



Impact of proportional pulse pressure in cardiac failure patients in a tertiary hospital

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Abstract:

Introduction: Proportional Pulse Pressure (PPP) is a critical risk marker in cardiovascular failure. PPP is a basic, cheap and effectively quantifiable clinical record. This painless test gives valuable prognostic data to patients with cardiovascular failure with decreased ejection fraction (EF) especially in those with an EF < 30% where lower corresponding heartbeat pressure freely predicts mortality.

Methods: An imminent observational study including 150 patients with diminished ejection fraction was done. Detail history, clinical assessment and factors like pulse pressure, PPP were assessed and related with ejection fraction.

Results: The mean age of the patients was 59.86 years and most of the study members (61.03%) were somewhere in the range of 45 and 65 years old. The most well-known etiology of heart failure (HF) was coronary illness in this review (74%). PPP showed critical relationship with ejection fraction. The explicitness for identifying HF was something else for PPP and systolic blood pressure (95 % each).

Conclusion: PPP might assist with distinguishing HF patients who present with low cardiovascular output, low EF and poor prognosis. Our ongoing perceptions build up the significance of clinically based abilities that should not be forgotten while overseeing HF.

Keywords: Proportional Pulse Pressure (PPP), Ejection fraction (EF), Heart Failure (HF), Systolic Blood Pressure (SBP), Cardiovascular

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Introduction

In emerging countries, heart failure (HF) is becoming a big issue. Despite advancements in HF treatment, morbidity and death remain extremely high. According to the American Heart Association/American College of Cardiology guidelines, HF is "a complex clinical syndrome that can result from any structural or functional cardiac disorder that impairs the ventricle's ability to fill or eject blood." [1] As a result, the recommendations say that the illness is primarily a clinical diagnosis based on a thorough history and physical examination. Blood pressure pulsatile components capture factors of cardiac risk that steady components do not. [2],[3],[4] The former, commonly measured as pulse pressure (PP), is known to be a significant risk factor for cardiovascular illness, including myocardial infarction, stroke, and cardiovascular mortality. [5] PP and proportional PP (PPP) have been reported to be independently and strongly linked with reduced cardiac output in individuals with advanced HF among clinically relevant physical symptoms in HF. [6] PPP assessment is a noninvasive method for diagnosing and prognosing HF, and it has been demonstrated in previous studies to correlate well with cardiac index. [7] The purpose of this study was to determine the relationship between PPP and ejection fraction (EF) in HF patients.

Materials and Methods:

After receiving approval from the institutional ethics committee, the study was conducted out as a prospective observational study at the Department of Medicine, a tertiary care facility Rohilkhand Medical College, Bareilly, India. After completing the inclusion and exclusion criteria, all patients admitted with a diagnosis of HF were eligible for enrolment in the research. Patients over the age of 18 who reported with HF symptoms and signs were eligible to participate in the trial. The study excluded patients with valvular heart disease, pericardial disease, and cor pulmonale. Prior to the start of the investigation, patients provided written informed consent. A full history was taken, followed by a thorough clinical examination and documentation of the findings.

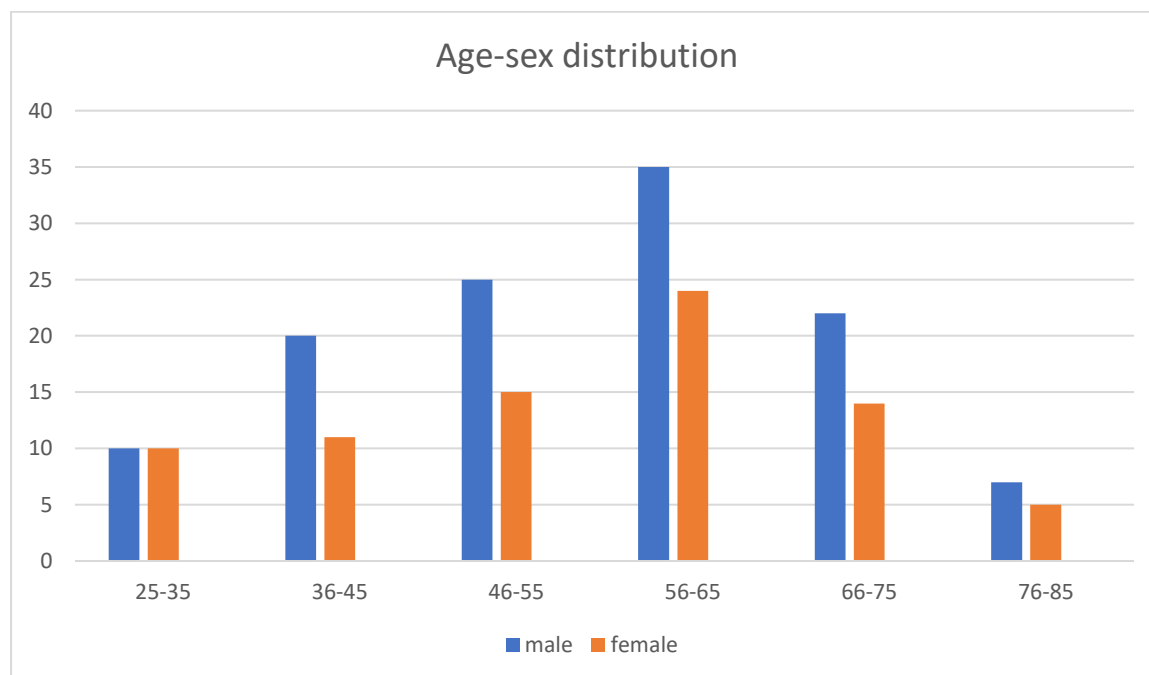
The difference between systolic and diastolic blood pressures (given in mm Hg) was used to compute PP. PPP was computed as a percentage by dividing the PP by the systolic blood pressure.[7] The echocardiographic examination was performed while the patient was at rest using an ACUSON Sequoia TM ultrasound equipment equipped with a 3.5-MHz phased array transducer. EF was estimated after doing 2D, M mode, and colour Doppler experiments.

