Scientific Research Publishing

World Journal of Cardiovascular Surgery, 2023, 13, 11-25
https://www.scirp.org/journal/wjcs
ISSN Online: 2164-3210
ISSN Print: 2164-3202

Performance of the Peguero-Lo Presti Index in Diagnosis of Left Ventricular Hypertrophy at CIMAK Hospital Center in North Kivu, Democratic Republic of the Congo

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How to cite this paper: Mukoso, F.N., Nkodila, A.N., Muhemed, T.-S.M., Kashinde, T.M., Ananas, S.J., Myatsi, S.N., Gakuru, A.N., Muratwa, O.G., Kamuanga, Z.T., Lubenga, Y., Kianu, B.P., Longo-Mbenza, B. and Tsongo, Z.K. (2023) Performance of the Peguero-Lo Presti Index in Diagnosis of Left Ventricular Hypertrophy at CIMAK Hospital Center in North Kivu, Democratic Republic of the Congo. *World Journal of Cardiovascular Surgery*, **13**, 11-25.
https://doi.org/10.4236/wjcs.2023.132002

Received: December 30, 2022
Accepted: February 25, 2023
Published: February 28, 2023

Abstract

Background and Objective: Despite the costs generated in the diagnosis of cardiac pathologies by the use of ultrasound, the ECG indices have demonstrated a high performance in the studies of developed countries in the diagnosis of these pathologies, but the data of these in sub-Saharan Africa are limited. The objective of this study is to evaluate the performance of the Peguero-Lo Presti index in the diagnosis of LVH among Congolese in order to make it a means of LVH diagnosis in an under-equipped environment. **Methods:** Cross-sectional and analytical study including 413 patients followed and hospitalized at the CIMAK Hospital Center during the period from February 2019 to June 2021. Sociodemographic parameters, history, biology, ultrasound and ECG parameters were studied. The performance of the Peguero-Lo Presti Index was validated by the Youden Index reinforced by the Area under the ROC curve. **Results:** Of the 413 patients admitted to the study, 69.5% were men versus 30.5% women, *i.e.* a sex ratio of 2M/1F; the mean age of the patients was 51.1 ± 11.6 years. The frequency of LVH found by echocardiography was 55.9%, it was 50.8% using the Peguero-Lo Presti index, 22%

and 10.2% using the Peguero-Lo Presti index, respectively. Sokolow-Lyon and Cornell ($p < 0.001$). The Peguero-Lo Presti curve is higher than the Sokolow-Lyon and Cornell curves. The area under the curve was 0.80 for Peguero-Lo Presti, 0.73 for Sokolow-Lyon and 0.66 for cornell. **Conclusion:** The newly proposed Peguero-Lo Presti index provides high sensitivity and specificity for the diagnosis of LVH in black Africans as also reported in the European and American population.

Keywords

Performance, Peguero-Lo Presti, ECG, Sokolow-Lyon, Cornell, DRC

1. Introduction

Left ventricular hypertrophy (LVH) is considered an independent predictor of cardiovascular events [1] [2]. Arterial hypertension (HTA) and LVH diagnosed incidentally have been shown to be associated with cardiovascular morbidity and mortality [3] [4] [5]. It is therefore necessary to diagnose LVH by in-depth examinations and to treat it within a reasonable time.

Echocardiography is considered to be a central cardiac medical imaging examination allowing accurate diagnosis of LVH [6]. However, the electrocardiogram (ECG) is also an important method for making a diagnosis of LVH. It is a non-invasive method, easy to use, available in developing countries and gives a good prognosis widely approved in the literature. Several ECG indices such as the Sokolow and Cornell index have made it possible to diagnose LVH. However, these indices have many clinical limitations due to their low sensitivity. Also, the sensitivity of these indices varies according to the etiologies of LVH [7] [8].

Therefore, a new index was finally developed to reduce the false negative rate. Peguero *et al.* [9] proposed this new index using the ECG, the Peguero-Lo Presti index, which demonstrated better sensitivity than Sokolow and Cornell in screening for LVH in hypertensive patients [10].

Several studies in developed countries have already approved the superiority of the Peguéro-Lo Presti index in LVH screening compared to Sokolow and Cornell [11] [12] [13] but in the Democratic Republic of Congo, this index has not yet been the subject of any study. Thus this study wants to test the performance of the Peguero-Lo Presti index in the diagnosis of LVH among Congolese in order to make it a means of LVH diagnosis in an under-equipped environment.

