Journal of Surgery and Medicine
e-ISSN=2602-2079

Evaluation of the effect of patient position in the management of chronic heart failure patients presenting with dyspnea

Güleser Akpınar, Hakan Topaçoğlu

Department of Emergency Medicine, School of Medicine, Düzce University, Düzce, Turkey

ORCID ID of the author(s)
GA: 0000-0001-8559-5098
HT: 0000-0003-0441-7455

Corresponding Author
Güleser Akpınar
Department of Emergency Medicine, School of Medicine, Düzce University, 81620, Düzce, Turkey
E-mail: guleserakpinarduman@gmail.com

Ethics Committee Approval
This study was initiated in the emergency department of a university hospital following the ethics committee approval. (Düzce University Non-Invasive Health Research Ethics Committee's approval with decision number 2020/55, March 16, 2020)
All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

Conflict of Interest
No conflict of interest was declared by the authors.

Financial Disclosure
The authors declared that this study has received no financial support.

Published
2021 March 19

Abstract

Background/Aim: One of the pathomechanisms of congestive heart failure is inadequate cardiac load, and one of the physiological ways to reduce cardiac load is to decrease venous return. Based on this mechanism, we aimed to reduce venous return and alleviate cardiac load in patients by drooping their legs. In this study, we aimed to evaluate the impact of leg position on patients' comfort and treatment, emphasize that patient position is valuable enough to be included in the treatment algorithm, and determine the effects of the patient sitting with legs hanging down position in an armchair (sitting position), or upright with the straight knees position on a stretcher with the stretcher's head at 90°C (high Fowler's position) on the patient's perception of dyspnea in chronic heart failure (CHF).
Methods: Patients over 18 years of age, followed-up with CHF diagnosis who presented to the emergency department (ED) with dyspnea were included in this case control study. The participants were divided into high Fowler's and sitting groups. According to the Visual Analog Scale (VAS) scoring, patients were asked to point to the severity of dyspnea. Patients' vital signs, 30-day mortality, and VAS scores were recorded at the 0^{th}, 15^{th}, 30^{th}, and 60^{th} minutes.
Results: A total of seventy-four patients were included in the study. Thirty-eight patients in the high Fowler's group, and thirty-six patients in the sitting group were treated. VAS started to decrease significantly at 15 minutes in sitting position. Although baseline VAS scores were higher at sitting than at the high Fowler's position, the end of the 60^{th} minute VAS scores and respiratory rate were significantly lower in the sitting group (P=0.016, and P=0.008, respectively). The mortality rate was significantly higher in the high Fowler's group (P=0.028).
Conclusions: We concluded that patient position plays a vital role in patients' perception of dyspnea and mortality in the acute treatment of CHF patients presenting with dyspnea. Perception of dyspnea disappears earlier, and mortality is lower in the sitting position.

Keywords: Dyspnea, Heart failure, Patient position, Upright sitting, Fowler's position

How to cite: Akpınar G, Topaçoğlu H. Evaluation of the effect of patient position in the management of chronic heart failure patients presenting with dyspnea. J Surg Med. 2021;5(3):284-288.

Introduction

The most common reason for patients with chronic heart failure (CHF) presenting to the emergency department (ED) is dyspnea [1]. Relieving dyspnea is the primary target of acute heart failure treatment. Dyspnea is a regulatory criterion for the approval of novel therapeutic agents and the common endpoint in clinical studies on acute heart failure [2, 3].

There is still no accurate, safe, reproducible, and methodology-validated tool for the assessment of dyspnea. The most used scale to evaluate the level of dyspnea is Visual Analog Scale (VAS), which provides better results in the assessment of dyspnea severity [4-6].

A decrease in a patient's perception of dyspnea is essential for patients, physicians, and clinical studies. Studies about the importance of patient position in assessing the severity and management of dyspnea are limited [7]. Therefore, we planned this study to emphasize the importance of patient position in acute treatment protocols for heart failure and show that it should be considered in the treatment algorithm.

There are differences in dyspnea perception, including the differences in patient profile, cultural interpretation of dyspnea, and other factors. To determine the effects on dyspnea interpretation, we included the vital parameters of the patient, such as heart rate (HR), respiratory rate (RR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and arterial blood gas (ABG) values in the assessment together with VAS.

