Complications in Adult Cases with Congestive Heart Failure

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COMPLICATIONS are frequently associated with severe heart failure, making its treatment difficult. In this study, age distribution and underlying diseases, which were thought to be related to the severity of heart failure and the frequency of its complications, were analyzed in patients with congestive heart failure.

Secondly, the frequency of complications in severe heart failure were enumerated.

1. Age distribution and underlying diseases in cases with heart failure.

From January 1982 to December 1984, 7535 patients admitted to the Heart Institute of Japan,

Fig.1. Age distribution and underlying diseases of cases with heart failure on admission.

AMI = acute myocardial infarction; OMI = old myocardial infarction; M = mitral valvular diseases; A = aortic valvular diseases; M+A = combined valvular disease; DCM = dilated cardiomyopathy; CHD = congenital heart diseases; IHD = ischemic heart disease; HHD = hypertensive heart disease

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Fig.2. Age distribution and underlying diseases of cases with severe heart failure on admission.

AMI = acute myocardial infarction; OMI = old myocardial infarction; M = mitral valvular diseases; A = aortic valvular diseases; M+A = combined valvular disease; DCM = dilated cardiomyopathy; CHD = congenital heart diseases; IHD = ischemic heart disease; HHD = hypertensive heart disease

Tokyo Women's Medical College. Five thousand eighty-seven patients were over 20 years of age and 440 of these cases (8.6%) presented heart failure on admission.

Age distribution and underlying diseases of patients with heart failure on admission are shown in Fig. 1. Ages were distributed almost symmetrically, peaking at between 50 and 59 years. The ratios of underlying diseases of heart failure were different in each age group. In the patients less than 60 years old, mitral valvular diseases were the most common diseases, followed by dilated cardiomyopathy and acute myocardial infarction. In the patients more than 60 years old, however, acute and old myocardial infarction were the main pathology.

Complications were found primarily in cases with severe heart failure. There were 206 patients with heart failure classified as third or fourth degree by the New York Heart Association or by Killip. Figure 2 shows the age distribution and underlying diseases of these cases. Cases with severe heart failure distributed nearly symmetrically, peaking at between 50 and 59 years.

In patients less than 60 years old, mitral valvular diseases and dilated cardiomyopathy were the most common. In patients more than

TABLE I COMPLICATIONS IN CASES WITH SEVERE HEART FAILURE

1. Respiratory system	
Pneumonia or acute bronchitis	42
Pulmonary embolus	9
Severe hemoptysis	5
Atelectasis	6
Pulmonary fibrosis	1
2. Urinary system	
Chronic renal failure	52
Acute renal failure	16
3. Gastrointestinal tract	
Bleeding	14
Protein losing gastroenteropathy	1
4. Central nervous system	
Loss of consciousness	28
Cerebral embolus	18
Cerebral vascular accident	12
5. Disseminated intravascular coagulation	3
6. Arrhythmia	
Ventricular tachycardia or fibrillation	42
Advanced atrioventricular block	21
Sick sinus syndrome	17

followed by ischemic or hypertensive heart 60 years old, acute and old myocardial infarction were the most common underlying diseases,

Fig.3. Pulmonary fibrotic change was detected in a 63-year-old female patient with severe mitral stenosis.

disease.

2. Complications in cases with severe heart failure

Numerous complications were found in cases with severe heart failure. Rates of occurrence of complications were studied in the 206 cases with severe heart failure, classified as third or fourth degree by the New York Heart Association or by Killip (Table I).

1) Respiratory system

Pneumonia or acute bronchitis was found in 42 cases (20.4%). Of 57 cases (40.4%) of mitral or combined valvular diseases, 23 suffered from pneumonia or acute bronchitis, which may have aggravated heart failure.

Pulmonary embolus was detected in 9 cases (4.4%). This rate is lower than that reported in Western countries, but is thought to be gradually increasing in Japan. Pulmonary embolus was clinically suspected from lower arterial oxygen content, which were worse than expected due to severe left heart failure. In cases of pulmonary embolus, scattered defects in pulmonary fields were detected by pulmonary scintigram. One or two million units of heparin per day were continuously infused for 2–4 weeks.

Other respiratory complications were found in cases with severe mitral valvular diseases. Five cases had severe hemoptysis. In three of them

dilatation of capillary vessels of the bronchi, (which are collateral vessels from the pulmonary vein to the bronchial vein) causing in severe pulmonary congestion, was detected by bronchoscopy. Bleeding from dilated bronchial capillary vessels was confirmed in only one case. In other cases, the origin of bleeding was thought to be an erosion in some pulmonary area compressed by the markedly dilated heart.

Atelectasis, especially of the low and median lobes of the right lung, was found in six cases with severe mitral valvular diseases. The bronchus was narrowed by extremely dilated atria and was blocked by thickened sputa.

In a patient with severe mitral stenosis who had suffered from severe pulmonary congestion for a long time, pulmonary fibrotic change developed. Pleural effusion was hardly treated in spite of intensive treatments using a lot amounts of diuretics and catecholamines. The patient had shortness of breath and palpitations on ordinary activity for a year after replacement of the mitral valve with an artificial valve. Figure 3 shows the patient's chest X-ray just before discharge.

