CHARACTERISTICS OF HEART PATTERNS ACCORDING TO TRADITIONAL MEDICINE IN PATIENTS WITH CARDIOVASCULAR DISEASE

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ABSTRACT

Objective: To investigate the characteristics of heart patterns according to traditional medicine and to examine the relationship between pro-BNP, EF indices, and the occurrence of these syndromes in patients with cardiovascular disease.

Method: A cross-sectional descriptive study was conducted on 180 patients diagnosed with chronic coronary syndrome and/or chronic heart failure, who were undergoing inpatient treatment at the Cardiology Department of Hue University of Medicine and Pharmacy Hospital.

Results: The syndromes of Heart Qi deficiency, Heart Qi and Blood deficiency, and Heart Qi and Yin deficiency were among the most commonly observed, with a prevalence rate exceeding 80%. In contrast, the syndrome of Upward flaming of heart fire was the least prevalent, occurring at a rate of 1.1%. The moderate level occurred at the highest rate in these three syndromes: Heart Qi deficiency, Deficiency of heart Qi and Blood, and Deficiency of heart Qi and Yin; the average score of the level was also the highest in these three syndromes. Individuals with a Deficiency of heart Qi and Yang pattern exhibited higher pro-BNP levels than those without this syndrome. Conversely, individuals with Water retention affecting the heart pattern showed lower EF levels than those without this syndrome. Individuals with the Heart Yang deficiency pattern had lower pro-BNP levels compared to those without the syndrome. Additionally, individuals with the Disharmony between the heart and kidney pattern and Heart and spleen deficiency pattern demonstrated higher EF levels compared to those without these syndromes ($p < 0.05$).

Conclusion: Heart Qi deficiency, Heart Qi and Blood deficiency, and Heart Qi and Yin deficiency were prevalent patterns with the most significant impact. There were significant differences in pro-BNP and EF levels between individuals with and without the patterns of Deficiency of heart Qi and Yang, Water retention affecting the heart, Heart Yang deficiency, Disharmony between the heart and kidney pattern, and Heart and spleen deficiency.

Keywords: *Chronic coronary syndrome, chronic heart failure, heart organ, traditional medicine*

I. INTRODUCTION

Cardiovascular diseases have been and continue to be a major global health issue, with high mortality rates. According to estimates from the World Health Organization, approximately 17.9 million people die from cardiovascular diseases each year, accounting for 31% of total global deaths. Among cardiovascular diseases, coronary artery disease and heart failure were conditions with high morbidity and mortality rates. Coronary artery disease alone accounts for 14% of global mortality and is a leading cause of reduced life expectancy [1]. Community studies have shown that 30-40% of patients die within one year, and 60-70% die within five years after being diagnosed with heart failure [2]. Therefore, accurate diagnosis and early treatment of coronary artery disease and heart failure were crucial to increase life expectancy and improve the quality of life for patients.

In traditional medicine, cardiovascular diseases were often characterized by pathological manifestations primarily associated with the “heart organ”. The heart organ functions as the principal controller of blood vessels, encompassing two primary aspects: governing blood and governing vessels. These roles contribute to the distribution and circulation of blood within the vascular system. The heart also functions as a continuously contracting organ, propelling blood throughout the entire body, and thereby driving circulatory dynamics. This activity facilitates the systemic distribution and circulation of blood, essential for maintaining bodily functions. Together, the heart, blood vessels, and blood create a unified circulatory system, with the heart serving as the primary driving force within this network [3]. In traditional medicine,

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Received date: 12/11/2024

Revised date: 12/12/2024

Accepted date: 15/12/2024

diagnostic evaluations primarily rely on clinical examinations, with minimal use of ancillary testing. This reliance can result in delayed detection of disease, thereby impacting treatment quality. With the continuous advancements in evidence-based medicine, exploring the relationship between traditional medicine syndromes and highly sensitive and specific laboratory indices was increasingly essential. Such an approach enables more accurate and timely diagnoses, thereby enhancing treatment outcomes. At present, research exploring the theoretical connections between the “heart organ” in traditional medicine and cardiovascular diseases remains limited. Additionally, there was a lack of standardized, objective criteria for classifying and diagnosing symptoms and syndromes within this framework. Based on the above theoretical and practical foundations, we conducted this study with two objectives:

(1) To investigate the characteristics of heart patterns according to traditional medicine in patients with cardiovascular diseases at the Hue University of Medicine and Pharmacy Hospital.

