"Doctor, Should I Be Worried About This?"

"Doctor, ¿Me tengo que preocupar por esto?"

LUCIANO BATTIONI[1, MTSAC,]

If we could differentiate the universal goals of the medical sciences, we might conclude that there are three: diagnosis, prognosis, and treatment.

Their relative importance differs between patients and doctors. The question I have chosen to title this letter is probably the most important to the patient. However, it is the one that has received the least scientific and technical development.

In daily practice we use prognostic tools consistently and even dogmatically. In fact, many times we try to use scores generated to predict an event X in one population and extrapolate them to an event Y in another. (1) Most of these tools have areas under the ROC curve ranging from 0.60 to 0.85. (2,3) If we offered someone these tools to detect fraudulent banking transactions, they would quickly shake our hand and show us the way out.

This poor current predictive performance is due not only to multiple limitations and difficulties associated with healthcare data management, but also to the tools that have been used so far. In the work entitled Events Prediction Ability in Patients with Hypertension using Artificial Neural Network Analysis of Ambulatory Blood Pressure Monitoring Compared to Clinical Risk Stratification, Di Gennaro et al. developed a simple neural network model capable of predicting what will happen to our patients more accurately. (4)

Beyond the limitations acknowledged by the authors, it is worth highlighting what this work represents: the introduction of Artificial Intelligence (AI) tools into clinical practice. The integration of AI into medicine will change our practice in ways we cannot yet imagine. By integrating multiple variables, creating ones that we did not know existed or linking facts that elude human analysis, we will be able to provide precision medicine. (5)

But not all that glitters is gold. For example, neural networks tend to overfit, i.e. they have high internal validity, but when validated in external cohorts their performance can drop significantly.

To conclude, this work represents one of the first instances of using AI tools in medicine at a national level and, despite its design limitations, it gives us a very small sample of what this integration could represent and encourages us to continue research in this area.

Ethical considerations

Not applicable.

Conflicts of interest

None declared.

(See authors' conflict of interests forms on the web).

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AUTHORS' REPLY

We would like to thank Dr. Luciano Battioni for his accurate and enriching comments on our work entitled Events Prediction Ability in Patients with Hypertension using Artificial Neural Network Analysis

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of Ambulatory Blood Pressure Monitoring Compared to Clinical Risk Stratification. We agree that, while classical risk stratification models are used in the development of risk stratification models, the incorporation of new methodological tools, such as the analysis using artificial neural networks represents an opportunity that would allow us to optimize the diagnostic and prognostic accuracy of different variables, such as those described in this study. These technologies make it possible to simultaneously integrate a large amount of data, identify patterns and generate more accurate predictions compared to the methodological analysis tools that we usually use.

We recognize, as Dr. Battioni points out, that these models are not exempt from limitations, such as the risk of overfitting and the need for external validation. However, we believe that their development and implementation, carefully evaluated, can complement our clinical analysis and act as a valuable supportive tool to make more accurate decisions.

We hope that this work will contribute to the promotion of dialogue and interdisciplinary research between clinical medicine and data science, and we thank you once again for the careful reading and the valuable contributions you have made in your letter.

Yours sincerely,

Federico Di Gennaro

Target Organ Damage in Special Situations: Are we Measuring Correctly?

Daño de órgano blanco en situaciones especiales. ¿Estamos midiendo bien?

BRUNO GUARINO[1]

I have read with interest the study by Travetto et al.: "Detection of Subclinical Cardiac Damage by Echocardiography in a Hypertensive Population with a High Prevalence of Obesity: Discrepancies According to the Indexing Method Used". (1) This descriptive, observational and prospective study included 150 adult patients with hypertension (HT). The differences and agreements between normalization of cardiac chambers measurements using allometric height-based indexing (AHI) and body surface area-based indexing (BSAI) were evaluated. In my opinion, it represents a bold attempt to leverage the resources available in any echocardiography laboratory to achieve a more accurate interpretation of the prevalence of target organ damage (TOD) in populations considered to be at high cardiovascular risk, such as patients with obesity and HT with left ventricular hypertrophy (LVH) or left atrial enlargement (LAE).

Since the 1980s, there have been ongoing efforts to normalize echocardiographic values, particularly for patients with increased left ventricular mass or left atrial dilatation, as a manifestation of elevated pressure in the left circuit. (2) The difficulty of adequately assessing obese patients with HT can be overcome by using AHI rather than BSAI. Interpreting LAE using the standard echocardiographic measurements can be challenging in cases with body mass index (BMI) > 35 kg/m^2. Therefore, the use of AHI is of high clinical value for early diagnosis, underscoring the limitation of the most commonly used method in the echocardiography laboratories, such as normalization using BSAI in this population. (3)

An example of the usefulness of this paper is the reclassification rate of LAE in the total population (28.5%) compared to that in the population with BMI > 40 kg/m^2 (55.4%). Given that the most recent survey on cardiovascular risk factors revealed that the prevalence of obesity was 61.6%, it is clear that accurate measurement of TOD in patients with obesity will pose a significant challenge in the coming years. (4) The greatest discrepancy between the methods appears to be LAE measured by AHI, particularly in hypertensive patients with BMI > 35 kg/m^2.