In the supine position, venous blood in the abdomen and lower extremities are mobilized, and venous return to the thoracic compartment increases (250-500 mL), further elevating pulmonary venous and capillary pressures. This may result in pulmonary edema, decreased pulmonary compliance, increased airway resistance, and dyspnea [8]. We tried to reduce the contribution of venous circulation in the lower extremities by giving the patient a sitting position with legs hanging down and revealing the effect of this position on dyspnea.

Patients are usually positioned on a stretcher with the stretcher's head at 90ºC, and the patients in upright position with legs stretching straight forward.

The objective of this study was to determine the effects of upright sitting with legs hanging down in an armchair (sitting position) or sitting upright with straight knees on a stretcher with the head of the stretcher at 90°C (high Fowler's position) on the severity of dyspnea and heart failure treatment and emphasize that patient position is valuable enough to be included in the treatment algorithm.

Materials and methods

Study setting and design

This is a case control study conducted on patients with CHF who presented to the ED with dyspnea complaints between April 1, 2020- September 1, 2020. The study was initiated after the approval of the Ethics Committee of our institution (ID: 2020/55; 16 March 2020).

This study was conducted in the ED of a tertiary care university hospital, which admits about 75,000 patients per year. Treatment was administered in accordance with the "2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure" [9]. To avoid bias, the patients who met the inclusion criteria were included in the groups consecutively and sequentially according to the order of admission to the hospital.

Participants and measurements

Patients in the chair (sitting group) were seated upright with legs hanging down (sitting position). Patients in the stretcher (high Fowler's group) were given an upright sitting position with legs stretching straight forward on a stretcher, with the stretcher's head at 90°C (high Fowler's position). Patients' gender, age, comorbidities were recorded, HR, RR, SBP, DBP, oxygen saturation (SpO_2), and ABG were measured after being seated on a chair or a stretcher. Chest ultrasonographic (US) examination was performed with the bedside LOGIQ P9 ultrasonography device (GE Healthcare, Tampa, USA), B lines were examined, and ejection fraction (EF) was measured with an echocardiography (echo) device. The researcher who conducted the study had a certificate showing that he was capable of ultrasonographic and echocardiographic evaluation.

The patient was asked to indicate the severity of shortness of breath according to the VAS score, assigning a number between 0-10. Zero indicated no dyspnea, while ten indicated the most severe dyspnea the patient has ever experienced. HR, RR, SBP, DBP, SpO_2, and VAS scores were measured at minutes 0, 15, 30 and 60. Blood gas was routinely monitored with Radiometer ABL800 flex device (Radiometer, Istanbul, Turkey) at minutes 0, 30, and 60 after beginning the treatment. Effect of the treatment position on the dyspnea perception and treatment were compared between the sitting and high Fowler's groups.

Inclusion criteria: Patients with a diagnosis of heart failure, COPD, and those who fulfill the following criteria were included in the study: Being over 18 years of age and presenting to the ED with moderate-to-severe dyspnea, RR >20 breaths/minutes, use of accessory respiratory muscles, bilateral rales on chest auscultation, pH <7.35, partial pressure of arterial oxygen (PaO_2) <60mm Hg, SpO_2<94 at room air, typical findings on chest X-ray, and B lines on chest ultrasonography.

Exclusion criteria: Illiterate patients, those who did not sign an informed consent form to participate in the study, who required non-invasive mechanical ventilation, were intubated, or required intubation, those who had cardiac arrest during treatment, those with pH <7.1, SBP <90 mm Hg, acute myocardial infarction, or a history of trauma were excluded.

Sample size

The minimal sample size required for the study was fifty-four with 0.5 effect size, 95% confidence interval and 5% significance level, as determined by the G*Power (Version 3.1.9.4) program. The study was performed with all seventy-four patients who met the inclusion criteria and who were admitted to the emergency department within 6 months.

