

ASSESSMENT OF CLINICAL, PARACLINICAL, AND SURGICAL CHARACTERISTICS OF PATIENTS RECEIVED AORTIC VALVE REPLACEMENT AT 108 MILITARY CENTRAL HOSPITAL

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SUMMARY

Objectives: To review some clinical, paraclinical, and surgical characteristics of patients who received aortic mechanical valve replacement at 108 Military Central Hospital. **Subjects and methods:** 69 patients with aortic valve stenosis (AS) received aortic mechanical valve replacement. Clinical and paraclinical symptoms of AS based on the criteria of the Viet Nam National Heart Association and ACC/AHA guidelines. **Results:** Anamnesis of rheumatic fever was 61.0%, NYHA II and III were 100%. Sinus rhythm was 94.2% and Sokolow - Lyon > 35 mm was 100%. Echocardiography: severe aortic valve took up 97.1%, mean pressure gradient > 40 mmHg accounted for 95.7%, left ventricular hypertrophied but left ventricular systolic function still preserved. Valve size 21 and 23 were the most used with 81.2%. The mean aortic cross-clamp time and operative time were 73.5 ± 38 minutes and 113 ± 94.9 minutes. **Conclusion:** Patients presented with symptoms of aortic stenosis, severe aortic valve stenosis on ultrasound, and left ventricular hypertrophy. In surgery, mechanical valves were the most common, accounted for 73.9%, in which valve size 21 took up 58%.

*Keywords: Aortic valve replacement; Aortic valve stenosis (AS).

INTRODUCTION

The normal aortic valve area is around 3 - 4 cm². Aortic stenosis is a progressive disease that leads to a gradual reduction in the orifice area, and it results in increased left ventricular load while simultaneously affecting systemic perfusion. Historically, the majority of patients with severe AS receiving aortic valve replacement exhibited a high transvalvular gradient, with variable left ventricular hypertrophy and normal or reduced left ventricular ejection fraction (LVEF) [6].

Evaluation of the aortic valve has always been considered the most difficult of the heart valves, but thanks to the advance in diagnostic tools and the aging population, aortic stenosis has become more common [7]. However, to date there is no way to predict the rate of disease progression in specific patients. Therefore, it is necessary to periodically monitor and carefully propagate the signs of disease progression [1]. The disease usually progresses silently, when symptoms appear, the prognosis is severe, with a 2-year mortality rate up to 50%. According to Braunwald, the mean survival time of patients with AS onset is < 5 years [6].

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This is further complicated by comorbidity associated with progressive aging, in particular coronary artery disease, hypertension, diabetes and the progressive decreases of the compliance of the vascular bed. Aortic valve replacement surgery is an effective treatment for a patient with severe AS.

Our hospital has performed many heart surgeries, and this research aims: *To review some clinical, paraclinical and surgical characteristics of patients with AS who received aortic valve replacement at 108 Military Central Hospital.*

SUBJECTS AND METHODS

1. Subjects

69 patients were diagnosed with AS and received aortic valve replacement at 108 Military Central Hospital during the period from May 2010 to May 2020.

2. Methods

* *Research method:* Prospective research, descriptive cross-sectional study.

- Conduct research: Study about the history of the disease, clinical and paraclinical characteristics under a uniform procedure definition:

+ History of the disease: Rheumatic heart disease, congenital aortic valve disease [2, 8].

+ ECG: Pulse, Sokolow - Lyon [8].

+ Transthoracic echocardiographic assessment includes measures of AS severity, LV function and LV wall thickness, and cavity dimensions and ejection fraction should be based on existing recommendations [8].

+ Surgery: Mechanical aortic valves, the size of mechanical aortic valves, the time of aortic cross - clamp and cardiopulmonary bypass (CPB).

- Evaluation criteria based on the standards of the Vietnam National Heart Association and ACC/AHA guidelines (USA) [2, 8].

3. Statistical analysis

Data were analyzed with SPSS programme 20.0. Values are presented as mean values, SD, percentage rate and p values < 0.05 were considered as significant.

RESULTS

1. Clinical characteristics and medical history

Table 1: Some clinical and historical characteristics (n = 69).

Clinical characteristics, medical history		Rate (%)
Rheumatic heart disease		61.0
Degenerative aortic valve disease		29.0
Euro score \geq 5%		17.3
Hypertension		34.8
Coronary Artery Disease		14.5
NYHA class	II	42.0
	III	58.0
Arrhythmia		5.8

Rheumatic heart disease accounted for high rates (61%), NYHA II and III for 100%, arrhythmia for 5.8% and Euro score \geq 5% for 17.3%.

2. Some paraclinical characteristics of aortic valve stenosis

Table 2: Some major paraclinical characteristics (n = 69).