(2) To examine the relationship between pro-BNP, EF indices, and the occurrence of heart organ syndromes in patients with cardiovascular diseases at the Hue University of Medicine and Pharmacy Hospital.

II. SUBJECTS AND METHODS

Research subjects

Patients diagnosed with chronic coronary syndrome (CCS) and/or chronic heart failure (CHF) who were receiving inpatient treatment at the Department of Cardiology, Hue University of Medicine and Pharmacy Hospital.

2.1.1. Inclusion Criteria

- Patients diagnosed with chronic heart failure according to the ESC 2021 guidelines [4].

- Patients diagnosed with chronic coronary syndrome according to the ESC 2019 guidelines [5].

- Patients who agree and voluntarily participate in the study.

Exclusion Criteria

- Patients who were unable to hear, understand, or respond to questions during the examination.

- Patients who were physically debilitated or had signs of mental disorders.

Research Methodology

***Study Design*:** Cross-sectional descriptive study.

Sample Size and Sampling Method: Convenience sampling method: all patients who meet the inclusion criteria during the study period. The total sample size collected was 180 patients.

Study Duration and Location: From August 2023 to April 2024 at the Department of Cardiology, Hue University of Medicine and Pharmacy Hospital.

Research Tools

- A pre-prepared research form, including sections on: general information, Characteristics of examination according to modern medicine and traditional medicine

- Medical records, ALPK2 blood pressure monitor, stethoscope, tongue depressor, thermometer, stopwatch, and weighing scale, as well as height and weight measuring tools.

Research Content

- Survey of the characteristics of heart patterns according to traditional medicine: Based on the diagnostic guidelines for common syndromes in Traditional Chinese Medicine, a survey was conducted on the occurrence of 12 patterns related to the heart organ: Heart Yin deficiency pattern (HYiDP), Heart Qi deficiency pattern (HQDP), Deficiency of heart Qi and blood pattern (DHQBP), Deficiency of heart Qi and Yin pattern (DHQYiP), Heart Yang deficiency pattern (HYaDP), Deficiency of heart Qi and Yang pattern (DHQYaP), Heart vessels stasis pattern (HVSP), Phlegm obstructing the heart vessels pattern (POHVP), Upward flaming of heart fire pattern (UFHRP), Disharmony between the heart and kidney pattern (DBHKP), Water retention affecting the heart pattern (WRAHP), Heart and spleen deficiency pattern (HSDP). The syndromes were evaluated based on the symptoms present within each syndrome. Each symptom was assigned a different score depending on its importance within the syndrome. The score for each symptom was calculated by multiplying its value by 0.7 (if the symptom was mild), by 1 (if the symptom was moderate), or by 1.5 (if the symptom was severe). The total score for each syndrome was the sum of the scores of all symptoms included in that syndrome. If the total score for a syndrome was 14 points or higher, the syndrome was considered present. If the score was below 14 points, it was considered normal. Within each syndrome, the severity was classified based on the total score: a score of 14–20.9 indicates mild

severity, 21–30 points indicates moderate severity and a score greater than 30 points indicates severe severity [6].

- Investigate the relationship between pro-BNP, EF levels, and the occurrence of heart organ syndromes according to traditional medicine.

Data Analysis and Processing:

The collected data is entered, cleaned, analyzed, and processed using SPSS 20.0 statistical software. Qualitative variables were expressed as percentages. Quantitative variables were presented as mean ± standard deviation (mean ±SD). The normal distribution of variables was tested using the Skewness and Kurtosis indexes. Variables with normal distribution were compared by using One-way ANOVA or Independent-Samples t-test. Variables without normal distribution were compared by using the Kruskal-Wallis H or Mann-Whitney U test. Results were considered statistically significant if p-value <0.05.