Statistical analysis

The normality of continuous variables was checked with the Shapiro-Wilk test. Student's t-test was used to analyze two normally distributed (p>0.05) data sets, while Mann-Whitney U test was utilized to compare two sets of non-normally distributed (p<0.05) data. ANOVA was applied on repeated measures to compare normally distributed data between several time points in the same group. If the result was statistically significant, multiple comparisons were made using the paired t-test with Bonferroni correction. Friedman's test (Dunn-Bonferroni test for multiple comparisons) was used as a nonparametric alternative to ANOVA for Repeated Measures. The correlation between two categorical variables was analyzed with Pearson's Chi-square test. Normally distributed variables were expressed as mean (standard deviation (SD)); non-normally distributed variables were presented with median (interquartile range (IQR)). Categorical variables were reported as a percentage. All analyses were performed using the statistical software SPSS version 19.0 (SPSS Inc., Armonk, NY). $P<0.05$ values were considered statistically significant.

Results

A total of seventy-four patients were included in the study. The median ages in the high Fowler's group (n=38, 55.3% males) and the sitting group (n=34, 58.3% males) were 73 (64.8-78) years and 71.5 (64-78.8) years, respectively. The patients' distribution in terms of age, gender, and chronic disease are shown in Table 1, which were similar between the two groups ($P>0.05$).

Table 1: Demographic characteristics of the groups

	High Fowler's (n=38)	Sitting (n=36)	*P*-value
Age - Median (IQR)	73 (64.8-78)	71.5 (64-78.8)	0.774
Gender - n (%)			
Female	17 (44.7)	15 (41.7)	0.790
Male	21 (55.3)	21 (58.3)	
Comorbidities - n (%)			
Diabetes			
No	25 (65.8)	26 (72.2)	0.550
Yes	13 (34.2)	10 (27.8)	
Hypertension			
No	16 (42.1)	12 (33.3)	0.437
Yes	22 (57.9)	24 (66.7)	
Chronic Obstructive Pulmonary Disease			
No	21 (55.3)	22 (61.1)	0.610
Yes	17 (44.7)	14 (38.9)	
Coronary artery disease			
No	12 (31.6)	16 (44.4)	0.254
Yes	26 (68.4)	20 (55.6)	

IQR: Interquartile range

Table 2 shows vital signs measured at admission and the 15th, 30th and 60th minutes in both sitting and high Fowler's groups. Post-hoc analysis revealed that HR, RR, and SBP significantly decreased at 30 minutes, SpO_2 increased dramatically at 60 minutes compared to the baseline values, while VAS significantly reduced at 15 minutes compared to the baseline in the high Fowler's group. In the sitting group, HR did not decrease substantially during the 1-hour treatment, while a significant drop in RR started at the 15th minute. SpO_2 significantly increased at 60 minutes, SBP began to drop significantly at 15 minutes, and DBP significantly decreased at 60 minutes compared to the baseline values. VAS started to significantly drop at 15 minutes in the sitting group.

No statistically significant difference was observed between the groups in terms of HR and SpO_2 at the specified time points. Simultaneously, RR was significantly lower in the sitting group at the 60th minute ($P=0.045$). Although the sitting group's VAS scores were significantly higher than the high Fowler's group at the time of admission, these scores were significantly lower in the sitting group at the end of 60 minutes ($P=0.016$).

The comparison of vital values according to the changes at the specified time intervals between the sitting and high Fowler's groups is given in Table 3. While HR significantly decreased in the sitting group at 30 minutes compared to the baseline values ($P=0.020$), RR's decrease was significantly higher in this group ($P=0.008$). No statistically significant difference was found between the groups in terms of SPO_2 at different times ($P>0.05$). The change in SBP at 30 minutes was significantly higher in the sitting group ($P=0.047$), which further increased at the 60th minute ($P=0.040$). There was no significant difference in terms of DBP ($P>0.05$). VAS was significantly in favor of the sitting group with a difference that started to increase at 15 minutes and further increased gradually at 30 and 60 minutes ($P<0.001$).