Clinical practice guidelines on cardiovascular prevention developed by various scientific societies include the use of AHI as a validated method. However, its daily use in cardiac imaging laboratories remains limited, despite its potential to reclassify patients,

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particularly those with more extreme values of BSAI. This could be achieved by replacing this method or by associating it with the echocardiographic assessment for LVH and LAE in patients with obesity grade I-II or greater and with a history of HT.

The incorporation of automatic normalization using AHI in echocardiography devices, as well as its systematic, use particularly in patients with HT and BMI > 35/40 kg/m², has the potential to facilitate early diagnosis of TOD and to intensify treatment in this type of special populations.

Ethical considerations

Not applicable.

Conflicts of interest

None declared.

(See authors' conflict of interests forms on the web).

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AUTHORS' REPLY

We thank Dr. Bruno Guarino for his interest in our work and agree with his words. The identification of valid indexes for the standardization of echocardiographic parameters related to body size in subjects with obesity is a complex issue. Many of these parameters vary according not only to height, weight, muscle mass, total body fat mass but also to body fat distribution, and the coexistence of other metabolic disorders associated with obesity. (1)

For those parameters with methods and cut-off values defined in clinical practice guidelines for the obese population, we consider it important to reinforce the need to incorporate them into routine practice. For those for which there is no consensus, it is crucial to always bear in mind the limitations of body surface area as an indexing method, especially in subjects with severe or morbid obesity.

Conversely, in the context of medical practice, it is crucial for healthcare professionals to acknowledge that "clinical obesity," characterized by alterations in tissue or organ function due to excess adiposity, (2) is not merely a cardiovascular risk factor but rather a distinct disease entity, adversely impacting health and well-being. Therefore, a specific and multidisciplinary approach is necessary to prevent the development of its complications, among which cardiovascular, metabolic, and renal diseases stand out. (2-4) It is imperative to acknowledge clinical obesity as a salient problem within the office setting so that people suffering from this condition can understand their risks and initiate treatment that will help them improve their quality of life and outcome.

Carolina Travetto

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Correlation of Ergospirometry with Echocardiography in Pulmonary Arterial Hypertension

Correlación de ergoespirometría con ecocardiograma en hipertensión arterial pulmonar

GUILLERMINA SORASIO[1,2,3, MTSAC,]

Pulmonary arterial hypertension (PAH) is a heterogeneous, chronic and progressive entity that leads to remodeling of the pulmonary arterioles with subsequent increase in pulmonary vascular resistance (PVR) and right ventricular function impairment, the main predictor of mortality (1).

It is essential to perform adequate baseline risk and follow-up stratification in these patients in order to initiate early treatment based on known risk scores. (2)

Although the 6-minute walk test is the most accessible and simple technique to assess functional capacity, it has certain limitations such as the influence of sex, age, height, weight, comorbidities and learning curve, among others. For this reason, ergospirometry or cardiopulmonary exercise test (CPET) is the ideal method to determine exercise limitation, though it is not very accessible and expensive. (3)

As mentioned above, stratifying patients with PAH at baseline and during follow-up is a priority, and CPET with variables such as peak oxygen consumption (peak VO_2) and ventilation to carbon dioxide production ratio (VE/VCO_2) is an important part of it. (4)

Among the echocardiographic variables, the relationship between the tricuspid annular plane systolic excursion distance (TAPSE) and pulmonary artery systolic pressure (PASP) as a surrogate of ventricular arterial coupling, and the reduction of the stroke volume index (SVI) have been associated with poor prognosis in PAH.

The prognostic association between CPET variables, mainly VE/VCO_2 ratio and VO_2, and echocardiographic variables, as the TAPSE/PSAP ratio, is not well established.

The study by D' Amelio et al. evaluated the predictive ability of echocardiographic right ventricular function parameters in relation to exercise capacity, and compared CPET with the echocardiogram. Seven patients were included, most of them with PAH and chronic thromboembolic pulmonary hypertension (CTEPH). A statistically significant correlation was observed in the linear regression between TAPSE/PSAP ratio and peak VO_2. Although the number of patients is limited for decision making, it is an interesting hypothesis when it comes to correlating the more accessible echocardiogram with CPET, thus allowing the assessment of the functional capacity of patients with PAH, which is an important prognostic parameter. The rest of the CPET variables such as the VE/VCO_2 slope and Doppler echocardiogram variables, as fractional area and right atrial diameter change did not show statistical association. (5)

This is a very interesting study that when applied to a larger number of patients will allow us to evaluate other significant associations of echocardiographic variables with CPET and enable their application to daily clinical practice.

Ethical considerations

Not applicable.

Conflicts of interest

None declared.

(See authors' conflict of interests forms on the web).

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AUTHORS' REPLY

I would like to thank Dr. Sorasio for her detailed and clear summary of the role played by each variable analyzed in the risk stratification of patients with PH. In response, I would like to highlight as a strength of the study that we found the correlation between TAPSE/sPAP and peak VO_2 in chronic patients treated according to the risk established for each one, and without modifying the therapeutic the last two months. So, the possibility of using an echocardiogram variable as a surrogate for CPET could have application in the risk stratification of those patients in follow-up.

Nicolás D´Amelio

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