	M	+	+	−	−	0.2	81	125
16	1	M	+	−	−	−	0.4	18	15

*Upper limit of normal total bilirubin = 1.2
†Upper limit of normal SGOT = 50.
‡Upper limit of normal SGPT = 35.

with heavy polymorphonuclear infiltrates, edema, and some hemorrhagic areas (Fig 2). The veins were congested, but arterial pathology was not identified. Liver biopsy showed inflammatory infiltrates in the portal tracts while liver architecture was preserved. Cultures of the gallbladder were sterile.

Nonoperative management with serial ultrasonographic and clinical evaluation was successful in the remaining 15 patients. They had spontaneous resolution of the gallbladder hydrops without recognizable sequelae. The hydrops resolved usually within 14 days of diagnosis, however, three of the patients had persistent dilatation at 30 days and one at 60 days.

DISCUSSION

The complications of Kawasaki syndrome and their incidence are listed by the National Kawasaki Syndrome Surveillance System.[6] In this study from the Center for Disease Control, 523 cases were compiled from 1976 through 1980. Gallbladder hydrops was reported in 2.5% of the children. At Childrens Hospital of Los Angeles, we have documented 16 cases of hydrops of the gallbladder in 117 patients studied by echocardiography in whom the gallbladder was specifically examined (13.7%). Only five (31%) of these cases were suspected clinically. Thus, the incidence of hydrops of the gallbladder associated with Kawasaki syndrome appears to be much higher than previously reported.

Three of the 16 patients with hydrops of the gallbladder were jaundiced with a predominantly direct hyperbilirubinemia. The etiology of the obstructive jaundice is evasive, since mechanical obstruction of bile flow has not been demonstrated or reported. When performed, operative and postoperative cholangiography have uniformly demonstrated normal caliber com-

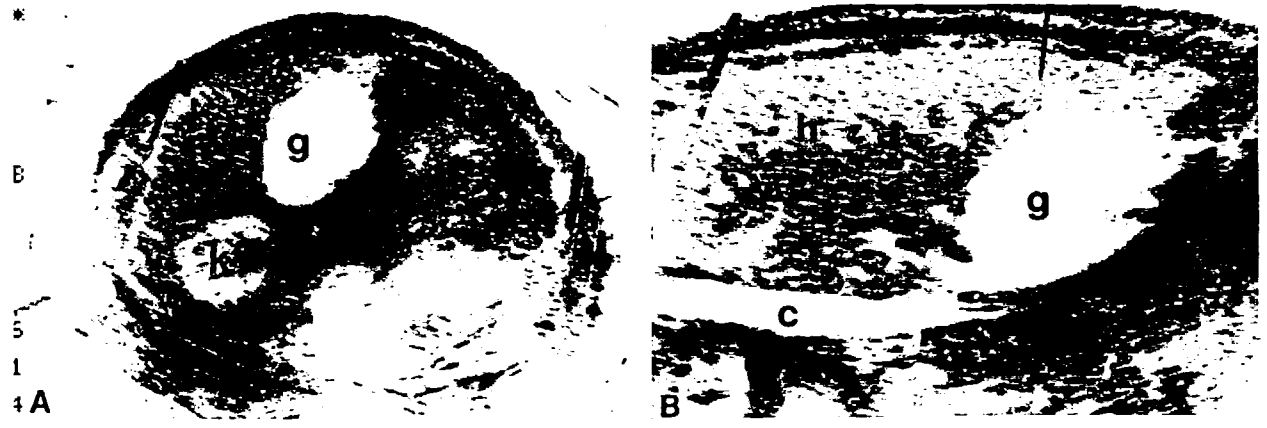

Fig 1. (A and B) Ultrasound of hydropic gallbladder showing enlarged acalculous gallbladder (g), larger than kidney (k). Common bile duct (c) is normal. L, liver.

Fig 2. Microscopic section of resected gallbladder wall showing suppurative cholecystitis.

mon and hepatic bile ducts with free flow of contrast into the duodenum.[7-9] Liver biopsy of one operative case at Childrens Hospital of Los Angeles showed normal hepatocytes with mild leukocyte infiltration of portal triads and minimal cholestasis.