Table 2: Comparison of body positions in terms of vital signs and VAS scores

		Time points				Within groups	Post Hoc analysis
		Baseline	15	30	60	P^b	
HR	High Fowler's (n=38)	109.1 (28.4) 102.5 (27)	102.8 (23.3) 105 (32.8)	98.3 (21) 97.5 (25.8)	98.7 (21.8) 97 (33)	0.007	BL>30** BL>60*
	Sitting (n=36)	100.4 (22.8) 95 (23.3)	98.8 (23.9) 94 (26.5)	99.5 (23.1) 97 (28)	97 (23) 96.5 (30.5)	0.182	-
Between groups	P^a	0.119	0.358	0.961	0.752[c]		
RR	High Fowler's	29.7 (7.1) 28 (9)	28 (6.1) 26.5 (8.3)	27.4 (6.8) 25 (9.3)	25.9 (6.1) 25 (9.3)	<0.001	BL>30** BL>60*** 15>60**
	Sitting	30.9 (5.1) 30 (6.8)	27.6 (5.1) 28 (8.3)	24.9 (5.2) 25 (6)	23.2 (5.5) 23 (8.3)	<0.001	BL>15**15>60*** BL>30***30>60* BL>60***15>30**
Between groups	P^a	0.290	0.987	0.172	0.045[c]		
SpO_2	High Fowler's	89.3 (9.7) 93 (11)	93.2 (5.9) 93 (5.3)	94.5 (3.7) 95 (7)	94.8 (5.1) 96.5 (5)	0.001	BL<30* BL<60**
	Sitting	90 (9.3) 91.5 (9)	92.3 (8.9) 94 (7)	94.3 (4.9) 96 (5.5)	95 (4.5) 96 (5.8)	<0.001	BL<30* BL<60*** 15<60*
Between groups	P^a	0.850	0.765	0.815	0.887		
SBP	High Fowler's	137.8 (28.4) 131 (30.3)	130.3 (25.9) 126.5 (36)	127.1 (21.3) 128.5 (25)	125.4 (21.2) 125 (25.5)	0.010	BL>30** BL>60***
	Sitting	156.6 (28.9) 152.5 (43)	145 (27.4) 138 (43.5)	136.2 (26.3) 131 (39.8)	133.8 (23.5) 130 (35.8)	<0.001	BL>15**15>60** BL>30*** BL>60***
Between groups	P^a	0.006[c]	0.033	0.222	0.215		
DBP	High Fowler's	81.8 (17.1) 81 (22.3)	75.6 (17.2) 74.5 (20.3)	73 (16.4) 72.5 (26.3)	71.9 (14) 68 (24.3)	<0.001[d]	BL>15** BL>30** BL>60**
	Sitting	90.8 (20.3) 93 (32.8)	85.2 (15.5) 87 (26.8)	81.9 (15.8) 80.5 (19.8)	79.9 (13.7) 79 (23.8)	0.001[d]	BL>30* BL>60**
Between groups	P^a	0.044[c]	0.013[c]	0.020[c]	0.016[c]		
VAS	High Fowler's	7.4 (1.7) 7.5 (2)	5.7 (1.6) 6 (2)	4.4 (1.8) 4 (2.3)	3.1 (2) 3 (3.3)	<0.001	BL>15**15>60*** BL>30***15>30** BL>60*** 30>60**
	Sitting	8.3 (1.2) 9 (1)	4.6 (1.9) 4 (3)	2.9 (1.6) 2 (2)	1.6 (1.5) 1 (1)	<0.001	BL>15**15>60*** BL>30***15>30** BL>60***30>60**
Between groups	P^a	0.010	0.007	0.001	<0.001		

Variables are presented as mean (SD) (first row) and median (IQR) (Second row); a: Comparison between Upright and Sitting groups (Mann Whitney-U test); b: Comparison between Baseline (BL); 15-, 30- and 60-min groups (Friedman test); c: Student t test; d: Repeated measure ANOVA; Post-hoc analysis with Bonferroni correction; *: $P<0.10$; **: $P<0.05$; ***: $P<0.001$. HR: Heart rate; RR: Respiratory Rate; SpO_2: oxygen saturation; SBP: Systolic Blood Pressure DBP: Diastolic Blood Pressure VAS: Visual Analog Scale

Table 3: Comparing patient positions in terms of changes in vital signs and VAS scores according to time intervals

