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Masaharu Shigenobu*

Atushi Tanabe†

Kohji Nakanishi‡

Yoshimasa Senoo**

Shigeru Teramoto††

*Okayama University,

†Okayama University,

‡Okayama University,

**Okayama University,

††Okayama University,

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Masaharu Shigenobu, Atushi Tanabe, Kohji Nakanishi, Yoshimasa Senoo, and Shigeru Teramoto

Abstract

Twenty patients with cholelithiasis associated with valvular heart disease were studied to assess the need and the optimal time for cholecystectomy. Twelve patients (11 symptomatic and 1 asymptomatic patients) underwent cholecystectomy. The remaining patients were asymptomatic. The levels of the total bilirubin in 9 patients, and of LDH in 15, were higher than normal. In most of the patients, the serum transaminase levels were higher than normal, but in few cases, the levels were higher than 200 IU/l. These abnormal values, however, were not consistently observed in these patients. No clear association between the type and form of valvular heart disease was demonstrated. The type of prostheses used for valve replacement in these patients were ball, tilting disc and leaflet. No significant differences in efficacy were observed among different types of prostheses. The incidence of silent stones is high in patients with valvular heart disease and heart surgery often causes deterioration in patients with cholelithiasis. The recovery of the patients who underwent cholecystectomy before valve replacement were better than those who underwent cholecystectomy after heart surgery. In conclusion, therefore, patients showing any abnormal results in liver function tests should be assessed in detail by abdominal echography and should receive surgical treatment of biliary tract before heart surgery if necessary.

KEYWORDS: valvular heart disease, cholelithiasis

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Indications and Timing of Surgery for Cholelithiasis Associated with Valvular Heart Disease

Masaharu Shigenobu*, Atsushi Tanabe, Kohji Nakanishi, Yoshimasa Senoo and Shigeru Teramoto^a

Departments of Cardiovascular Surgery and Second Department of Surgery, Okayama University Medical School, Okayama 700, Japan

Twenty patients with cholelithiasis associated with valvular heart disease were studied to assess the need and the optimal time for cholecystectomy. Twelve patients (11 symptomatic and 1 asymptomatic patients) underwent cholecystectomy. The remaining patients were asymptomatic. The levels of the total bilirubin in 9 patients, and of LDH in 15, were higher than normal. In most of the patients, the serum transaminase levels were higher than normal, but in few cases, the levels were higher than 200IU/l. These abnormal values, however, were not consistently observed in these patients. No clear association between the type and form of valvular heart disease was demonstrated. The type of prostheses used for valve replacement in these patients were ball, tilting disc and leaflet. No significant differences in efficacy were observed among different types of prostheses. The incidence of silent stones is high in patients with valvular heart disease and heart surgery often causes deterioration in patients with cholelithiasis. The recovery of the patients who underwent cholecystectomy before valve replacement were better than those who underwent cholecystectomy after heart surgery. In conclusion, therefore, patients showing any abnormal results in liver function tests should be assessed in detail by abdominal echography and should receive surgical treatment of biliary tract before heart surgery if necessary.

Key words : valvular heart disease, cholelithiasis

The incidence of surgical treatment of other organs in patients with valvular heart disease has increased by recent advance of diagnostic methods. The frequency of biliary system complications in valvular heart disease patients is known to be particularly high. The purpose of this study is to analyse indications and timing of surgery for cholelithiasis in patients with valvular heart dis-

ease.

Subjects and Methods

Between 1978 and 1991, we performed valvular heart surgery for 455 patients. Among them, 20 were identified as having cholelithiasis and were enrolled in this study.

Age, sex, form of valvular change, New York Heart Association (NYHA) classification, cardiothoracic ratio,

* To whom correspondence should be addressed.

cardiac rhythm, and presence or absence of anticoagulant therapy were reviewed. The form and cause of valvular heart disease, type and number of surgeries and kind of prosthesis were also examined. The presence of symptoms of cholelithiasis, and diagnostic method, whether or not surgery had been performed, time and type of surgery, as well as type of gallstones and prognosis were noted. Liver function was determined in all patients when cholelithiasis was diagnosed.

Results

The mean age of patients (9 men, 11 women) at the time of surgery was 51.4 ± 6.2 years. Valvular changes in these patients included mitral valve disease in 10, aortic valve disease in 5 and combined valvular disease (mitral and aortic) in 5 cases.

