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ON THE QUESTION OF SURGICAL TREATMENT OF THE ACQUIRED HEART DISEASES

Research of the surgical treatment results of patients with single (n-221) and multiple (n-269) valve heart defects has shown that risk factors of patients with single and multiple valve defects equally influence surgery outcome; and presence of two or more risk factors significantly increases the risk of hospital lethality.

Keywords: single and multiple valve defects, risk factors, acquired heart diseases, qualitative and quantitative indicators.

Introduction

Operations on heart valves belong to the hi-tech treatment methods demanding high financial expenses, corresponding hardware, implanting materials (artificial limbs, endoprostheses, patches, etc.). It should be noted that the lethality at surgical correction of the acquired heart diseases (AHD) remains to be at a high rate and reaches today in single-valve correction – 5,0%, in multi-valve correction – 8,0% (according to the cardiovascular surgery commission of advisory board of Ministry of Health of the Russian Federation – 2011). Therefore, the relevance of studying the problem of surgical treatment of AHD becomes obvious.

Research objective – to study features of clinical progression and ratio of single- and multi-valve heart diseases in the north, as well as influence of risk factors on outcomes of surgical treatment of AHD.

Materials and methods

This article shows the results of surgical treatment of 490 patients with AHD in the Cardiac Surgery Department of the State budget institution of Republic of Sakha (Yakutia) "Republic hospital № 1 – National Medical Centre" in the period of 2006 to 2011.

Etiological factors of valve diseases were congenital heart diseases – 18 (3,67%), infectious endocarditis (IE) – 98 (20,00%), rheumatism – 283 (57,76%), sclerodegenerative disease of valves – 51 (10,41%), congenital dysplasia of connecting tissue – 34 (6,94%), ischemic heart disease (IHD) - (1,22%).

Average age of the operated patients in various etiological groups was as follows: rheumatism – 56,2; infectious endocarditis – 41,2; sclerodegenerative disease of heart valves – 67,4; congenital dysplasia of connecting tissue – 37,3; congenital heart diseases – 39,7.

Distribution of patients by types of diseases is given in table 1.

All operated patients were divided into two groups: I – group of patients after single-valve correction (221 – 45,1%), II – group of patients after multi-valve correction (269 – 54,9%). The detailed characteristics of both groups are shown in table 2.

All operations were executed by standard technology via the median sternotomy in the conditions of artificial blood circulation and cardioplegia with the use of cold cardioplegic solution at a moderate or deep hypothermia.

Results and discussion

The results of comparative analysis of quality indicators of the patients discharged from the hospital and the patients deceased in the hospital with one-valve correction point to the following factors of high risk: heart failure (HF) of the 3^{rd} or 4^{th} functional class (FC), repeated operation, pulmonary hypertension (PH) of the 3^{rd} or 4^{th} degree, hemorrhage in the postoperative period, pulmonary embolism (PE) in anamnesis, acute kidney injury (AKI) in the postoperative period (see tab. 3).

The analysis of quantitative indicators of the same group shows that high risk factors are initially low level of the ejection fraction (EF), increased level of creatinine, time of the artificial blood circulation (ABC) and time of aortic compression (see tab. 4). These data correspond with the results of many researchers [1,2,5].

The results of the main quality indicators analysis of the group of patients with multi-valve correction also correspond with the results of research of patients with single-valve correction, i.e. high risk factors remain the same: HF of the 3^{rd} or 4^{th} FC, repeated operation, PH of the 3^{rd} or 4^{th} degree, hemorrhages, PE in anamnesis, AKI (see tab. 5).

The research results of the main quantitative indicators of patients with multi-valve correction agree with the results after single-valve correction (see tab. 6). Thus, high risk factors in multi-valve correction are low level of EF, nephratony, duration of time of ABC and aortic compression. These results correspond with the data of the majority of researchers [1, 3, 4].

Conclusions

Thus, our research and observation results show:

1. High percent of patients with multi-valve defects in the advanced stage of heart failure of the 3rd and 4th FC., which is a regional feature in connection with the extreme geo-climatic conditions and lack of the transportation infrastructure in the remote regions of the North.
2. Risk factors among patients with single- and multi-valve defects equally influence surgery outcomes.
3. Presence of two or more risk factors sharply increases the risk of hospital lethality.
4. In the conditions of the North it is necessary to diagnose heart diseases as early as possible. This can be achieved by organizing mobile teams via air medical service.