2. Patients and Methods

2.1. Design and Population of Study

This study included patients hospitalized and followed on an outpatient basis at CIMAK Hospital in Cardiology during the period from February 2019 to June

2021. Transthoracic echocardiography was used as a tool to make the diagnosis of LVH according to the guidelines of ESC [6]. The echocardiography was performed by an expert echocardiographer who did not know the clinical parameters of the patients he was performing the ultrasound.

2.2. Sampling of Participants

A simple random sampling was carried out from the exhaustive lists of ultrasound scans performed at CIMAK. A telephone appointment was made with the patients who performed the ultrasounds, to whom the objectives of the study and its progress were explained and their informed consent was requested. Volunteers were invited to participate in the study at a set date and time.

2.3. Inclusion Criteria

The inclusion criteria used were as follows:

- be 18 years of age or older, regardless of level of study (undergraduate, graduate or postgraduate);
- be asymptomatic;
- have carried out the ECG and echocardiography simultaneously;
- have agreed to participate in the study, after free and informed consent in accordance with the recommendations of Helsinki III.

2.4. Non-Inclusion Criteria

Exclusion criteria included age < 18 years, history of infarction, ECG or echocardiography indicating myocardial infarction, ventricular paced rhythm, atrioventricular block, bundle branch block, ventricular arrhythmias, Wolff-Parkinson syndrome-White, hypertension or another type of structural heart disease that could cause LVH. Subjects with incomplete data, poor quality echocardiogram or ECG were also excluded.

2.5. Data Collection

Data collection was carried out using a questionnaire adapted to European studies [11] [12] [13].

Demographic data, cardiovascular risk factors, history and antihypertensive treatment were collected from patient chart archives.

The measurement of anthropometric parameters was carried out by trained interns:

- the weighing for the measurement of body weight was carried out in kilograms using a validated electronic scale. The scale was balanced on a stable, flat surface. The participant was lightly dressed and barefoot. The reading was made to the nearest 100 g;
- height was measured using a measuring rod, to the nearest centimeter, in a standing participant, barefoot and bareheaded;
- the waist circumference was measured, to the nearest 0.1 cm, using a tape

measure applied directly to the skin along the horizontal line passing through the umbilicus;

- the hip circumference was measured under the same conditions, with the tape passing through the widest part of the pelvis, at the height of the greater trochanters;
- BP was measured non-invasively, using an OMROM M6 tensiometer. The cuff was on the left arm, at heart level. Measurements were made with a participant seated and relaxed for at least 5 minutes. The average of three consecutive measurements separated by three minutes apart was retained;

Echocardiographic evaluation was performed with a CHISON CBit 8 type ultrasound scanner (Chison Medical Tecnologies Co., Ltd. China 214142) equipped with a 3.5 MHz probe, following the updated recommendations of the American Society of Echocardiography and the European Association of Cardiovascular Imaging [14]. The different images were recorded for later validation by a team of 2 experienced doctors with diplomas in cardiovascular ultrasound.

Interventricular septum (SIV) thickness, left ventricular posterior wall thickness (PPd), and left ventricular diameter (DTD) were assessed on a long-axis parasternal view at a level just below the valve leaflets. mitral, end-diastolic and leading edge to leading edge. A simultaneous ECG was performed to correlate the left ventricular measurements with the cardiac cycle. MVG was calculated using the following equation: MVG (grams) = 0.8 × 1.04 × [(DTD + SIV + PPd)3 − (DTD)3] + 0.6 g, where MVG is left ventricular mass, DTD is left ventricular end diastolic diameter, SIV is interventricular septum thickness, PPd is posterior wall thickness in diastole. LVM was indexed by body surface area and height. The relative wall thickness (EPR) was calculated as: (2 × PPd)/DTD. E (peak E-wave velocity) and A (peak A-wave velocity) and E-wave deceleration time (TDE) were recorded in apical four-chamber view with color flow imaging to optimal alignment of pulsed Doppler with blood flow. The pulsed Doppler sample volume (axial size 1 - 3 mm) was placed between the tips of the mitral leaflets using a low frequency filter setting (100 - 200 MHz) and low signal gain so that the shapes optimal spectral waveforms do not show interference. For these different measurements, the average of five consecutive cardiac cycles was recorded. The ECG was performed with a Cardionic DT80 type electrocardiograph, the patient was at rest, lying on an examination table undressed, lying in the supine position, eyes sometimes closed. The electrodes are placed on bare skin. The parameters were RV5, RV6, SV1, SV2, SV3, SV4, SV5, RaVL, SL3 and SD.