Research Ethics

This research was the product of the University-level science and technology project (University of Medicine and Pharmacy, Hue University) with code 102/24, which has been evaluated and licensed by the council. The study was conducted only after obtaining informed consent from the research participants. All collected information was kept confidential and used solely for research purposes.

III. RESULTS

General characteristics of the study subjects

Table 1. General characteristics of the study subjects

Characteristics		n = 180	%
Gender	Male	79	43.9
	Female	101	56.1
Age	< 40	0	0.0
	40- 59	31	17.2
	60-69	49	27.2
	70-79	49	27.2
	≥ 80	51	28.4
	Mean±SD	71.9±12.4	
BMI (kg/m^2)	<18,5	27	15.0
	18,5- 22,9	93	51.7
	≥23	60	33.3
	Mean ±SD	21.8±3.3	

The proportion of females (56.1%) was higher than that of males (43.9%). All research participants were over 40 years old, with an average age of 71.9 ± 12.4 years. In terms of body mass index (BMI), the highest proportion of participants fell within the normal weight range (51.7%), while a significant proportion were overweight or obese (33.3%).

3.2. Characteristics of heart patterns

Table 2. Distribution of heart patterns

Patterns	Total (n = 180)		CCS (n=62) (a)		CHF (n= 59) (b)		CCS + CHF (n= 59) (c)		p (a-b-c)
	n	%	n	%	n	%	n	%	
HYiDP	98	54.4	34	54.8	30	50.8	34	57.6	0.759
HQDP	152	84.4	56	90.3	46	78.0	50	84.7	0.172
DHQBP	161	89.4	60	96.8	51	86.4	50	84.7	0.065
DHQYiP	157	87.2	57	91.9	49	83.1	51	86.4	0.335
HYaDP	101	56.1	38	61.3	31	52.5	32	54.2	0.587
DHQYaP	141	78.3	51	82.3	43	72.9	47	79.7	0.437

Patterns	Total (n = 180)		CCS (n=62) (a)		CHF (n= 59) (b)		CCS + CHF (n= 59) (c)		p (a-b-c)
	n	%	n	%	n	%	n	%	
HVSP	63	35.0	21	33.9	19	32.2	23	39.0	0.723
POHVP	92	51.1	39	62.9	26	44.1	27	45.8	0.071
UFHRP	2	1.1	0	0.0	1	1.7	1	1.7	0.546
DBHKP	77	42.8	31	50.0	22	37.3	24	40.7	0.341
WRAHP	128	71.1	46	74.2	42	71.2	40	67.8	0.740
HSDP	127	70.6	52	83.9	35	59.3	40	67.8	0.011

Notes: *Heart Yin deficiency pattern (HYiDP), Heart Qi deficiency pattern (HQDP), Deficiency of heart Qi and blood pattern (DHQBP), Deficiency of heart Qi and Yin pattern (DHQYiP), Heart Yang deficiency pattern (HYaDP), Deficiency of heart Qi and Yang pattern (DHQYaP), Heart vessels stasis pattern (HVSP), Phlegm obstructing the heart vessels pattern (POHVP), Upward flaming of heart fire pattern (UFHRP), Disharmony between the heart and kidney pattern (DBHKP), Water retention affecting the heart pattern (WRAHP), Heart and spleen deficiency pattern (HSDP).*

HQDP, DHQBP, and DHQYiP were the most common patterns, with prevalence rates above 80%. The next most common syndromes were HYiDP, HYaDP, DHQYaP, POHVP, WRAHP, and HSDP, all of which appeared at relatively high rates (above 50%). The least common pattern, UFHRP, was observed in only 1.1% of cases.

Overall, most of the heart organ patterns showed no significant differences in distribution across the three patient groups ($p > 0.05$). However, HSDP exhibited a significant difference between the three groups ($p < 0.05$).