Paraclinical features		Rate (%)
Electrocardiogram	Sinus rhythm	94.2
	Sokolow - Lyon > 35 mm	100.0
Echocardiography	Very severe and severe aortic stenosis	97.1
	Moderate aortic stenosis	2.9
	Mean pressure gradient > 40 mmHg	95.7

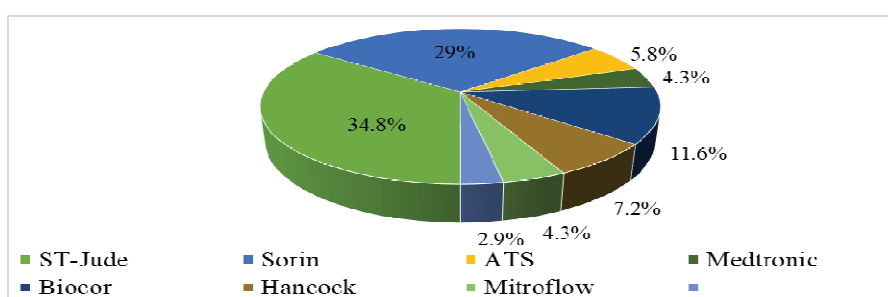
ECG was mainly sinus rhythm and left ventricular hypertrophy. The results of echocardiography showed that severe aortic valve stenosis took up 97.1%, mean pressure gradient > 40 mmHg accounted for 95.7%.

Table 3: Left ventricular size and function (n = 69).

Echocardiogram results		Male (n = 48)	Female (n = 21)	General results
EF (%)	$\bar{X} \pm SD$	61.9 ± 10.7	58.7 ± 15.7	60.9 ± 12.4
	Min - Max	41 - 78	30 - 87	30 - 87
LVEDd (mm)	$\bar{X} \pm SD$	49.6 ± 8.2	49.4 ± 10.2	49.5 ± 8.8
	Min - Max	30 - 71	32 - 68	30 - 71
LVEDs (mm)	$\bar{X} \pm SD$	33.4 ± 7.3	32.9 ± 8.2	33.3 ± 7.6
	Min - Max	20 - 51	19 - 49	19 - 51

Left ventricular hypertrophy with mean LVEDd and LVEDs are 49.5 ± 8.8 mm and 33.3 ± 7.6 mm, respectively. Left ventricular systolic function is preserved.

3. Some characteristics in the operation



Ozaki

Figure 1: The types of mechanical aortic valve used (n = 69).

The most commonly used mechanical aortic valve were St-JUDE and Sorin, the proportions being 34.8% and 29%, respectively. In addition, some other types of biological valve also widely used were Biocor valves with the rate of 11.6%.

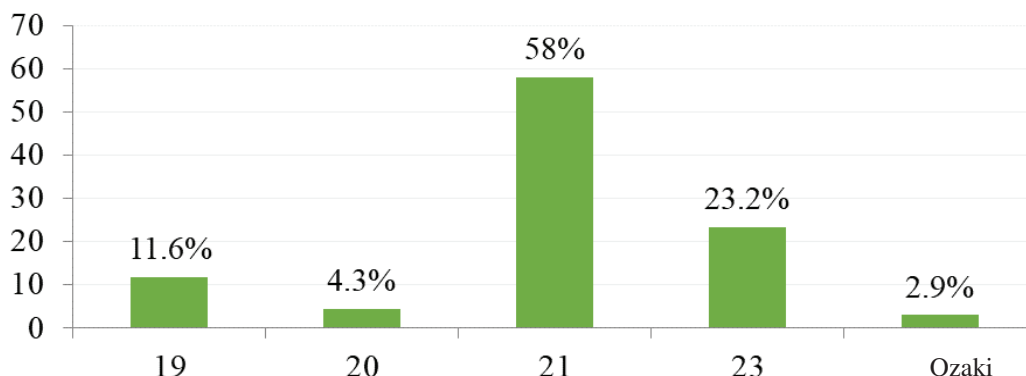


Figure 2: The size of aortic valve replacement (n = 69).

The most used valves were of sizes 21 and 23, accounting for 81.2%, of which valve size 21 accounted for more than 50% of aortic valve replacement cases.

Table 4: Aortic cross-clamp and CPB (n = 69).

Time	Male (n = 48)	Female (n = 21)	General results
Aortic cross - clamp time (minutes)	75.5 ± 39.4	68.6 ± 34.7	73.5 ± 38.0
CPB time (minutes)	107.8 ± 78.8	124.8 ± 124.8	113 ± 94.9

The operative time was about 120 minutes. Mean aortic cross-clamp time was 73.5 ± 38.0 minutes, and mean CPB time was 113 ± 94.9 minutes.

DISCUSSION

1. Clinical characteristics and medical history

The data in table 1 shows that the cause of stenosis is mainly due to rheumatism with the rate of 61%, degeneration with the rate of 29%, and 10% is due to congenital. this result is consistent with some studies in developing countries with high rates of group a hemolytic streptococcus [2]. the incidence of calcific aortic stenosis is increasing as the general age of the population increases. for many years, rheumatic heart disease was the main cause of aortic valve disease. over the last half-century, however, there has been a change from a rheumatic etiology to a

'degenerative' mechanism because of the increase in access to health care in developed countries and the increasing age of the population in the us and europe. however, this result is different from author Nguyen Hai Au [3] in a study on 50 patients, the causes of severe aortic stenosis include: 42% was the degenerative valve, 29% was the rheumatic heart, and 29% was congenital aortic valve disease. this result is also different from the epidemiological trend of as with a high rate due to degenerative valve, this may be due to different patient groups.

