

Research Article

## Clinical Cardiology vs. Artificial Intelligence

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### Abstract

*This article summarizes dynamic subaortic stenosis and functional mitral regurgitation, clinical signs essential for establishing a clinical diagnosis. Artificial intelligence is not applicable to individualized medicine for humans, because we are all different in structure and function. Artificial intelligence is useful for everything except individualizing the diagnosis or treatment for each patient.*

**Keywords:** Dynamic Subaortic Stenosis, Systolic Anterior Motion, Dynamic Mitral Regurgitation, Ventury Effect

### 1. Advancement of Medical Science

- In the 20th century alone, more scientific contributions have been made than in all preceding centuries.
- In the 19th century, the average life expectancy was 40 years, and by the mid-20th century, it had increased to over 60 years.
- Albert Einstein (1879-1955) made possible the understanding of atomic radiation, which is the basis for the use of radioisotopes in the diagnosis and treatment of many human diseases. "E" (energy) = "mc" (mass), times the speed of light (300,000 km/s) squared. ( $E = mc^2$ ).
- Fleming made possible the synthesis of penicillin, which gave rise to the era of antibiotics.
- Goldstein and Brown discovered cholesterol metabolism (Nobel Prize winners) in 1957, and by 2000, the average life expectancy had increased to 85 years.
- The wealth of knowledge is such that no physician could have fully assimilated it through a lifetime of study.

### 2. Risks of Medical Specialization and Technological Advancement

#### 2.1. Research

- Original research is based on the SEARCH FOR A TRUTH.
- Currently, researcher evaluation systems require a greater number of published research papers, and this has led to the need to remain relevant by publishing articles that do not necessarily fulfill the original precept of research: THE SEARCH FOR A TRUTH.
- Original research depends neither on the method nor on the

instrumentation used, but on the original scientific content, which must necessarily arise from the researcher's creative idea.

- Chersterton sarcastically stated (1874-1936): Research that does not arise from a creative idea can be compared to "a blind man who enters a dark room looking for a black hat that does not exist".

#### 2.2. Doctor's Mission

The modern physician, in addition to a solid clinical preparation based on knowledge of the physiology and pathophysiology of diseases, recognized through clinical history and physical examination, requires knowledge of technology to complement the diagnosis and therapeutic decision. This, combined with experience and the intelligent use of evidence-based medicine, must build the highest quality that a physician must have, which is "CLINICAL JUDGMENT", in order to make an accurate diagnosis and effective, individualized treatment to optimize medical efficiency and costs.

#### 2.3. Clinical Judgment

*“Medicine as a scientific discipline has always required physicians to possess a keen eye for observation and sound judgment in interpreting data. Logical reasoning has been the best tool for making a diagnosis, and for this, the cultivation of intelligence is the foundation, and the brain is its best instrument.” Ignacio Chávez, MD*

## 2.4. The Modern Doctor

Currently, clinical medicine has been gradually replaced by technology, and even today, with artificial intelligence, knowledge has been simplified to an unacceptable level. To such an extent that physiology, pathophysiology, and clinical practice are gradually being forgotten, replaced by algorithms, clinical guidelines, and artificial intelligence. The latter teaches everything that exists in a subject, but not in a person, which are the result of drawing conclusions about truths, but not about the person being seen. Readers forget the foundation of medicine and simply copy these results, following practical results and forgetting about clinical medicine. This leads to the loss of "clinical judgment," which is the most important function of the physician. This frequently culminates in misdiagnosis and irrational price increases for medicine. The doctor who only knows clinical skills IS OBSOLETE, and the professional who only master's technique ceases to be a doctor and becomes a TECHNICIAN, incapable of providing efficient results for the patient who consults him.

## 3. Clinical Guidelines

- "However, that in our enthusiasm for collectively endorsing these guidelines, we are marginalizing the importance of physician judgment and inadvertently risking the conversion of guidelines into "Cookbooks"
- "We hope that publication on this viewpoint will help temper

enthusiasm for overzealous conversion of guidelines into performance measures, thereby restoring the vital role of physician judgment and insight into patient management"

## 3.1. This Behavior Leads to a Paradox

### 3.1.1. "The More Technology Appears, The Less Professional Capacity the Doctor Has"

Physicians must base their practice on high-level clinical medicine and must leverage their knowledge to use and interpret technology rationally. The more complex high technology becomes, the more necessary the physician's clinical and human skills become. "The modern physician" now requires a double effort: mastering clinical medicine and also specifically understanding the technology they use to practice medicine efficiently and truly as a form of modern medicine.