Table 3. Degree of heart patterns

Patterns		Total (n = 180)		CCS (n=62) (1)		CHF (n= 59) (2)		CCS + CHF (n= 59) (3)		p (1-2-3)
		%	X±SD	%	X±SD	%	X±SD	%	X±SD	
HYiDP	mild	43.3	14.6 ± 5.7	43.5	14.8 ± 4.7	37.3	14.4 ± 6.6	49.2	14.6 ± 5.6	0.908
	moderate	9.4		11.3		8.5		8.5		
	severe	1.7		0.0		5.1		0.0		
HQDP	mild	33.3	20.5 ± 6.5	37.1	20.5 ± 4.8	27.1	20.9 ± 7.1	35.6	20.0 ± 7.4	0.809
	moderate	46.1		53.2		42.4		42.4		
	severe	5.0		0.0		8.5		6.8		
DHQBP	mild	29.4	21.5 ± 6.1	19.4	22.8 ± 3.8	42.4	20.5 ± 6.8	27.1	21.2 ± 7.2	0.052
	moderate	53.3		77.4		35.6		45.8		
	severe	6.7		0.0		8.5		11.9		
DHQYiP	mild	32.8	21.3 ± 6.9	32.3	21.1 ± 5.2	39.0	21.3 ± 7.8	27.1	21.4 ± 7.6	0.974
	moderate	45.6		58.1		28.8		49.2		
	severe	8.9		1.6		15.3		10.2		
HYaDP	mild	42.2	15.1 ± 5.3	46.8	15.3 ± 4.6	33.9	15.5 ± 6.3	45.8	14.6 ± 4.8	0.588
	moderate	13.3		14.5		16.9		8.5		
	severe	0.6		0.0		1.7		0.0		

Patterns		Total (n = 180)		CCS (n=62) (1)		CHF (n= 59) (2)		CCS + CHF (n= 59) (3)		p (1-2-3)
		%	X±SD	%	X±SD	%	X±SD	%	X±SD	
DHQYaP	mild	52.8	18.3 ± 13.1	64.5	17.2 ± 3.9	40.7	17.8 ± 6.2	52.5	19.7 ± 21.7	0.811
	moderate	24.4		17.7		30.5		25.4		
	severe	1.1		0.0		1.7		1.7		
HVSP	mild	23.9	11.1 ± 7.2	25.8	10.7 ± 7.0	15.3	11.6 ± 8.0	30.5	11.0 ± 6.6	0.788
	moderate	10.6		8.1		15.3		8.5		
	severe	0.6		0.0		1.7		0.0		
POHVP	mild	36.7	14.4 ± 6.5	53.2	15.1 ± 6.1	27.1	14.2 ± 6.5	28.8	13.9 ± 7.0	0.518
	moderate	11.7		4.8		9 15.3		15.3		
	severe	2.8		4.8		1.7		1.7		
UFHRP	mild	1.1	5.5 ± 3.3	0.0	6.1 ± 3.0	1.7	5.7 ± 3.7	1.7	4.8 ± 3.1	0.087
	moderate	0.0		0.0		0.0		0.0		
	severe	0.0		0.0		0.0		0.0		
DBHKP	mild	37.8	13.3 ± 4.3	50.0	13.8 ± 3.4	28.8	13.0 ± 5.0	33.9	13.1 ± 4.4	0.473
	moderate	5.0		0.0		8.5		6.8		
	severe	0.0		0.0		0.0		0.0		
WRAHP	mild	43.9	17.3 ± 5.7	67.7	15.8 ± 4.2	28.8	18.3 ± 6.0	33.9	17.8 ± 6.4	p_{2-3}=0.02
	moderate	25.6		6.5		40.7		30.5		
	severe	1.7		0.0		1.7		3.4		
HSDP	mild	55.6	16.1 ± 4.5	72.6	17.1 ± 2.9	45.8	15.2 ± 5.0	47.5	15.9 ± 5.1	0.08
	moderate	15.0		11.3		13.6		20.3		
	severe	0.0		0.0		0.0		0.0		