- The Sokolow-Lyon index was calculated by: SV1 + RV6 or RV5 [10]
- The Cornell index was calculated by: SV3 + RaVL
- The Peguero-Lo Presti index was calculated by: SD + SV4

LVH was defined according to Sokolow-Lyon when SV1 + RV6 or RV5 ≥ 35 mm; for Cornell SV3 + RaVL ≥ 28 mm in men and SV3 + RaVL ≥ 20 mm in women, on the other hand the Peguero-Lo Presti index defines LVH as SD+ SV4 ≥ 23 mm in women and SD + SV4 ≥ 28 mm in humans [10] (**Figure 1**).

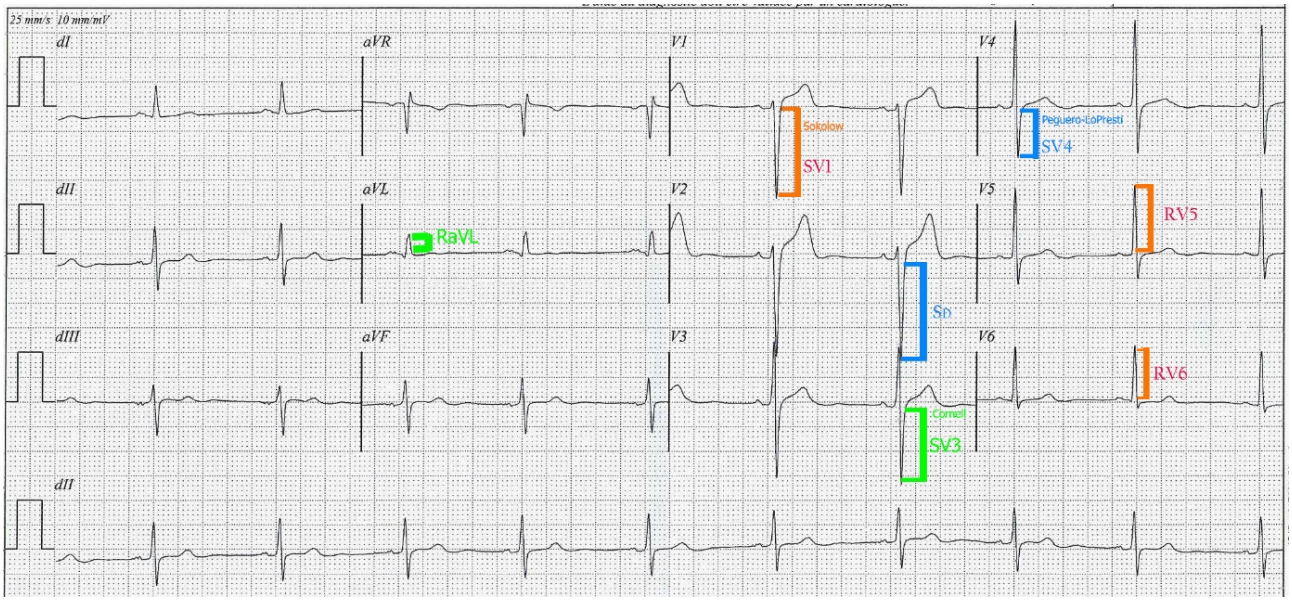

Figure 1. Illustration of index calculation: Peguero-Lo Presti, Cornell and Sokolow.