The etiology was rheumatic fever in 16 cases and prolapse syndrome in four (Table 1). According to NYHA classification, eight patients were evaluated as grade II, eight as grade III, and four as grade IV. Mean cardiothoracic ratio was 60.2 ± 4.0 %. The identified rhythms were atrial fibrillation (12 cases) and sinus rhythm (8 cases). Anticoagulant therapy using warfarin was given to 18 patients.

Mitral valve replacement was carried out in nine patients, mitral commissurotomy in two, aortic valve replacement in five, and aortic valve replacement with mitral commissurotomy in four patients. This was first-time cardiac surgery for 15 patients and second-time cardiomy for five. The following prostheses were used: at the mitral valve, Björk-Shiley valve (4 cases), St. Jude Medical valve (4 cases), and Hancock valve (1 case); in the aortic position, Björk-Shiley valve (4 cases), Lillehei-Kaster valve (3 cases), and Starr-Edwards valve (2 cases) (Table 1).

Eleven patients experienced acute or chronic episodes of biliary colic and the remaining nine patients were asymptomatic. Diagnosis was usually established by an abdominal echography, however, in two patients gallstones were detected by fluoroscopy during cardiac catheterization.

Abdominal pain was the initial symptom reported by eleven patients (55 %), four of which experienced biliary colic before cardiac surgery, two immediately after cardiac surgery, and five during

Table 1 Clinical findings and surgical features of 20 valvular heart disease patients with cholelithiasis

Clinical findings and surgical features	Number of patients ^a
Sex (Male/Female)	9/11
Valve lesions	
Mitral stenosis	8
Mitral regurgitation	3
Aortic stenosis	4
Aortic regurgitation	5
Causes of the valve disease	
Rheumatic fever	16
Prolapse syndrome	4
NYHA ^b classification	
II	8
III	8
IV	4
Cardiothoracic ratio (%)	
55-60	8
60-65	8
65-70	4
Cardiac rhythm	
Atrial fibrillation	12
Sinus rhythm	8
Anticoagulant therapy	
Yes	18
No	2
Number of surgeries	
First-time	15
Second-time	5
Type of operation	
Mitral valve replacement	9
Open mitral commissurotomy	2
Aortic valve replacement	5
Aortic valve replacement with mitral commissurotomy	4
Kind of prosthetic valve ^c	
Mitral position	
Björk-Shiley	4
St. Jude Medical	4
Hancock	1
Aortic position	
Björk-Shiley	4
Lillehei-Kaster	3
Starr-Edwards	2

a: Mean age of patients was 51.4. b: New York Heart Association. c: Valve replacement was not carried out in 2 patients.

the late postoperative period. Cholecystectomy was performed in five patients before cardiac surgery and in seven others after surgery. Common bile duct drainage with a T-tube was necessary in three of these patients. Gallstones were classified as bilirubin stones in seven instances and cholesterol stones in five instances. Prognosis was good in patients who underwent cholecystectomy before valve surgery. However, postoperative bleeding was noted in two patients who had cholecystectomy after valve replacement. In the conservative management group, one patient experienced recurrent symptoms (Table 2).

Cholelithiasis evaluation showed the following laboratory data for liver function: total bilirubin (standard value: 0.22-0.96 mg/dl) was ≥ 0.97 mg/dl in 11 cases (55%), direct bilirubin (0.09-0.37 mg/dl) was ≥ 0.38 mg/dl in 11 cases (55%), GOT (11-40 IU/l) was ≥ 41 in 15 cases (75%), GPT (6-35 IU/l) was ≥ 36 in 14 cases (70%), LDH (210-430 IU/dl) was ≥ 431 in 15 cases (75%), alkaline phosphatase (30-108 IU/dl) was ≥ 109 in 5 cases (25%), and total cholesterol (133-255 mg/dl) was ≥ 256 mg/dl in

11 cases (55%).

Discussion

The relation between heart disease and biliary system disease has been suggested in the past (1). Breyfogle (2) and Ravdin *et al.* (3) reported a high frequency of ischemic heart disease complicating biliary tract disease. However, pathogenesis is still unclear, and there have been few reports on management of valvular heart disease associated with cholelithiasis.