Notes: *Heart Yin deficiency pattern (HYiDP), Heart Qi deficiency pattern (HQDP), Deficiency of heart Qi and blood pattern (DHQBP), Deficiency of heart Qi and Yin pattern (DHQYiP), Heart Yang deficiency pattern (HYaDP), Deficiency of heart Qi and Yang pattern (DHQYaP), Heart vessels stasis pattern (HVSP), Phlegm obstructing the heart vessels pattern (POHVP), Upward flaming of heart fire pattern (UFHRP), Disharmony between the heart and kidney pattern (DBHKP), Water retention affecting the heart pattern (WRAHP), Heart and spleen deficiency pattern (HSDP).*

The syndromes HYiDP, HYaDP, DHQYaP, HVSP, POHVP, and DBHKP all had the highest proportion of "mild severity" across all three patient groups. The syndromes HQDP, DHQBP, and DHQYiP predominantly appeared with "moderate severity" in all three groups, and had the highest average scores among the 12 syndromes, ranging from 20.0 ± 7.4 to 22.8 ± 3.8.

There was a difference in the mean score of the WRAHP between the CHF group and the CCS+CHF group ($p<0.05$).

3.3. The relationship between pro-BNP and EF index with the occurrence of heart organ syndromes in patients with cardiovascular diseases

Table 4. The relationship between pro-BNP and EF index with the occurrence of heart organ syndromes

Patterns		CCS		CHF		CCS + CHF		p
		pro-BNP (1)	EF (2)	pro-BNP (3)	EF (4)	pro- BNP (5)	EF (6)	
HYiDP	Yes	873.2 ± 1092.9	67.0 ± 6.0	4934.7± 6066.2	55.0 ± 16.0	7704.3± 9611.1	50.0 ± 14.0	>0.05
	No	521.6 ± 447.4	66.0 ± 8.0	5265.9± 7021.2	57.0 ± 13.0	5356.6± 9256.9	54.0 ± 16.0	
HQDP	Yes	210.2 ± 247.6	68.0 ± 7.0	4930.4± 7320.6	58.0 ± 15.0	6843.6± 11647.1	49.0 ± 12.0	>0.05
	No	814.4 ± 896.8	66.0 ± 8.0	5144.0± 6305.9	55.0 ± 14.0	6233.7± 9105.6	53.0 ± 16.0	
DHQBP	Yes	112.2 ±85.6	64.0 ± 4.0	6024.0± 9053.2	56.0 ± 14.0	3836.8± 3900.0	48.0 ± 9.0	>0.05
	No	745.0 ± 860.4	66.0 ± 8.0	4939.5± 6070.2	56.0 ± 14.0	6796.5± 10066.3	53.0 ± 16.0	
DHQYiP	Yes	302.0 ± 268.4	64.0 ± 4.0	6237.9± 8223.7	53.0 ± 16.0	7082.8± 12559.0	51.0 ± 11.0	>0.05
	No	761.9 ± 887.8	67.0 ± 8.0	4845.9± 6126.5	56.0 ± 14.0	6212.0± 9011.5	52.0 ± 16.0	
HYaDP	Yes	768.9 ± 964.6	68.0 ± 6.0	4922.5± 6228.5	55.0 ± 16.0	9535.7± 11876.7	49.0 ± 14.0	$p_{1;2;3;4;6}$>0.05 p_5<0.05
	No	665.0 ± 806.4	66.0 ± 8.0	5266.3± 6843.6	57.0 ± 13.0	3728.2± 5764.6	54.0 ± 15.0	
	Yes	118.3 ± 82.8	67.0 ± 6.0	4691.9± 6945.5	57.0 ± 15.0	6824.8± 10360.2	46.0 ± 11.0	$p_{2;3;4;5;6}$>0.05 p_1<0.05
	No	889.1 ± 896.4	66.0 ± 8.0	5255.5± 6377.8	55.0 ± 14.0	6197.7± 9259.1	53.0 ± 16.0	
HVSP	Yes	808.0 ± 902.2	66.0 ± 7.0	5092.5± 5584.2	56.0 ± 15.0	7569.7± 10234.9	54.0 ± 15.0	>0.05
	No	239.8 ± 224.5	66.0 ± 9.0	5098.6± 8260.0	56.0 ± 12.0	4390.8± 7737.2	49.0 ± 15.0	
POHVP	Yes	889.9 ± 1129.2	67.0 ± 6.0	4549.8± 5781.0	55.0 ± 15.0	7071.6± 10169.2	51.0 ± 15.0	>0.05
	No	545.8 ± 506.5	66.0 ± 8.0	5875.9± 7447.8	57.0 ± 13.0	5454.5± 8517.3	53.0 ± 15.0	
UFHRP	Yes	707.8 ± 847.1	66.0 ± 7.0	5133.3± 6539.0	56.0 ± 14.0	6428.7± 9441.0	52.0 ± 15.0	>0.05
	No	-	-	2956.0 ± 0.0	67.0 ± 0.0	388.1 ±0.0	65.0 ±0.0	
DBHKP	Yes	644.3 ± 921.6	65.0 ± 7.0	5798.9± 7400.5	54.0 ± 15.0	7081.7± 9757.2	49.0 ± 14.0	$p_{1;2;3;4;5}$>0.05 p_6<0.05
	No	764.1 ± 827.1	67.0 ± 8.0	3722.5± 3999.0	58.0 ± 13.0	5229.1± 8934.0	57.0 ± 15.0	
WRAHP	Yes	1008.6 ± 922.8	69.0 ± 4.0	3818.6± 6438.7	56.0 ± 17.0	7563.3± 9935.5	52.0 ± 14.0	$p_{1;3;4;5;6}$>0.05 p_2<0.05
	No	543.7 ± 798.9	65.0 ± 8.0	5650.6± 6510.3	56.0 ± 13.0	5732.3± 9197.4	52.0 ± 15.0	