Some common chronic diseases were also associated with AS, such as hypertension (34.8%) and coronary artery disease (14.5%). Several epidemiological

studies have reported a strong association between hypertension and the occurrence of degenerative AS [9]. Furthermore, a history of common hypertension (30 - 80%) is associated with exacerbation of pathological problems in patients with degenerative AS [3].

Euro score scale $\geq 5\%$ took up 17.3% and $\leq 3\%$ was the main one accounting for 72.5%, showing the severe condition of the study subject with the high rate of early mortality post-surgery [7].

The NYHA class II and III were 100%, in which the NYHA III was mainly. This result is similar to other studies on clinical manifestations of heart failure but the rate of severe heart failure is higher than that of other domestic and foreign studies. For example, Nguyen Hai Au's study recorded the number of 32% [3]. Without NYHA I, IV in this study, NYHA I has no surgical indication, and patients with NYHA IV would be very difficult postoperative care with many complications.

2. Some paraclinical characteristics of AS.

The rate of sinus rhythm before surgery accounted for 94.2%. The picture suggesting left ventricular (LV) thickening and LV anemia with Sokolow - Lyon > 35 mm is 100%. Similar to the research of Nguyen Hai Au, the rate of sinus rhythm was 82.35% and the increased LV burden was 91.04% [5].

The results of echocardiography are mainly severe aortic valve stenosis with the rate of 97.1%, mean gradient > 40 mmHg is 95.7%, this shows that damage to the aortic valve system is

serious injury. According to medical documents, when AS appears symptoms, the mortality rate increases by 9.4%/year [6].

These are important implications for surgical indications for the purpose of prolonging life and improving the patient's quality of life [7]. The CPB time of our study is similar to many other studies in the country [4, 5].

In addition to the surgical criterion of aortic valve replacement surgery, the degree of AS, mean difference in left ventricular systolic function (EF), left end-diastolic diameter (LVEDd), and left end-systolic left ventricular diameter (LVEDs) are also interested in research [7, 8].

The EF%, LVEDd and LVEDs showed left ventricular dilation but left ventricular systolic function was preserved. This result is equivalent to other domestic studies such as Duong Duc Hung's (64.5 ± 13.3 ; 49.84 ± 9.57 and 31.93 ± 8.68), Hachiro K. and et al's (61.1 ± 10.3 ; 49.3 ± 6.9 and 33.1 ± 7.2) [5, 10]. There is a study showing that severely reduced left ventricular function is one of the factors predicting the risk of death in patients with aortic stenosis.

3. Some characteristics in the surgery

The valve type and size of the artificial aortic valve chosen to suit the patient are very important to avoid prosthesis-patient mismatch (PPM) and complications after surgery. The term valve PPM describes a state in which the effective orifice area (EOA) of a normally functioning heart

valve prosthesis is too small in relation to the patient's body size; this situation results in high transvalvular pressure gradients [8]. Mechanical valves used for aortic valve replacement (AVR) continue to be associated with bleeding risks because of anticoagulation therapy, while bioprosthetic valves are at risk of structural valve deterioration requiring reoperation. This risk/benefit ratio of mechanical and bioprosthetic valves has led American and European guidelines on valvular heart disease to be consistent in recommending the use of mechanical prostheses in patients younger than 60 years of age [7, 8].

The results in figure 1 show that St. Jude and Sorin valves are the most used valves, mainly with valve sizes 21 and 23, with a high ratio of 81.2%. Many studies have found that these are two types of valves with large EOA, with valve size 21 about 1.5 ± 0.1 and with valve size 23 about 1.98 ± 0.23 [8]. The results of using the valves are also different from other studies, this may be due to the surgeon's habit of using the artificial valve or the specifics of the hospital.

Many authors are interested in Aortic cross-clamp times and CPB time because the longer those times, the more postoperative the complications are the CPB time of the study (113 ± 94.9 minutes) was similar to the results of Nguyen Hai Au's study (120.6 ± 48.6 minutes) and longer than the result of the author Duong Duc Hung's study (95 ± 21.25 minutes) [3, 5]. It may be due to the complexity of the aortic valve lesions in different studies.

CONCLUSION

Symptoms of aortic stenosis were evident with moderate and severe heart failure in 100% of cases, severe aortic stenosis accounted for 97.1%, and mean PG (> 40 mmHg) was 95.7%. Left ventricular hypertrophy with an increase of LVEDd, LVEDs and Sokolow - Lyon > 35 mm was 100%. The mechanical aortic valve used in surgery was mainly the valve size 21, in which St.Jude and Sorin valves were 63.8%, CPB time was 113 ± 94.9 minutes.

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