(2) Urinary system

Chronic renal failure was diagnosed if the serum concentration of creatinine was higher than 2 mg/dl or creatinine clearance was lower than 20 ml/hour. When serum creatinine concentration or creatinine clearance became better than above-mentioned limits after treatment of heart failure, patients were not considered to have chronic renal failure for the purposes of this study.

Fifty-two of the 206 cases with severe heart failure (25.2%) had chronic renal failure. In cases with severe heart failure the amounts of water intake and transfusion usually must be reduced as much as possible. In cases with chronic renal failure, however, 2 liters or more of urinary output per a day are necessary in order to keep lower serum levels of creatinine, urea nitrogen and others. In cases with both heart failure and chronic renal failure, diuretics, dialysate free ultrafiltration and others are used to keep water balance negative.

Acute renal failure was found in 16 cases (7.8%) where patients could not urinate more than 400 ml per a day in spite of intensive heart failure treatment. In most of them, acute renal failure occurred at cardiogenic shock. Peritoneal dialysis was given safely to patients with extreme decrease of cardiac contraction. In these cases, dialysate free ultrafiltration and continuous

Fig. 4. A 57-year-old female case suffering from protein-losing gastroenteropathy. Severe right ventricular failure lasted for a long time in spite of mitral valve replacements. MVR = mitral valve replacement; SAM = Sakakibara-Arai-Mera Valve; B-S = Björk-Shiley valve

arteriovenous hemofiltration also could be used with small changes of cardiac output and arterial pressure. These methods, however, were not always effective enough to decrease serum levels of creatinine and urea nitrogen into the normal range. After slight improvements in cardiac contraction, hemodialysis was carefully used in most cases.

(3) Digestive system

Acute right ventricular failure induced liver dysfunction, with elevation of serum levels of GOT, GPT, LDH and others. After treatment of heart failure, these serum levels rapidly decreased in most cases and usually specific treatment was not necessary.

In some patients with right ventricular failure, liver congestion lasted for a long time. Serum level of choline esterase decreased in these situations and, in a small number, ascites came out with hepato-splenomegaly.

Fourteen cases (6.8%) had bleeding of the gastrointestinal tract. Usually, gastric or duodenal ulcer was revealed.

One patient with severe right ventricular failure suffered from protein-losing gastroen-

teropathy with intestinal bleeding. Pressure of the right atrium was 15 mmHg for a considerable time (Fig. 4).

(4) Central nervous system

Cerebral emboli occurred in 13 cases with valve decesses and in 5 cases with a marked decrease of ventricular contraction. Twelve older cases suffered from cerebral vascular accidents. These accidents and cardiogenic shock were the main causes of loss of consciousness. An artificial respirator was used in 23 cases of severe pulmonary congestion with or without respiratory infection and in 24 cases of cerebral accidents.

(5) Arrhythmias

Advanced atrio-ventricular block and sick sinus syndrome were found in 21 and 17 cases, respectively. Temporary or permanent artificial pacemakers were implanted in 27.

Forty-two patients with severe heart failure suffered from ventricular tachycardia or ventricular fibrillation. A succession of five or more ventricular premature contractions was diagnosed as ventricular tachycardia. These serious ventricular arrhythmias often occurred in cases with a marked decrease of cardiac contraction. If

these arrhythmias could not be suppressed by xylocaine, mexiletine and others, other antiarrhythmic drugs with suppression to cardiac function should be used; however these medicines may make heart failure worse.

3. Surgical treatments applied to cases with severe heart failure

Some patients with severe heart failure could not be treated by medical means alone. Intra-aortic balloon pumping was used in 28 cases. This method was used in 21 cases of acute myocardial infarction, whose cardiac function would be improved hopefully after intensive treatment to heart failure.

Twenty-three patients with severe heart failure required operation. Closure of ventricular septal perforation was performed in 3 cases; ventricular aneurysmectomy in 4; replacement of mitral valve in 5; replacement of aortic valve in 3, including 2 cases with acute aortic regurgitation caused by acute endocarditis; replacement of malfunctioning artificial mitral or aortic valve in 5 and other operations in 3.

4. In hospital prognosis.

Even though treatment for heart failure has improved, of 206 cases, 81 (39.3%) with severe heart failure died in hospital. Eighty-six of 206 cases (41.7%) with severe heart failure had one or more of the complications listed in Table I. Cases suffering from severe arrhythmias were excluded from them.

Forty-four of 86 cases (51.1%) with complications died in hospital; 37 of 120 cases (30.8%) without complications died. Complications occurred in cases with extremely severe heart failure, and at the same time complications made their in-hospital prognosis worse.

It is necessary to develop methods of treatment for complications occurring in cases of severe heart failure in order to decrease the in-hospital death rate. Cardiologists and specialists in other fields must work together for this development. I hope that this symposium marks the beginning of such cooperation in studying complications in cases with heart failure to develop methods of treatment.