Patterns		CCS		CHF		CCS + CHF		p
		pro-BNP (1)	EF (2)	pro-BNP (3)	EF (4)	pro- BNP (5)	EF (6)	
HSDP	Yes	210.2 ± 247.6	63.0 ± 9.0	4974.9± 6412.8	55.0 ± 14.0	6177.9± 6129.3	45.0 ± 11.0	$p_{1;2;3;4;5}>0.05$ $p_6<0.05$
	No	814.4 ± 896.8	67.0 ± 7.0	5177.7± 6634.0	56.0 ± 14.0	6388.5± 10666.7	55.0 ± 16.0	

Notes: *Heart Yin deficiency pattern (HYiDP), Heart Qi deficiency pattern (HQDP), Deficiency of heart Qi and blood pattern (DHQBP), Deficiency of heart Qi and Yin pattern (DHQYiP), Heart Yang deficiency pattern (HYaDP), Deficiency of heart Qi and Yang pattern (DHQYaP), Heart vessels stasis pattern (HVSP), Phlegm obstructing the heart vessels pattern (POHVP), Upward flaming of heart fire pattern (UFHRP), Disharmony between the heart and kidney pattern (DBHKP), Water retention affecting the heart pattern (WRAHP), Heart and spleen deficiency pattern (HSDP).*

There was a correlation between pro-BNP levels and the occurrence of the DHQYaP syndrome, specifically: the pro-BNP levels in the group with DHQYaP syndrome were higher than those in the group without this syndrome ($p < 0.05$).

There was a correlation between the EF index and the occurrence of the WRAHP syndrome, specifically: the EF in the group with WRAHP syndrome was lower than that in the group without this syndrome ($p < 0.05$).

There was a correlation between pro-BNP levels and the occurrence of the HYaDP syndrome, specifically: the pro-BNP levels in the group with HYaDP syndrome were higher than those in the group without this syndrome ($p < 0.05$).

There was a correlation between the EF index and the occurrence of the DBHKP and HSDP syndromes, specifically: the EF in the groups with DBHKP and HSDP syndromes was higher than that in the groups without these syndromes ($p < 0.05$).

