

Gall Stones in Young Adults

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Professor Ludlow (1930) reported 8 cases of gallstones among Koreans and noted that in contrast to the cholesterol stones commonly found in the gallbladder in the West, those found in Korea tended to be pigmented stones found in the common bile duct (CBD). These findings were well confirmed by other Korean reports.

Until now, it has been accepted that gallstone disease is most common after age 50. Recently an increasing number of reports have appeared concerning the gradually increasing incidence of gallstone disease among young adults with specific reference to the composition of the stones, the relation of gallstone disease and the use of oral pills, and its relation to hemolytic disease. However, a satisfactory and comprehensive study has yet to be done. All evidence points to a different type of gallstone found in the young as compared to those found in the elderly. In Korea there has been little study of this phenomenon. We propose to investigate this phenomenon and to conduct as comprehensive a study as possible within our sources.

MATERIAL AND METHODS

During a 10 year period from January 1, 1970, to December 31, 1979, total of 785 patients were operated on for gallstone disease. These patients who received surgery were divided into two groups: Group A composed of 104 patients under 35 and Group B composed of 681 patients over 36 years old.

Only those patients who received surgery for their gallstone disease were included in this study. Those who received multiple surgery for the same gallstone disease were counted only once in this study.

RESULTS

1) Sex and age distribution

Among the 785 patients, 312 (40%) were male and 473 (60%) were female. The male: female ratio was 1:1.5. In Group B, the male: female ratio was 1:1.4. In Group A, the male: female ratio was 1:2.2.

The age distribution ranged from 17 years to 84 years. The average age was 46.3 years. Males averaged 43.1 years and females averaged 49.0 years (Table I).

2) Location of stone

Single location of biliary calculi: In Group

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Table I. Distribution by age

Age (year)	No. of patients	%
15 - 20	7	0.9
21 - 25	13	1.7
26 - 30	30	3.8
31 - 35	54	6.9
36 - 40	90	11.5
41 - 45	98	12.5
46 - 50	118	15.0
51 - 55	142	18.1
56 - 60	84	10.7
61 - 65	75	9.5
66 - 70	49	6.2
above 71	25	3.2
	785	100.0

A, 41(38%) had stones in the gallbladder (GB), 16(15.4%) had stones in the CBD, and 6(5.7%) had stones in the intrahepatic duct (IHD). In Group B, 291(42.7%) had a stone in the GB, 139(20.4%) had a stone in the CBD, and 27

(3.9%) had a stone in the IHD. In the entire sample, 42% of the stones were in the GB, 19.7% were in the CBD, and 4.2% were in the IHD.

Multiple locations of biliary calculi: The total incidence of multifocal gallstones (2 or more locations) was 265/785(33.8%). In Group A, the incidence was 41/104(39.4%). In Group B, the incidence was 224/681(32.9%). There was no difference in the incidence of GB stones and CBD stones in either group: (GB-60.5%: 64.9%, CBD-53.8%: 52.6%). Group A had almost twice the incidence of stones in the IHD compared to Group B. (A:31.7% - B:19.2%). This difference is statistically significant ($0.005 < P < 0.01$).

Of those in Group A with stones in the GB, 35% had additional stones in either the CBD or the IHD. Among those with stones in the CBD, 46% had additional stones in the IHD. In order of decreasing frequency, the incidence of combined stones were GB+CBD, CBD+IHD, GB+CBD+IHD, and GB+IHD (Table II, III).

Table II. Location of gallstone (Below 35 years)

Sex/Site	GB	CBD	IHD	GB+CBD	GB+IHD	CBD+IHD	GB+CBD IHD
Male	12	6	3	4	0	5	2
Female	29	10	3	10	1	14	5
Total	41	16	6	14	1	19	7

M : F = 1:2.2

GB : 63

CBD : 56

IHD : 33 (31.7%)

Table III. Location of gallstone (Above 36 years)

Sex/Site	GB	CBD	IHD	GB+CBD	GB+IHD	CBD+IHD	GB+CBD IHD
Male	114	58	12	57	2	28	9
Female	177	81	15	63	3	45	17
Total	291	139	27	120	5	73	26

M : F = 1 : 1.4

GB : 442

CBD : 358

IHD : 131 (19.2%)

3) Chief complaints

The chief complaint was R.U.Q. abdominal pain or epigastric pain. Hyperbilirubinemia (above 1.5mg%) also appeared in 43% of the young age group. Only 13% showed symptoms of dyspepsia. Among this group displaying indigestion, only 18.7% had fat intolerance.