2.6. Statistical Analyzes

After encoding and validation, the data were entered into a computer using Epi-InfoTM software, version 7.1.2.0. Continuous variables were expressed as means ± standard deviation, median (SDQ) and categorical variables as percentages. The normality of the distribution of continuous variables was tested by the Kolmogorov-Smirnov test. The comparison of the means in independent samples was carried out using the Student's t test for the normally distributed variables and that of the medians was carried out by the Man Whitney U test for the non-Gaussian data. To compare the proportions, the chi-square test or Fisher's exact test was used. Logistic regression was used to find the determinants of LVH, with calculation of the OR and their confidence intervals to estimate the degree of association. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) was used to detect the diagnostic performance of the ECG indices. Performance between ECG indices was assessed by the Youden index. The ROC curve was used to evaluate the best values of the ECG indices. Area under the ROC curve (AUC) was used to determine ECG indices as a measure of overall diagnostic performance. All analyzes were performed with SPSS for Windows software version 25. A p-value < 0.05 was considered statistically significant.

2.7. Ethical Considerations

The data were collected anonymously and confidentially. The privacy and confidentiality of the respondents were safeguarded. The three fundamental principles of ethics were respected at the time of the study, namely: the principle of respect for the person, that of beneficence, and that of justice. The protocol for this research study was conducted in accordance with the Declaration of Helsin-

ki and approved by the Ethics committee of the University of Goma (UNIGOM/CEM/09/2022).

3. Results

3.1. General Characteristics According to Gender

The characteristics of the study population are illustrated in Table 1. It shows that of the 413 patients admitted to the study, 69.5% were men versus 30.5% women, *i.e.* a sex ratio of 2M/1F; the mean age of the patients was 51.1 ± 11.6 years. By comparing the men to the women, we note that the men had a significantly high average HR, a frequency of heart failure, dyslipidemia, atrial fibrillation, VTE, the use of BB and ARB II high than the women ($p < 0.05$). On the other hand, women had a significantly higher mean BMI than men ($p = 0.012$) (Table 1).

3.2. Biological, Ultrasound and ECG Characteristics

This table indicates that the biological, ultrasound and ECG variables were comparable with statistically significant differences between men and women except for LDL-c, ProBNP, QTc, TDE, E/A and Cornell index where this difference was not remarkable (Table 2).

Table 1. General characteristics according to gender.

Variable	Overall n = 413	Male n = 287	Female n = 126	p
Age, years	51.1 ± 11.6	51.0 ± 11.5	51.1 ± 12.0	0.996
BMI, Kg/m^2	28.4 ± 4.3	28.3 ± 4.1	28.6 ± 4.8	0.522
SBP, mmHg	131.0 ± 18.3	132.5 ± 17.6	127.6 ± 19.4	0.012
DBP, mmHg	79.1 ± 14.8	79.8 ± 14.4	77.4 ± 15.6	0.131
MBP, mmHg	96.4 ± 14.6	97.4 ± 13.8	94.1 ± 16.2	0.039
PP, mmHg	52.0 ± 14.1	52.7 ± 15.4	50.2 ± 10.4	0.096
HR, cbm	79.9 ± 20.2	81.6 ± 21.9	76.3 ± 15.4	0.014
HTA, n (%)	378 (91.5)	266 (92.7)	112 (88.9)	0.140
DM, n (%)	42 (10.2)	35 (12.2)	7 (5.6)	0.026
Heart failure, n (%)	133 (32.2)	112 (39.0)	21 (16.7)	<0.001
Dyslipidemia, n (%)	147 (35.6)	112 (39.0)	35 (27.8)	0.018
Atrial fibrillation, n (%)	28 (6.8)	28 (9.8)	0 (0.0)	<0.001
Venous thromboembolic disease, n (%)	21 (5.1)	21 (7.3)	0 (0.0)	<0.001
BB, n (%)	147 (35.6)	119 (41.5)	28 (22.2)	<0.001
ARA II, n (%)	287 (69.5)	210 (73.2)	77 (61.1)	0.001
Calcium blocker, n (%)	245 (59.3)	175 (61.0)	70 (55.6)	0.178

Table 2. Biological, ultrasound and ECG characteristics according to gender.