Descriptive statistics for quantitative data are reported as N, mean, and standard deviation. For qualitative data, the frequency count, N, and percentage were tabulated. Appropriate statistical tests, including correlation analysis, were used to determine the relationship between parameters. P 0.5 was regarded as statistically significant. All statistical analyses were carried out using SPSS 23.0 version for Windows.

Results:

The study included 160 patients with heart failure. [Figure 1] depicts the age-sex distribution of the patients. The patients' mean age was 59.86 years, and the majority of study participants (61.03%) were between the ages of 45 and 65. Males outnumbered females (64%).

Figure 1: Age-sex distribution of the patients



[Table 1] shows the baseline characteristics of the study participants. In this investigation, coronary heart disease was the most common cause of HF (74%).

Table 1: Baseline characteristics of the study participants.

CHARACTER	EF < or = 30	EF = 31-40	P-VALUE
Pulse rate	82.31	89.74	0.276
SBP	97.99	120.98	0.001
DBP	75.01	86.13	0.001
QRS widening	52/76	34/76	0.001

The mean PP and PPP for patients with EF 30% were 26.62 mm Hg and 24.86%, respectively, whereas the corresponding values for patients with EF 31%-40% were 34.98 mm Hg and 30.98 %, respectively. The difference between PP means was 10.08 mm Hg (95% CI 8.70-12.71, P 0.0001), and the difference between PPP means was 5.04% (95% CI 3.65-5.69, P 0.0001). Regression analysis revealed a linear relationship between PPP and EF ($r = 0.667$, P 0.001).

Discussion:

HF is still a common diagnosis for people who complain of shortness of breath when exerted. Patients with HF require recurring admissions because to their low quality of life. A complete clinical history, careful clinical examination, and echocardiographic data are frequently used to diagnosis HF. In the current Indian context, most patients from lower socioeconomic backgrounds may not be able to afford to have an echocardiographic examination done on a regular basis. In such cases, low-cost clinical assessments like PP and PPP, which correlate to observed EF, may aid in clinical decision making.

The majority of patients in this study were above the age of 55, which matched the findings of Petrie et al.[8] In this study, the male-female ratio was around 3:2, which differed from prior investigations that found no sex-related differences.[Image 1] In this study, over 80% of patients had NYHA classes 3 and 4. In our analysis, 74% of patients had related coronary artery disease, which was consistent with the findings of Lee et al., who discovered that in industrialised nations, coronary artery disease has become the most common cause, accounting for 60%-75% of patients with HF.[9] In this study, patients with a lower EF had lower systolic and diastolic blood pressures, and this difference was statistically significant. The PPP and EF were shown to have a statistically significant association in this study. An earlier study looked at the association between PPP and CI and discovered that it was statistically significant.[8] Another study found that PP was an accurate predictor of the cardiac index in patients with advanced cardiac dysfunction.[10] In this study, there was a statistically significant difference in the PP and PPP between individuals with an EF of 30% and those with an EF between 31 and 40%.

Low PP was found to be a predictor of unfavourable cardiovascular events in individuals with advanced HF in a research by Petrie et al.[11] PPP was discovered to be a noninvasive predictor of long-term outcome in HF patients.[12] Similarly, in a study conducted by Tokitsu et al., the PP linked positively with the LV stroke volume index in patients with maintained EF.[13]

Conclusion:

We investigated the value of clinical data (PP and PPP), which are noninvasive and easily measured even in primary care settings, for assessing patients with HF in this study. The study's findings call for further investigation of these measures so that in the future, this

information might assist clinicians in decision-making and prognosis assessment in HF patients.

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Conflicts of interest: nil.

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