4) Complications

In Group A, the incidence of complications was GB empyema (21 cases: 20%), ascending cholangitis (15 cases: 15%), and bile peritonitis (4 cases: 4%). In Group B, there was GB empyema (7%), ascending cholangitis (9%), and bile peritonitis (2%). Group A demonstrated a higher incidence of these complications thus leading to a grave prognosis.

Gallstones due to clonorchis sinensis occurred in 2 cases in Group A and in 6 cases in Group B. Those due to ascaris occurred in 8 cases and only in Group B. Other complications are listed in Table IV.

Table IV. Complicated disease

Disease	Young age group		Old age group	
	No. of Pts.	%	No. of Pts.	%
GB Empyema	21	20	47	7
Ascending Cholangitis	15	14	61	9
Bile Peritonitis	4	4	17	2
Hepatitis	8	8	35	5
Liver Abscess	4	4	37	5
Portal Fibrosis	2	2		
Cholesterolosis	1	1		
Peptic Ulcer	4	4	45	7
Gastritis	3	3	52	8
Pancreatitis	4	4	36	5
Parasite; Ascaris	0	0	8	1
Clonorchis	2	2	6	1

5) Diagnosis

The various diagnostic methods utilized (cholangiogram, percutaneous transhepatic cholangiogram (PTC), ERCP, and simple abdominal X-ray) resulted in varying degrees of effectiveness. The most accurate diagnostic tools to localize stones in CBD and IHD were ERCP and intraprooperative cholangiogram with a 95% effectiveness. Positive diagnosis of gallstones via simple abdominal X-ray occurred in 3 cases. We have utilized ERCP since late 1970 and among 19 cases, 17 cases were positively diagnosed with only 1 false positive and 1 false negative. Liver function tests and blood tests have not been especially effective in helping with a diagnosis.

6) Surgical methods

The type of surgery varied depending on both the location of the stones and on the patient's condition. There was no apparent difference in the types of surgery between both groups. However, the higher frequency of various internal biliary bypass procedures required in Group A than in Group B ($0.025 < P < 0.05$) supports the more complicated surgical findings inherent in Group A (Table V).

Table V. Type of operation

Operation/Group	Group A	Group B
Cholecystectomy	25	163
Cholecystectomy + T-tube insertion	49	387
Cholecystectomy + Choledochoduodenostomy	9	37
Cholecystectomy + Roux-en-Y Choledochojunostomy	18	85
Segmental Resection	2	2
Longmire Operation	1	3
Hepaticojunostomy	0	4

$$\bullet X^2 = 4.2636 \quad P < 0.05$$

DISCUSSION

It is well recognized that gallstone disease is most prevalent in those past 40 years of age and may be due to various factors such as diet, obesity, pregnancy, parasites, etc. Very little has been published on gallstones in young adults. Until now, the main culprits were suspected to be hemolytic disease and congenital abnormality. However, the widespread use of birth control pills has produced great concern because of their possible connection with gallstones in young adults.

Various reports have been published concerning the incidence of gallstones due to hemolytic disease: Griffin (1954) — 10%, Gravier (1968) — 66.7%, MacMillan (1974) — 71%, and Dennis (1976) — 2%.

However in our sample group of 785, there was no single proven case of gallstones due to hemolytic disease.

Louis (1980) examined the incidence of gallstones in relation to the age of the patient, to obesity, and to the use of birth control pills. He concluded that the incidence of gallstones increased inversely with the age of the first pregnancy and with obesity. He found no correlation between the use of birth control pills and the frequency of gallstones. Bennion (1976) and Leissner (1977), on the other hand, emphatically maintained that the incidence of gallstones increased proportionately with the use of birth control pills.