Variable	Overall n = 413	Male n = 287	Female n = 126	p
CT, mg/dl	159.4 ± 44.1	156.0 ± 45.8	170.5 ± 36.2	0.045
LDL-c, mg/dl	91.5 ± 38.2	90.7 ± 36.1	93.6 ± 44.1	0.631
TG, mg/dl	81.9 (75.5 - 95.0)	78.7 (75.5 - 81.9)	95.0 (92.0 - 96.3)	0.028
HDL-c, mg/dl	45.6 (43.6 - 51.3)	44.6 (43.6 - 45.6)	51.3 (50.3 - 53.3)	0.001
Creatinine, mg/dl	1.0 (0.62 - 1.1)	1.05 (1.0 - 1.10)	0.62 (0.41 - 0.68)	<0.001
Troponin, pg/ml	1.5 (0.01 - 9.9)	5.7 (1.5 - 9.9)	0.01 (0.001 - 0.03)	0.003
ProBNP, pg/ml	59.0 (38.0 - 100.0)	64.0 (28.0 - 100.0)	59.0 (38.0 - 436.0)	0.610
QTc	425.4 ± 63.0	425.3 ± 73.7	425.7 ± 25.4	0.953
SIV	11.3 ± 3.0	12.1 ± 3.0	9.4 ± 1.9	<0.001
PP	11.2 ± 2.3	11.7 ± 2.4	9.9 ± 1.5	<0.001
FEVG	63.8 ± 19.3	62.4 ± 18.3	67.1 ± 21.0	0.023
MVGIsc	116.9 ± 43.4	127.6 ± 41.9	92.3 ± 36.4	<0.001
DTD	48.4 ± 9.6	49.5 ± 10.3	45.8 ± 7.3	<0.001
EPR	0.5 ± 0.1	0.5 ± 0.1	0.4 ± 0.1	<0.001
E/Ea	5.1 (5.0 - 6.0)	6.0 (5.0 - 6.6)	4.8 (4.0 - 5.0)	0.003
TDE	150.8 ± 51.3	151.4 ± 51.9	149.4 ± 50.0	0.720
SOG	18.4 ± 7.2	19.0 ± 7.7	16.9 ± 5.5	0.006
DTOD	15.5 ± 4.5	16.2 ± 4.9	13.7 ± 2.9	<0.001
PAPS	13.0 (10.0 - 13.0)	13.0 (10.0 - 14.0)	10.0 (8.0 - 15.0)	0.040
E/A	1.01 (0.94 - 1.08)	1.05 (0.92 - 1.08	0.96 (0.94 - 1.17)	0.055
Peguero-Lo Presti	26.0 (23.0 - 28.0)	28.0 (27.0 - 29.0)	19.0 (18.0 - 20.0)	<0.001
Sokolow-Lyon	26.0 (23.0 - 27.0)	28.0 (26.0 - 30.0)	22.5 (20.0 - 24.0)	0.028
Cornell-Voltage	15.0 (15.0 - 16.0)	15.0 (14.0 - 18.0)	15.0 (11.0 - 16.0)	0.063

3.3. Frequency of LVH on Echocardiography in the Study Population

3.3.1. Overall Frequency of LVH and by Gender

The frequency of LVH found by echocardiography was 55.9% in all patients included in the study, it was significantly higher in men 65.9% against 33.3% in women ($p < 0.001$) (**Figure 2**).

This figure shows that the frequency of LVH was 50.8% for Peguero-L Presti, 22% for Sokolow Lyon Voltage and 10.2% for Cornell voltage. This fréquence was significantly higher using the Peguero-Lo Presti index compared to the Sokolow-Lyon and Cornell index ($p < 0.001$) (**Figure 3**).

3.3.2. General Characteristics According to LVH

In this table, it was indicated that patients with LVH had a higher average age, a

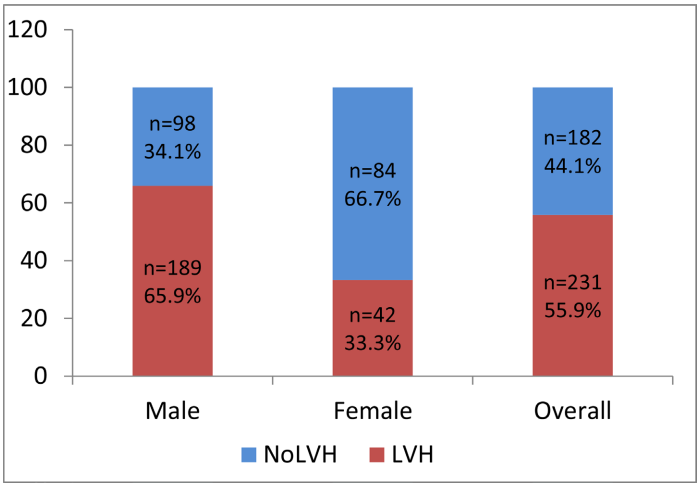

Figure 2. Frequency of LVH in the whole group and according to gender LVH frequency according to ECG index.