	Time interval	High Fowler's	Sitting	*P*-value
HR	Baseline- 15 min	1 (14.3)	2 (11.5)	0.914
	Baseline- 30 min	7 (16.5)	1.5 (12.5)	0.020
	Baseline- 60 min	5.5 (21)	3.5 (24.8)	0.289
	15 - 30 min	2 (13.5)	-1 (12.3)	0.117
	15 - 60 min	1 (15.3)	1.5 (21.5)	0.657
	30 - 60 min	1 (12)	2.5 (13.3)	0.369
RR	Baseline- 15 min	2 (4)	2 (2)	0.117
	Baseline- 30 min	3 (5.8)	4 (4.5)	0.008
	Baseline- 60 min	4 (4)	7 (6)	0.001
	15 - 30 min	1 (4.5)	2 (2)	0.020
	15 - 60 min	2 (4)	4 (2.8)	0.006
	30 - 60 min	1 (4)	2 (1.8)	0.359
SpO_2	Baseline- 15 min	-2 (6.5)	-1.5 (5.8)	0.704
	Baseline- 30 min	-3 (11)	-2.5 (5.8)	0.996
	Baseline- 60 min	-4 (11)	-2.5 (7)	0.584
	15 - 30 min	-1 (4)	0 (3)	0.723
	15 - 60 min	-1.5 (5)	-1 (4)	0.794
	30 - 60 min	-1 (3)	-0.5 (2)	0.750
SBP	Baseline- 15 min	5 (18.8)	10 (23.8)	0.147
	Baseline- 30 min	10.8 (16.3)	20.4 (24.1)	0.047
	Baseline- 60 min	12.4 (19.7)	22.9 (23.4)	0.040
	15 - 30 min	3.2 (11)	8.8 (15.5)	0.081
	15 - 60 min	2 (20.3)	9 (20.8)	0.101
	30 - 60 min	1.7 (8.6)	2.5 (15.6)	0.783
DBP	Baseline - 15 min	6.3 (11.9)	5.6 (16.4)	0.826
	Baseline- 30 min	8 (16.8)	11.5 (26.5)	0.729
	Baseline- 60 min	9.9 (14.3)	10.9 (18.4)	0.801
	15 - 30 min	1 (12.8)	2 (20.3)	0.808
	15 - 60 min	3.6 (12.7)	5.3 (16)	0.613
	30 - 60 min	3.5 (12.3)	0.5 (12)	0.615
VAS	Baseline- 15 min	2 (1.3)	4 (2.8)	<0.001
	Baseline- 30 min	3 (2.3)	6 (3)	<0.001
	Baseline- 60 min	4 (3)	7 (2)	<0.001
	15 - 30 min	1 (1)	2 (1)	0.121
	15 - 60 min	3 (2.3)	3 (2)	0.416
	30 - 60 min	1 (1)	1 (1)	0.846

SD: Standard deviation; IQR: Interquartile range; HR: Heart rate; RR: Respiratory Rate; SpO_2: oxygen saturation; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure VAS: Visual Analog Scale; Numerical variables are presented as mean (SD), or median (IQR).

Changes in ABG values were compared between the high Fowler's and sitting groups for all specified time intervals (Table 4). No significant difference was found between the high Fowler's and sitting groups in terms of the difference in lactate levels. pH differences between baseline values, and 30 and 60 minutes were significantly higher at the sitting position (BL-30: P=0.002, BL-60: P=0.003). O_2 differences were higher in the sitting group at 30-60 minutes (P=0.003). CO_2 values dropped more profoundly from baseline at the 30th and 60th minutes in the sitting group (BL-30: P=0.024, BL-60: P=0.012). SpO2 values were markedly higher at the 60th minute compared to baseline in the sitting group (P=0.012)

Table 4: Comparing patient positions in terms of differences in blood gas parameters according to time intervals