It is well known that females have a much higher incidence of gallstone disease than males. However, this incidence was disproportionately much higher among females in the young age group. Our results indicated that Group A had a much higher proportion of females to males than Group B (A — 1:2.2, B — 1:1.4). Interestingly enough, Dennis (1976) reported that

among women, pregnancy is the most important factor with regard to gallstones and that when women who had never had a pregnancy were counted, only the sex ratio equalized.

In contrast to the gallstones found in Western countries which are composed of cholesterol and appear most frequently in the GB, the gallstones in Japan (Kameda, 1960) and Korea (Hur, 1963; Kim, 1970; Park, 1972) are composed of bilirubin and are located in the CBD and IHD. As the living standards in Japan and Korea improve and approach the West in terms of calories and meat and low fiber products ingested, a "westernization" of gallstones is steadily increasing. To illustrate this point, the incidence of pigmented gallstones in Japan in 1913 was 69.6% as compared to the incidence of cholesterol stones in 1960 of 67.7% (Kameda, 1960). Masao (1978), dividing those with gallstone disease into those over 69 and those under 39, found that the older age group had bilirubin stones in the CBD while the younger group had cholesterol stones in the GB. In Korea, the ratio of incidence of gallstones found in GB versus CBD were reported; Kim (1966) 1:1.5, Kim (1970) 1:1.7, Park (1972) 1:1.9, Lee (1976) 1:1.8, Min (1974) 1:0.6. Our study showed a ratio of 1.23:1. This indicates that a "westernization" of gallstones has occurred in Korea.

We have already mentioned that gallstones in the IHD and CBD have been frequently found. When comparing Group B (> 36 yrs) and Group A (< 35 yrs), it becomes apparent that there is no difference in the frequency of CBD stones but there is a significant difference in the frequency of IHD stones. Hur (1963) reported an incidence of IHD of 19% in our hospital, and our data of 21% in the entire patient population is in agreement. In Group B, the incidence was 19.2% which is approximately one-half the incidence of 31.7% found in Group A. The causative factors for IHD stones are believed to

be strictures of the intrahepatic biliary tree due to either congenital defects or to parasites. Recently, we operated on 3 cases with IHD stricture with stones in young adults and attained excellent results with intrahepatic cholangioplasty. Whether the strictures cause stone formation or vice versa is not certain. However, the nature of the strictures consisted of a membranous web which lent itself to easy repair by cholangioplasty. This has led us to believe that the initial lesion (insult) to the IHD occurred at a young age as evidenced by the higher incidence of IHD stones in this group, and that with the passage of time, they gradually worsened and became symptomatic at an older age. This is not to say that other factors should not bear investigating.

The findings indicated that the number of complications such as GB empyema, ascending cholangitis and other troubles were significantly higher (2x) in Group A than in Group B. Contributing factors to this higher ratio of accompanying disease and complications may be tardy diagnosis, high incidence of IHD stone and recurrence. These findings should alert us to search for additional stones in other locations at the time of the initial operation.

ERCP was performed in 19 cases of which 17 cases were positively detected with 1 case of false positive and 1 case of false negative. These exceptional results indicate to us that further use of ERCP should be made in addition to its use in detecting IHD stones. During the periods of this study, utilization of ultrasound was not popular. However, our clinical experiences in the use of ultrasound for the last several years have proven its efficacy as a complementary modality to ERCP in detection of intrahepatic and common bile duct stones.

CONCLUSION

A 10 year study involving 785 patients who

underwent surgery for gallstones by the Surgical Department of Yonsei University College of Medicine revealed significant differences between the patients under 35 and those over 36. Compared to the reports from our hospital 10 years ago in which the ratio of gallbladder stones to CBD stones was 49%, our current report detects an upward trend in the incidence of gallbladder stones at 55.3%.

In the younger age group, the female incidence was more common. The incidence of an IHD stone was almost twice as high in the young age group ($P < 0.01$). However, there was no significant difference in the frequency of CBD and GB stones between both groups. In addition, those patients in the young age group had a significantly higher rate of complicated disease. This corresponds to a higher frequency of biliary by-pass procedures ($P < 0.05$) among the young age group when compared to the older age group.

Considerations of all facts concerned lead us to conclude that gallstones in the young age group are not as rare as we anticipated and are much more troublesome to manage. Furthermore, a search for possible additional stones in other locations should be made when one operates on young adults with gallstones.

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