IV. DISCUSSION

Characteristics of heart organ patterns

Regarding the frequency distribution of heart organ syndromes according to traditional medicine in cardiovascular diseases, our study found that the syndromes of HQDP (84.4%), DHQBP (89.4%), and DHQYiP (87.2%) were the most commonly observed. The least prevalent syndrome was UFHRP, which occurred in only 1.1% of cases. Furthermore, we noted that the syndromes of HQDP, DHQBP, and DHQYiP were predominantly of moderate severity, with prevalence rates ranging from 42.4% to 58.1%. These syndromes also had the highest average severity scores, with values ranging from 20.0 ± 7.4 to 22.8 ± 3.8. Thus, it can be concluded that the syndromes of HQDP, DHQBP, and DHQYiP were not only frequently encountered but also tended to have a greater impact compared to the other syndromes. HYiDP, HYaDP, DHQYaP, HVSP, POHVP, and DBHKP all exhibited a predominance of “mild severity,” with the highest prevalence rates. According to traditional medicine, cardiovascular diseases are fundamentally caused by root (Ben) deficiency with the excessive branch (Biao): root deficiency refers to the deficiency of the body’s fundamental substances (Yin, Yang, Qi, and Blood). The Heart, which governs the Blood, is particularly important in this context, any pathological changes in the Heart directly affect the Blood, Blood deficiency weakens the Heart’s ability to promote circulation (Heart Qi), and as the Blood deficiency progresses, it can gradually lead to Yin deficiency. On the other hand, Yang deficiency primarily progresses from Qi deficiency, which exacerbates the condition. Excessive Biao in traditional medicine refers to the pathological processes of cold stagnation, phlegm dampness, water dampness, and blood stasis. During a certain stage, the clinical manifestations of coronary artery disease and heart failure may appear relatively stable. However, as the condition progresses, the location and nature of the disease can change in a complex manner, and the symptoms may transform or interact with each other. Therefore, the classification of the severity of the disease is

primarily based on the degree of Ben deficiency with excessive Biao, the severity of pathogenic excess, and the extent of damage to the organs. If there is a deficiency in Qi, Blood, Yin, and Yang without the presence of blood stasis, phlegm-dampness, or water dampness, the disease is considered to manifest at a mild level. If accompanied by signs of excessive Biao, the disease has progressed to a moderate or severe stage. Clinically, this is often manifested as a mix of deficiency and excess. The syndrome of UFHRP appeared at the lowest prevalence. The pathogenesis of this syndrome is primarily due to excessive heart fire, which strongly consumes the body's vital substances, leading to the transformation of the five emotions and six pathogenic factors into fire (excessive Biao and Ben). This mechanism differs from the predominant pattern of Ben deficiency with excessive Biao typically seen in cardiovascular diseases in general. Overall, the distribution of the aforementioned Heart organ syndromes showed no significant differences between the three disease groups.

The WRAHP in CCS and the group with both diseases were most commonly observed at a mild severity level, with prevalence rates of 67.7% and 33.9%, respectively. However, in the HF group, it appeared with moderate severity in the highest proportion (40.7%). This can be explained by the differences in the role of water and dampness in the pathogenesis of these two conditions. In CHF, water and dampness were key factors in excessive branches, whereas, in CCS, water and dampness primarily arise as a result of damage to the Yang aspects of the heart and kidney organs. Therefore, there was a significant difference in the severity of WRAHP across the three disease groups ($p < 0.05$) [7].

4.2. The relationship between pro-BNP and EF levels and the occurrence of heart organ syndromes in cardiovascular patients.

The primary biological effects of pro-BNP include natriuresis, diuresis, peripheral vasodilation, and the inhibition of the renin-angiotensin-aldosterone system as well as the sympathetic nervous system. An increase in myocardial wall stress is a strong stimulus for the release of pro-BNP into the bloodstream. The secretion of serum pro-BNP levels may be associated with the concept of Cold obstruction in traditional medicine. Cold is a Yin pathogen, characterized by its ability to induce stagnation and constriction, leading to the obstruction of Qi circulation and the contraction of the meridians. Cold is also associated with water-Qi, which is connected to the kidneys. When cold pathogens invade the body, they cause an accumulation of cold and water, which can result in reduced urine output. Therefore, higher levels of pro-BNP are released to balance endovascular volume, and osmolality, and regulate systemic circulatory pressure in patients with the DHQYaP. This mechanism may explain why patients with DHQYaP exhibit significantly higher pro-BNP levels compared to those without this syndrome ($p < 0.05$).