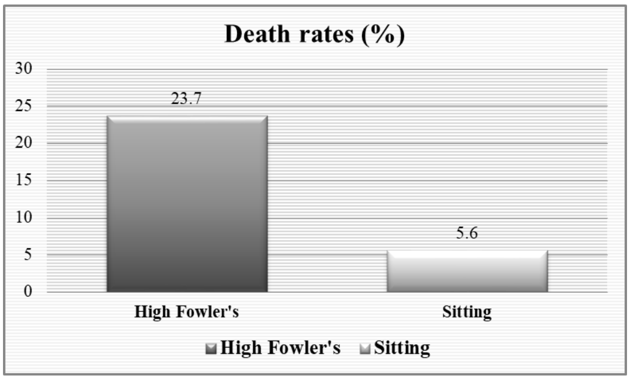
	Time interval	High Fowler's	Sitting	*P*-value
pH	Baseline- 30 min	-0.015 (0.1)	-0.045 (0.1)	0.002
	Baseline- 60 min	-0.02 (0.1)	-0.065 (0.1)	0.003
	30 - 60 min	-0.01 (0)	-0.01 (0.1)	0.597
O_2	Baseline- 30 min	-9.8 (14.4)	-8.6 (17.5)	0.991
	Baseline- 60 min	-13.1 (14.6)	-18.1 (15.7)	0.163
	30 - 60 min	-2 (6)	-5.4 (9.2)	0.003
CO_2	Baseline- 30 min	1.8 (11.7)	4.8 (4.6)	0.024
	Baseline- 60 min	2.2 (13.4)	5.2 (5.6)	0.012
	30 - 60 min	1 (5)	1.1 (5.4)	0.824
Lactate	Baseline- 30 min	0.5 (0.8)	0.7 (0.6)	0.398
	Baseline- 60 min	0.9 (1.3)	1 (0.6)	0.523
	30 - 60 min	0.5 (0.8)	0.5 (0.5)	0.700
$ASpO_2$	Baseline- 30 min	-2.6 (5.1)	-4.5 (6.2)	0.143
	Baseline- 60 min	-2 (5.8)	-4.8 (8.4)	0.012
	30 - 60 min	-0.5 (2.8)	-1.1 (5)	0.112

$ASpO_2$: SpO_2 value in arterial blood gas. The values are presented as median (IQR).

Echocardiography was performed in all patients within the first hour. No significant difference was found between the groups regarding EF values measured with echo (P=0.243).

The rate of mortality was significantly higher in the high Fowler's (23.7%) group than in the sitting (5.6%) group (P=0.028) (Figure 1).

Figure 1: Mortality rates of the high Fowler's position and sitting position



Discussion

Literature review showed that the effect of patient position on the perception of dyspnea, which is the most common cause of presentation to the ED in heart failure, has not been studied. This study will contribute to finding the best approach for providing comfort to CHF patients diagnosed with dyspnea and reducing the density in emergency services. We found that dyspnea was affected by patient position. According to the VAS score, when the patients self-assessed dyspnea, a significantly more effective decrease was observed in the sitting position compared to the high Fowler's position.

Classification of patients' dyspnea complaints may play an essential role in evaluating the patient, planning interventions, and predicting the prognosis. Previous studies have shown that VAS better captures the changes in dyspnea over time compared to other scales and that positioning the patient during measurement (sitting upright vs. supine) affects the reactions [5, 10]. Therefore, we preferred VAS in our study because it is used more widely, and its validity and reliability have been proven in many studies [3, 11].

Timing of dyspnea measurement is essential. It would be ideal to measure dyspnea at its peak to calculate the greatest difference from the worst dyspneic status. Although most patients present with dyspnea, they recover with standard treatment. Thus, measurement delay can affect the patient selection and limit the opportunity to demonstrate new treatments' effectiveness [5]. Patients included in the studies are usually evaluated and reported within the first hour.

Being in an upright or semi-sitting position reduces venous return and is beneficial in patients with heart failure [12]. Studies evaluating the effect of body position on pulmonary function have found that pulmonary function improved both in healthy subjects and patients with pulmonary disease, cardiac disease, neuromuscular diseases, and obesity with a more upright posture [13]. Recumbent positions induce an increase in airway resistance and possibly large airways, limiting expiratory volumes and flow [14, 15].

We investigated the effect of patient position on dyspnea perception and vital signs. SBP, RR and VAS significantly decreased in the sitting group in the first 15 minutes, while HR, RR, and SBP significantly reduced in the upright group at 30 minutes. This result indicates that the sitting group responds to treatment faster in terms of vital signs. However, VAS significantly decreased in both groups at 15 minutes, suggesting no significant difference between both groups in terms of dyspnea perception at 15 minutes, although the VAS score was significantly lower in the sitting group at the end of the 60th minute.