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Table 1

Distribution of the operated patients by types of defects

	Type of valve defect	Number of patients	Percent from general group
1	Isolated defect of mitral valve: a) with prevalence of stenosis b) with prevalence of insufficiency	137 81 56	27,96% 16,53% 11,43%
2	Isolated defect of aortic valve: a) with prevalence of a stenosis b) with prevalence of insufficiency	84 62 22	17,14% 12,65% 4,49%
3	Multi-valve defects: a) mitral-aortic defects b) mitral-tricuspid defects c) mitral-aortic-tricuspid defects	217 65 81 71	44,29% 13,27% 16,53% 14,49%
4	Combined defects of valves and coronary arteries: a) mitral defect and coronary pathology b) aortic defect and coronary pathology c) multi-valve defects and coronary pathology	52 7 12 33	10,61% 1,43% 2,45% 6,73%

Table 2

Comparative analysis of patients in both groups

Indicator	Group I n = 221	Group II n - 269
Average age of patients	52,1 лет	55,4 лет
Men Women	103 (46,61%) 118 (53,39%)	142 (51,79%) 127 (47,21%)
FC of HF (NYHA) FC 1 FC 2 FC 3 FC 4	 15 (6,79%) 54 (24,43%) 150 (67,88%) 2 (0,90%)	 4 (1,49%) 103 (38,29%) 141 (52,42%) 21 (7,80%)
Initial PH Degree 1 – 2 Degree 3 – 4	 181 (81,90%) 40 (18,10%)	 194 (72,12%) 75 (27,88%)
Atrial fibrillation	117 (52,94%)	204 (75,83%)
PE in anamnesis	4 (1,81%)	24 (8,92%)
Hypertensive disease	107 (48,42%)	137 (50,93%)
IHD	24 (10,86%)	28 (10,41%)
Left ventricular hypertrophy	98 (44,34%)	143 (53,16%)
IE in anamnesis	57 (25,79%)	47 (17,47%)

Table 3

Comparative qualitative indicators of discharged and deceased patients of group I

Indicators	Discharged patients (n – 216)	Deceased patients (n – 5)
Men Women	101 (46,76%) 115 (53,24%)	2 (40%) 3 (60%)
Average age of patients	51,9	54,8
FC of HF (NYHA) FC 1-2 FC 3-4	 68 (31,48%) 148 (68,52%)	 1 (20%) 4 (80%)
Original operation Repeated operation	201 (93,06%) 15 (6,94%)	2 (40%) 3 (60%)
Left ventricular hypertrophy	97 (44,91%)	1 (20%)
Degree of PH Degree 1-2 Degree 3-4	 180 (83,33%) 36 (16,67%)	 1 (20%) 4 (80%)
Thromboembolia in anamnesis	2 (0,93%)	2 (40%)
Hypertensive disease	105 (48,61%)	2 (40%)
IHD	22 (10,19%)	2 (40%)
IE in anamnesis	56 (25,93%)	1 (20%)
Coronary failure in postoperative period	5 (2,31%)	1 (20%)
Hemorrhage in postoperative period	7 (3,24%)	2 (40%)
AKI in postoperative period	2 (0,93%)	3 (60%)

Table 4

Comparative quantitative indicators of patient group after single-valve correction

Indicators	Discharged patients	Deceased in immediate postoperative period
EDD of LV (mm)	56,77	62,63
ESD of LV (mm)	39,13	49,93
Left atrium (mm)	53,27	61,21
EF of LV (%)	55,34	37,84
Creatinine (mg/ml)	88,15	116,40
Time of ABC (min.)	92,05	116,38
Time of aortic compression (min.)	58,38	82,58

Table 5

Main qualitative indicators of patients with multi-valve correction

Indicators	Discharged patients (n – 256)	Deceased patients (n – 13)
Men Women	137 (53,52%) 119 (46,48%)	5 (38,46%) 8 (61,54%)
Average age of patients	53,2	58,9
FC of circulatory failure FC 1-2 FC 3-4	 105 (41,02%) 151 (58,98%)	 2 (15,38%) 11 (84,62%)
Original operation Repeated operation	235 (91,80%) 21 (8,20%)	8 (61,54%) 5 (38,46%)
Left ventricular hypertrophy	136 (53,13%)	7 (53,85%)
Initial PH degree Degree 1-2 Degree 3-4	 190 (74,22%) 66 (25,78%)	 4 (30,77%) 9 (69,23%)
Initial atrium fibrillation	191 (74,61%)	13 (100%)
Thrombembolia in anamnesis	18 (7,03%)	6 (46,15%)
Hypertensive disease	133 (51,95%)	4 (30,77%)
IHD	24 (9,38%)	4 (30,77%)
IE in anamnesis	45 (17,58%)	3 (23,08%)
Coronary failure in postoperative period	5 (1,95%)	3 (23,08%)
Hemorrhage in postoperative period	14 (5,47%)	8 (61,54%)
AKI in postoperative period	4 (1,56%)	8 (61,54%)

Table 6

Main quantitative indicators of patients with multivalvate correction

Indicators	Discharged patients	Deceased in immediate postoperative period
EDD of LV (mm)	56,3	62,4
ESD of LV (mm)	38,2	45,3
Left atrium (mm)	57,3	64,5
EF of LV (%)	54,3	46,7
Creatinine (mg/ml)	84,5	112,8
Time of ABC (min.)	115,8	169,9
Time of aortic compression (min.)	82,5	97,8

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