Ejection fraction (EF) is an index used to evaluate the heart's pumping function, calculated as the percentage of blood ejected from the heart with each beat. When EF is low, the kidneys receive less blood than usual, impairing the body's ability to eliminate salt and water. This retention increases blood volume, placing additional strain on the heart. This may relate to the mechanism of the WRAHP in traditional medicine: prolonged DHQYaP disrupts the harmony between Yin and Yang, weakening the connection between the heart and kidneys. This affects the function of the kidney Yang, which, when deficient, cannot effectively transform water. Consequently, water and dampness accumulate internally, rising upward and obstructing the heart organ and vessels. The diminished activating function of the heart organ results in reduced contractility and circulation. Consequently, the EF in individuals with the WRAHP was significantly lower than in those without this pattern ($p < 0.05$). Kidney Yin is the foundation of Yin fluids in the body, providing nourishment and moisture to the organs and tissues. In patients with DBHKP, kidney Yin deficiency leads to internal heat, depleting bodily fluids. This mechanism contrasts sharply with that of the WRAHP, as it reduces circulatory volume and lessens the burden on the heart. Consequently, EF in individuals with the heart-kidney disharmony pattern was higher than in those without this pattern. Spleen Qi deficiency leads to Heart Blood deficiency, reducing circulatory volume and thereby lessening the heart's workload. This explains why individuals with the HSDP across all three disease groups had a higher EF compared to those without this pattern. Given that EF was lower in patients with both CHF and CCS than in those with either condition alone, the EF difference between patients

with and without these two patterns became more pronounced in those with both diseases ($p < 0.05$).

V. CONCLUSIONS

The most commonly observed syndromes were HQDP, DHQBP, and DHQYiP, followed by HYiDP, HYaDP, DHQYaP, POHVP, WRAHP, HSDP, and, with the lowest prevalence, UFHRP. The syndromes HYiDP, HYaDP, DHQYaP, HVSP, UFHRP, and DBHKP mostly appeared with mild severity. The syndromes HQDP, DHQBP, and DHQYiP mostly appeared with moderate severity and had the highest average severity scores. In CCS, the pro-BNP level was higher in the group with DHQYaP and the EF was lower in the group with WRAHP. In patients with both CCS and CHF, the pro-BNP level was lower in the group with HYaDP, and the EF was higher in the groups with DBHKP and HSDP.

REFERENCES

1. **WHO (2002), "**Chapter 4: Quantifying selected major risks to health", The World Health Report - Reducing Risks, Promoting Healthy Life, p. 47-97.
2. **L., Douglas and Mann (2018),** Harrison's Principles of Internal Medicine, Heart Failure: Pathophysiology and Diagnosis, 1-11.
3. **Department of Traditional Chinese Medicine, Vietnam Military Medical University (2012),** "Ischemic Heart Disease," Pathology of Traditional Chinese Medicine, People's Army Publishing House, pp. 48-61.
4. **Theresa A McDonagh et al. (2021),** 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure, European Heart Journal, Volume 42, Issue 36.
5. **Knuuti J. et al. (2019),** 2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes: The Task Force for the diagnosis and management of chronic coronary syndromes of the European Society of Cardiology, European Heart Journal, 41(3).
6. **Diagnostic Subcommittee of China Association of Traditional Chinese Medicine (2008),** Diagnosis standards for common syndromes in traditional Chinese medicine, Journal of TCM University of Hunan, Oct 2008 Vol.28 No.5, p3-8, p63-65.
7. **Jun Shi, Liangtao Luo, Jing Chen, Juan Wang, Huihui Zhao, Wei Wang (2019)**, "Study on the differences between Traditional Chinese Medicine syndromes in NYHA I–IV classification of chronic heart failure", Evidence-Based Complementary and Alternative Medicine, Vol 2019, p2543413, DOI: 10.1155/2019/2543413.