Studies showing the relationships between patient relief following dyspnea treatment, mortality rate, or hospitalization due to heart failure have reported mortality rates between 5-15% [16, 17]. Our study's mortality rate was 23.7% in the high Fowler's position and 5.6% in the sitting group. The mortality rate was significantly higher in the high Fowler's group, and accordingly, it can be said that patient position affected mortality.

Dyspnea develops not because of a single pathophysiological mechanism but after disruption in numerous systems. Both cardiac and pulmonary reasons are prominent in the etiology in about one-third of patients presenting to the ED with the complaint of dyspnea. In our study, 22 patients had hypertension, 17 patients had chronic obstructive pulmonary disease, and 26 had coronary artery disease, in line with the literature.

Studies have shown that vital hemodynamic parameters and cardiac output may change depending on the body position in CHF patients [18]. In a study by Vitacca et al. [19], it was observed that HR did not increase, while cardiac index and left atrium pressure decreased in the supine position. In our study, HR significantly decreased in the high Fowler's position at 30 minutes. This may be due to different patient positions.

Studies about vasodilators have shown that a rapid drop can be provided in cardiac filling pressure between the right-left sides in CHF, resulting in dyspnea relief [20, 21]. When the patient is in the sitting position, the blood will be pooled in the periphery, resulting in a decrease in cardiac filling pressure and dyspnea relief.

Limitations

The first limitation of the study was its single centered design. Second, the patient's body positions were not evaluated when the stretcher head was at different angles.

Conclusion

We concluded that in the acute treatment of CHF patients who presented with dyspnea, the patient's body position plays an essential role in hemodynamics, mortality, and the patient's perception of shortness of breath. The perception of shortness of breath in the sitting position disappears significantly earlier, and the mortality rate in these patients is lower. In CHF patients' acute management, choosing the patient position, especially the sitting position, will contribute positively to patient comfort.