From a collected review of the English language literature, 41 patients have been reported with documented hydrops of the gallbladder (Table 2), including the 16 cases here reported. Twelve patients have been operated on for treatment of the hydrops. Cholecystectomy has been performed in five patients and cholecystostomy in three, and in four cases, the surgical procedure was not specified. The remaining 29 patients have been treated medically. All of the patients have recovered from the syndrome and none of the patients treated medically or surgically have had significant

Table 2. Review of the Literature

Study	No. of Cases	Medical	Surgical
Childrens Hospital of Pittsburgh[1]	5	5	0
Childrens Hospital of Michigan[2]	4	4	0
Center for Disease Control[6]	7	3	4
University of Michigan Medical Center[11]	2	1	1
Nassau Hospital[12]	1	0	1
Childrens Hospital of Eastern Ontario[9]	2	0	2
USAF Medical Center, Keesler[8]	1	0	1
Childrens Hospital of Philadelphia[7]	2	1	1
Milwaukee Childrens Hospital[10]	1	0	1
Childrens Hospital of Los Angeles	16	15	1
Total	41	29	12

sequelae of the gallbladder hydrops. One case of perforated gallbladder was reported.[10] This case was diagnosed by ultrasound as a perforation and successfully treated by cholecystostomy.

The etiology of the hydrops is uncertain. Several authors have postulated an obstruction of the cystic duct by nonspecific vasculitis,[11] or external compression by enlarged lymph nodes.[12] Operative cholangiograms have been reported as normal in all but one case where cystic duct obstruction with normal common and intrahepatic bile ducts were reported.[9] Patent cystic ducts were visualized during ultrasound examinations at Childrens Hospital of Los Angeles.

The gross surgical findings of reported cases include tensely distended inflammed gallbladder walls and dilated cystic ducts. Each gallbladder operated on has been reported sterile by culture. This finding fails to explain the dilatation, dysfunction, and suppuration of the gallbladder during the acute phase of Kawasaki syndrome.

As a result of the review of the reported cases and our own observations, we conclude that the gallbladder is organically inflammed during the Kawasaki syndrome; however, as the disease subsides, the inflammatory process in the gallbladder resolves without bacterial invasion. Although each clinician must use judgment in treating the individual patient, it would appear that the majority of patients with hydrops of the gallbladder associated with Kawasaki syndrome can and should be treated medically and do not require surgical intervention. Repeated ultrasonographic studies are helpful in guiding the clinician in arriving at the appropriate decision.

REFERENCES

1. Bradford B, Reid B, Weinstein B, et al: Ultrasonic evaluation of the gallbladder in mucocutaneous lymph node syndrome. Radiology 142:381-384, 1982

2. Slovis T, Hight D, Philippart A, et al: Sonography in the diagnosis and management of hydrops of the gallbladder in children with mucocutaneous lymph node syndrome. Pediatrics 65:789-794, 1980

3. Ternberg LJ, Keating JP: Acute acalculous cholecystitis,

complication of other diseases of childhood. Arch Surg 110:543-547, 1975

4. Kawasaki T, Kosaki F, Akawa S, et al: A new infantile acute febrile mucocutaneous lymph node syndrome prevailing in Japan. Pediatrics 54:271-276, 1974

5. Yanagihara R, Todd J: Acute febrile mucocutaneous lymph node syndrome. Am J Dis Child 134:603-614, 1980

6. Bell DM, Morens DM, Holman RC, et al: Kawasaki syndrome in the United States. Am J Dis Child 137:211-214, 1983

7. Koss J, Coleman B, Mulhern C, et al: Mucocutaneous lymph node syndrome with hydrops of the gallbladder diagnosed by ultrasound. J Clin Ultrasound 9:477-479, 1981

8. Westfall C, Massello T: Kawasaki disease associated with hydrops of the gallbladder, a case presentation and review of the literature. Z Kinderchir 32:379-383, 1981

9. Mercer S, Carpenter B: Surgical complications of Kawasaki disease. J Pediatr Surg 16:444-448, 1981

10. Sty J, Starshak R, Goronstein L: Gallbladder perforation in a case of Kawaski disease: Image correlation. J Clin Ultrasound 11:381-384, 1983

11. Magilavay D, Speert D, Silver T, et al: Mucocutaneous lymph node syndrome: Report of 2 cases complicated by gallbladder hydrops and diagnosed by ultrasound. Pediatrics 61:699-702, 1978

12. Mofenson H, Greensher J, Molavi M: Gallbladder hydrops, complication of Kawasaki disease. NY State J Med 80:249-251, 1980