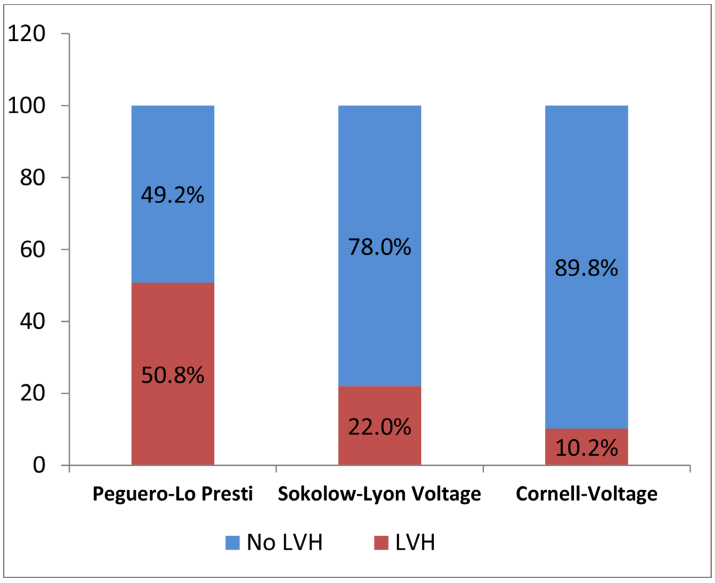

Figure 3. Different LVH frequencies according to ECG indices.

frequency of patients over 55 years old, a high frequency of diabetics, HF, dyslipidemia, obesity, a frequency high intake of BB and ARA II ($p < 0.05$). Mean or median values of BMI, HR, LDL, creatinine, proBNP and troponin were significantly higher in patients with LVH ($p < 0.05$) (**Table 3**).

3.3.3. LVH Determinants in the Study Population

By introducing alone to test the association between LVH and the independent variables, it was noticed that alone, age greater than 55 years, male gender, diabetes mellitus status, BMI ≥ 30 Kg/m^2, dyslipidemia and BB use were directly associated with LVH.

In multivariate analysis, adjusted all these significant variables in bivariate, age over 55 years, male sex, diabetes mellitus status, BMI ≥ 30 kg/m^2 and dyslipidemia were independently associated with LVH (**Table 4**).

Table 3. General characteristics of the study population according to LVH.

Variables	LVH+ n = 231	LVH− n = 182	p
Age, year	52.9 ± 12.8	48.7 ± 9.4	<0.001
Age ≥ 55 years	91 (39.4)	42 (23.1)	<0.001
HTA, n (%)	210 (90.9)	169 (92.3)	0.373
DM, n (%)	14 (6.1)	28 (15.4)	0.002
Heart failure, n (%)	119 (51.5)	14 (7.7)	<0.001
Dyslipidemia, n (%)	112 (48.5)	35 (19.2)	<0.001
Atrial fibrillation, n (%)	28 (12.1)	0 (0.0)	<0.001
Obesity, n (%)	77 (33.3)	42 (23.1)	0.014
PP ≥ 65 mmHg	28 (12.1)	14 (7.7)	0.093
Venous thromboembolic disease, n (%)	14 (6.1)	7 (3.8)	0.216
BB, n (%)	112 (48.5)	35 (19.2)	<0.001
ARA II, n (%)	182 (78.8)	105 (57.7)	<0.001
Calcium blocker, n (%)	91 (39.4)	77 (42.3)	0.309
BMI, Kg/m^2	28.9 ± 4.3	27.7 ± 4.3	0.007
SBP, mmHg	132.4 ± 20.4	129.3 ± 15.1	0.085
DBP, mmHg	79.7 ± 16.1	78.2 ± 13.0	0.319
MBP, mmHg	97.3 ± 16.5	95.2 ± 11.7	0.164
PP, mmHg	52.7 ± 13.3	51.0 ± 15.1	0.236
HR, cbm	84.0 ± 22.6	74.8 ± 15.3	<0.001
CT	154.3 ± 47.0	165.2 ± 40.0	0.074
LDL-c	124.7 (91.0 - 158.4)	77.0 (71.0 - 79.0)	0.002
TG	81.9 (79.1 - 81.9)	85.3 (43.6 - 51.3)	0.397
HDL-c	45.6 (41.6 - 46.5)	47.5 (43.6 - 51.3)	0.241
Creatinine	1.1 (0.98 - 1.21)	0.81 (0.62 - 1.0)	0.001
ProBNP	100.0 (38.0 - 716.0)	37.0 (15.0 - 59.0)	0.001
Troponin	9.9 (9.1 - 11.5)	0.76 (0.01 - 1.5)	<0.001