Merendino and Manhas (4) identified cholelithiasis in 31% of 39 patients who underwent valve replacement: 4.5 to 10 times higher than the usual frequency. They assumed that chronic hemolysis resulting from valve replacement was the major cause. Harrison *et al.* (5) reported complications of cholelithiasis in 39% of 46 patients who had undergone valve replacement and emphasized its association with cholelithiasis. However, these studies were conducted on a limited number of cases and stressed the necessity for determining frequency in a larger number.

In this series, we have found cases in which cardiac surgery was postponed due to biliary colic prior to operation or biliary pain immediately followed surgery. Therefore, in patients with valvular heart disease associated with cholelithiasis, scheduling for cholecystectomy should be considered. While all symptomatic patients in our experience underwent cholecystectomy and common bile duct drainage, only one out of nine asymptomatic patients did, and the surgical indications for asymptomatic cholelithiasis should be argued.

Liver function was examined in evaluation of cholelithiasis. Total bilirubin was higher than normal in 50% of the subjects. LDH was also higher than normal in 75%. Serum transaminase levels were elevated in many cases. Therefore, when liver function tests in patients with valvular heart disease are abnormal, abdominal echography should be conducted to determine the pres-

Table 2 Clinical findings and outcome of 12 patients treated surgically for cholelithiasis

Clinical features and surgical outcome	Number of patients
Symptoms	
Symptomatic	11
Asymptomatic	1
Diagnostic method	
Echography	10
Fluoroscopy	2
Time of operation	
Before cardiac surgery	5
After cardiac surgery	7
Operative procedures	
Cholecystectomy	9
Cholecystectomy with T-tube drainage	3
Type of gallstones	
Bilirubin stone	7
Cholesterol stone	5
Surgical outcome	
Good recovery	10
Postoperative bleeding	2

ence or absence of gallstones. Such patients should be asked previous episodes of abdominal pain, or jaundice. The high incidence of silent stones indicates that the necessity of conducting routine abdominal echography in patients with valvular heart disease.

Cholelithiasis was associated with both types of valvular heart disease (aortic valve and mitral valve), showing no clear relation with the form of the valvular lesion (stenosis or regurgitation). No significant relationship was detected between the complications of cholelithiasis and cardiothoracic ratio or cardiac rhythm. However, we can assume that blood flow disturbance from valvular heart disease may lead to occult hemolysis. Furthermore, hemolysis resulting from the prosthesis elevates LDH and bilirubin levels after valve replacement, but there were no significant differences in the rate of hemolysis among the prostheses used. The notion that replacement induced the formation of gallstones was not supported because cholelithiasis was identified before valve replacement in 56 % of the subjects.

Of the 12 patients in our study who underwent cholecystectomy, 7 had bilirubin stones and 5 cholesterol stones. This shows that there is no clear relation between valvular diseases and the type of gallstones. Congestion of the bile and bacterial infections are considered to be important pathogenic factors. Therefore, postoperative biliary drainage for a certain period is necessary to prevent bile congestion and bacterial cholangitis; and occasionally, papillotomy is also needed. These procedures may induce endocarditis in patients in which a foreign body (a prosthesis) has been implanted. Because such patients are usually on anticoagulant therapy, there is a risk of secondary hemorrhage. In fact, we experienced two patients who had bleeding following cholecystectomy. Therefore, optimal time for surgery is the most important issue for patients with valvular heart disease associated with cholelithiasis.

Diagnosis of silent stones does not assure that the asymptomatic status will continue. On the contrary, the possibility of postoperative biliary

episodes is considered to be high. Comfort *et al.* (6) followed up 112 patients with other diseases who underwent laparotomy, in which gallstones were incidentally detected but were not removed, revealing that 10 to 20 years later, 51 (46 %) had biliary episodes. Lund (7) identified silent stones in 34 patients by radiography and reported that one-third of them had biliary episodes later and that three patients developed cancer. In fact, we found that asymptomatic patients undergone cardiac surgery experienced a sudden onset of biliary pain immediately after cardiac surgery. Considering the great stress of biliary events on patients in the postoperative acute stage, we recommend removal of gallstones, even in case of silent stones.

Because patients who have valve prosthesis definitely need anticoagulant therapy, leaving the T-tube in place after cholecystectomy will delay reinstatement of warfarin, which may cause thrombo-embolic complications. Cholelithiasis is also often associated with acute or chronic cholecystitis, and may be an additional focus of endocarditis. Considering those risks related to cholelithiasis in patients with valve prostheses, surgical treatment for the biliary tract system should be carried out before valve replacement.

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