References

1. Gheorghiade M, Filippatos G, De Luca L, Burnett J. Congestion in acute heart failure syndromes: an essential target of evaluation and treatment. Am J Med. 2006;119:3-10. doi: 10.1016/j.amjmed.2006.09.011.
2. Yancy CW, Jessup M, Bozkurt B, Butler J, Donald EC, Mark H, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on practice guidelines. Circulation. 2013:15;128(16):e240-327. doi: 10.1161/CIR.0b013e31829e8776. Epub 2013 Jun 5
3. West RL, Hernandez AF, O'Connor CM, Starling RC, Califf RM. A review of dyspnea in acute heart failure syndromes. Am Heart J. 2010;160:209-14. doi: 10.1016/ j.ahj.2010.05.020.
4. Placido R, Gigaud C, Gayat E, Ferryd A, SOLAL AC, Plaisance P, et al. Assessment of dyspnoea in the emergency department by numeric and visual scales: a pilot study. Anaesth Crit Care Pain Med. 2015;34:95-9. doi: 10.1016/j.accpm.2014.09.001. Epub 2015 Apr 7.
5. Pang PS, Cleland JG, Teerlink JR, Cleland JGF, Teerlink JR, Collins SP, et al. A proposal to standardize dyspnoea measurement in clinical trials of acute heart failure syndromes: the need for a uniform approach. Eur Heart J. 2008;29:816-24. doi: 10.1093/eurheartj/ehn048. Epub 2008 Mar 1.
6. Mebazaa A, Pang PS, Tavares M, Collins SP, Alan B. Storrow AB, et al. The impact of early standard therapy on dyspnoea in patients with acute heart failure: the URGENT-dyspnoea study. Eur Heart J. 2010;31:832-41. doi: 10.1093/eurheartj/ehp 458. Epub 2009 Nov 11.
7. Cleland JG, Coletta A, Witte K. Practical applications of intravenous diuretic therapy in decompensated heart failure. Am J Med. 2006;119:26-36.doi: 10.1016/j.amjmed. 2006.09.014.
8. Gheorghiade M, Follath F, Ponikowski P, Barsuk JH, Blair JEA, Cleland JG, et al. Assessing and grading congestion in acute heart failure: a scientific statement from the acute heart failure committee of the heart failure association of the European Society of Cardiology and endorsed by the European Society of Intensive Care Medicine. Eur J Heart Fail. 2010;12(5):423-33. doi: 10.1093/eurjhf/hfq045. Epub 2010 Mar 30.
9. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JGF, Coats AJS, et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. Eur Heart J. 2016;37(27):2129-2200. doi: 10.1093/eurheartj/ehw128. Epub 2016 May 20.
10. Allen LA, Metra M, Milo-Cotter O, Filippatos G, Reisin LH, Bensimhon DR, et al. Improvements in signs and symptoms during hospitalization for acute heart failure follow different patterns and depend on the measurement scales used: an international, prospective registry to evaluate the evolution of measures of disease severity in acute heart failure (MEASURE-AHF). J Card Fail. 2008;14:777-84. doi: 10.1016/j.cardfail. 2008.07.188. Epub 2008 Aug 15.
11. Yürüktümen A, Karcıoğlu Ö, Topacoğlu H, Akarca FK. Dispne ile başvuran geriyatrik olgularda yakınma şiddeti ile klinik ve laboratuvar verilerinin değerlendirilmesi. Turk J Emerg Med. 2009;9(4):163-8.
12. Martin-Du P, Benoit R, Girardier L. The role of body position and gravity in the symptoms and treatment of various medical diseases. Swiss medical weekly. Swiss Med Wkly. 2004;134:543-51.
13. Katz S, Arish N, Rokach A, Zaltzman Y, Marcus EL. The effect of body position on pulmonary function: a systematic review. BMC Pulm Med. 2018 Oct 11;18:159. doi: 10.1186/s12890-018-0723-4.
14. Manning F, Dean E, Ross J, Abboud RT. Effects of side lying on lung function in older individuals. Phys Ther. 1999;79:456-66.
15. Melam GR, Buragadda S, Alhusaini A, Alghamdi MA, Alghamdi MS, Kaushal P. Effect of different positions on FVC and FEV1 measurements of asthmatic patients. Phys Ther Sci. 2014;26:591-3. doi: 10.1589/jpts.26.591. Epub 2014 Apr 23.
16. Mentz RJ, Mi X, Sharma PP, Qualls LG, devore AD, Johnson KW, et al. Relation of dyspnea severity on admission for acute heart failure with outcomes and costs. Am J Cardiol. 2015;115:75-81. doi: 10.1016/j.amjcard.2014.09.048. Epub 2014 Oct 15.
17. Nieminen MS, Harjola VP, Hochadel M, Drexler H, Komajda M, Brutsaert D, et al. Gender related differences in patients presenting with acute heart failure. Results from euroheart Failure Survey II. Eur J Heart Fail. 2008;10:140-8. doi: 10.1016/j.ejheart. 2007.12.012.
18. Faggiano P, D'Aloia AD, Simoni P, Gualeni A, Foglio K, Ambrosino N, et al. Effects of body position on the carbon monoxide diffusing capacity in patients with chronic heart failure: relation to hemodynamic changes. Cardiology. 1998;89:1-7. doi: 10.1159/000006735.Cardiology. 1998;89(1):1-7.
19. Vitacca M, Scalvini S, Volterrani M, Paneroni M, Giordano A, Ambrosino N. Physiological and symptom effects of changing posture from sitting to supine, and vice versa, in stable chronic heart failure. Acta Cardiol. 2016;71:543-548. doi: 10.2143/AC.71.5.3167497.
20. Harada K, Yamamoto T, Okumura T, Shigekiyo M, Terada, Okada A, et al. Intravenous nicorandil for treatment of the urgent phase acute heart failure syndromes: a randomized, controlled trial. Eur Heart J Acute Cardiovasc Care. 2017;6:329-338. doi: 10.1177/2048872616633837. Epub 2016 Feb 16
21. Solomonica A, Burger AJ, Aronson D. Hemodynamic determinants of dyspnea improvement in acute decompensated heart failure. Circulation: Circ Heart Fail. 2013;6:53-60. doi: 10.1161/cırcheartfaılure.112.970335. Epub 2012 Nov 14.

This paper has been checked for language accuracy by JOSAM editors.
The National Library of Medicine (NLM) citation style guide has been used in this paper.