3.3.4. Diagnostic Performance of the Index

This table indicates that the sensitivity, specificity, positive and negative predictive values and Youden index of Peguero-Lo Presti were higher than those of Sokolow-Lyon and Cornell. Thus the Peguero-Lo Presti index has a higher performance in the diagnosis of LVH (Table 5).

This figure shows that the Peguero-Lo Presti curve is higher than the Sokolow-Lyon and Cornell curves. The area under the curve was 0.80 for Peguero-Lo Presti, 0.73 for Sokolow-Lyon and 0.66 for cornell (Figure 4).

Table 4. LVH determinants in the study population.

Variables	Univariate analysis		Multivariate analysis	
	p	Crude OR (95%CI)	p	aOR (95%CI)
Gender				
Female		1		1
Male	<0.001	3.86 (2.48 - 6.01)	<0.001	3.16 (1.36 - 11.31)
Age ≥ 55 years				
No		1		1
Yes	<0.001	2.17 (1.40 - 3.35)	<0.001	6.99 (3.67 - 13.33)
DM				
No		1		1
Yes	0.003	2.82 (1.44 - 5.53)	0.012	2.12 (1.54 - 9.98)
BMI ≥ 30 Kg/m²				
No		1		1
Yes	0.023	1.67 (1.07 - 2.59)	0.004	2.62 (1.35 - 5.08)
Dyslipidemia				
No		1		1
Yes	<0.001	3.95 (2.52 - 6.20)	<0.001	3.66 (1.86 - 7.21)
Use of BB				
No		1		1
Yes	<0.001	3.95 (2.52 - 6.20)	0.752	1.12 (0.57 - 2.21)

Table 5. Diagnostic performance of the index of the Peguero-Lo Posti, Sokolow-Lyon and Cornell indices.

Variable	AUC	Youden indix	Se	Sp	VPP	VPN
Peguero	0.80 (0.79 - 0.86)	0.70 (0.45 - 0.82)	90.9 (75.7 - 98.1)	76.9 (56.4 - 91.0)	83.3 (71.1 - 91.0)	87.0 (69.0 - 95.2)
Cornell	0.73 (0.59 - 0.83)	0.37 (0.12 - 0.49)	78.8 (61.1 - 91.0)	57.7 (36.9 - 76.6)	70.3 (59.3 - 79.3)	68.2 (50.7 - 81.7)
Sokolow	0.66 (0.53 - 0.78)	0.30 (0.11 - 0.44)	65.6 (46.8 - 81.4)	53.9 (33.4 - 73.4)	64.1 (56.1 - 77.9)	53.5 (41.2 - 66.3)

4. Discussion

LVH is an important manifestation leading to cardiovascular disease, and can significantly predict cardiovascular events [15]. It has been reported that the electrocardiogram gives diagnostic clues for LVH close to those provided by ultrasound [16]. Several ECG indices in the diagnosis of LVH have been used, the most commonly used are Sokolow-Lyon and Cornell [17]. However, these indices have a low diagnostic sensitivity of LVH. The performance of ECG in the

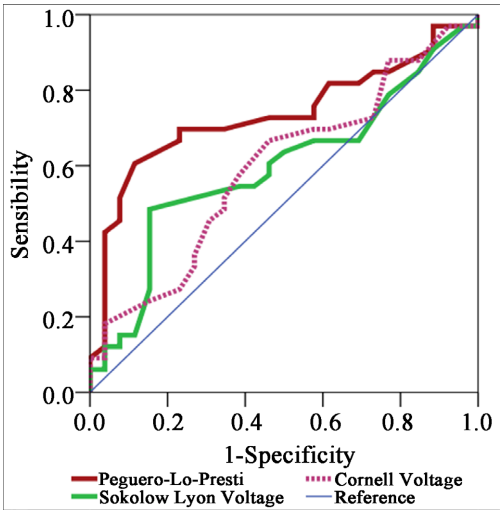

Figure 4. ROC performance curve for the Sokolow-Lyon, Cornell and Peguero-Lo Presti indices.

diagnosis of LVH is influenced by several factors. In general, the ECG uses electrical voltage to diagnose LVH, on the other hand, the electrical voltage depends on myocardium which can be affected resulting in an anomaly of electrical conduction [18]. Other factors that may also affect results are gender and race [19]. Therefore, it is particularly important to propose a new ECG index with high sensitivity that can be routinely used in clinics in under-equipped settings. The Peguero-Lo Presti index [9] has been proposed. This index is obtained by adding SD (the amplitude of the deepest S wave in any lead) to the S amplitude in V4 (SD + SV4) [9]. The authors of this index found that this improved the diagnostic sensitivity of LVH.

In our study, the frequency of LVH on cardiac ultrasound was 55.9%, it was close to that reported when using the Peguero-Lo Presti index (50.8%) but further from that reported. found when the Sokolow-Lyon voltage index (22%) and Cornell Voltage (10.2%) were used. These results were similar to those found by Tiron *et al.* who reported a high frequency of LVH using Peguero-Lo Presti, Sokolow-Lyon voltage and Cornell-Voltage [20]. The determinants of this LVH in this study were male sex, age over 55, obesity and dyslipidemia. These factors act through insinoresistance, through oxidative stress and through atherosclerosis.

As a screening test, the results of this study showed that the Peguero-Lo Presti index had the highest sensitivity (90.9%), followed by Sokolow-Lyon voltage (78.8%) and Cornell voltage (65.6%). The specificity of the Peguero-Lo Presti index was also higher than that of Sokolow-Lyon voltage and Cornell-voltage.

The ROC curve showed that the Peguero-Lo Presti index had an AUC of 0.80, indicating its good overall performance compared to Skolow-Lyon (0.73) and Cornell (0.66). The results of this study are consistent with those of Gamrat *et al.* which showed that the Peguero-Lo Presti index had improved sensitivity and specificity compared to the Sokolow-Lyon and Cornell-Voltage sensitivity (55% versus 9% at 34%) and specificity (78% versus 71% at 70%) in the diagnosis of

LVH [21]. When screening for LVH in patients with cardiovascular disease, routine use of the Peguero-Lo Presti index should be considered [22] concluded by these authors.

To improve the diagnostic accuracy of the Peguero-Lo Presti index, the area under the curve and the maximum Youden index were also calculated, this showed that the Peguero-Lo Presti index had values of the area under the ROC curve and higher Youden index than Sokolow-Lyon and Cornell-Voltage. These data are consistent with data reported by several Western studies [23] [24].

Although the results of this study suggest that the Peguero-Lo Presti index may be an appropriate LVH screening tool for cardiac patients, a larger population and additional adjustments may be required, including taking into account extra-cardiac factors such as race and sex [25].

5. Conclusion

The newly proposed Peguero-Lo Presti index provides high sensitivity and specificity for the diagnosis of LVH in black Africans as also reported in the European and American population. Hence, its use is routinely recommended in all Cardiology Departments of African hospitals in general and Congolese in particular.

Acknowledgements

The authors would like to express their deepest gratitude to the Administrative Authorities of CIMAK Hospital Center for their invaluable assistance. We are deeply indebted to all the participants who make this survey possible through their informed consent. We would like to particularly thank all our promoters for their commitment for the success of the present survey.

Availability of Data and Materials

The data and analyses carried out for this study are available from the corresponding author: freddymukoso@gmail.com.

Declarations

Ethics approval and consent to participate.

The study protocol was approved by the ethics committee of the University of Goma (UNIGOM/CEM/09/2022) and the study was conducted in accordance with the Helsinki principles. All participants signed written informed consent forms before enrollment.

Author's Contributions

All authors contributed to data analysis, drafting or revising the article, have agreed on the journal to which the article will be submitted, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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