### 3.2. Is the use of the Stethoscope Still Current in Cardiology?

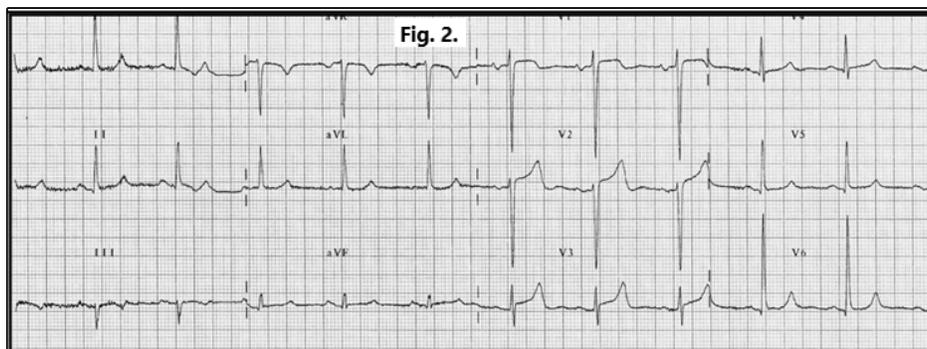
Nowadays, it is rare for a cardiologist to master the auscultation of the heart, so the MOST VALUABLE CLINICAL TOOL that a cardiologist has for clinical diagnosis has been lost and unfortunately, in this way, the STETHOSCOPE is only useful for differentiating a person in a white coat between a cook, a hairdresser, an automotive technician or a doctor, Even If the Latter No Longer Knows What This Instrument Is For (Figure1)



## 4. Clinical Case

An 83-year-old female patient was advised by a cardiologist to require surgical treatment for severe aortic stenosis and mitral regurgitation. Her daughter requested a second opinion, asking if

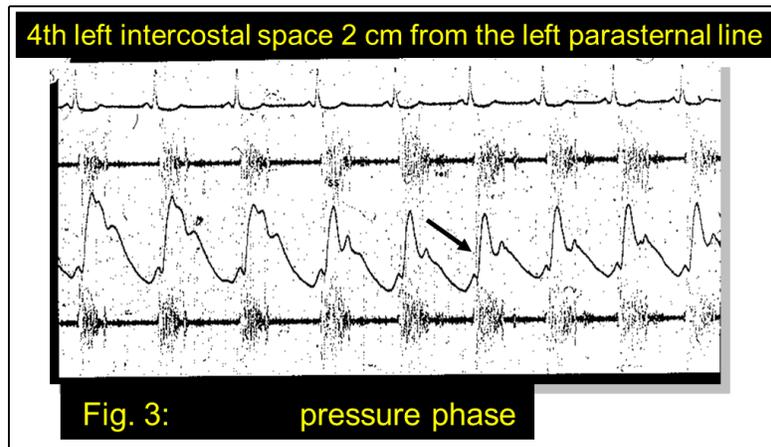
this "treatment" would pose a high risk for her mother's surgery. ECG Interpretation: Left ventricular enlargement with diastolic ventricular overload (figure 2).



#### 4.1. The Second Cardiologist Clinical Findings

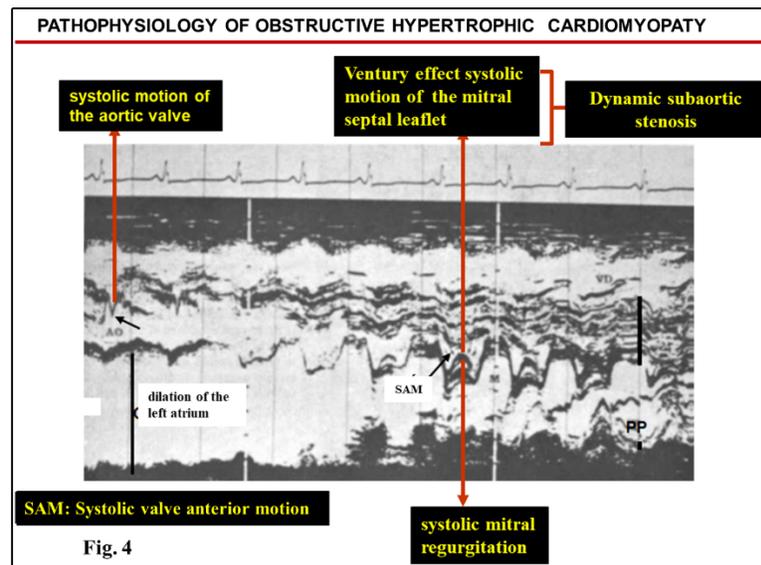
The heart auscultation revealed a grade II-III ejection murmur in the left third intercostal space and mitral valve, with an erased first sound followed by a grade III-IV holosystolic murmur with a third

sound and hyperflow rumble. A Valsalva maneuver was performed, revealing an increase in the systolic murmur during the pressure phase. A simultaneous recording of ECG, phonocardiogram and carotid pulse, with Valsalva maneuver (figure 3).

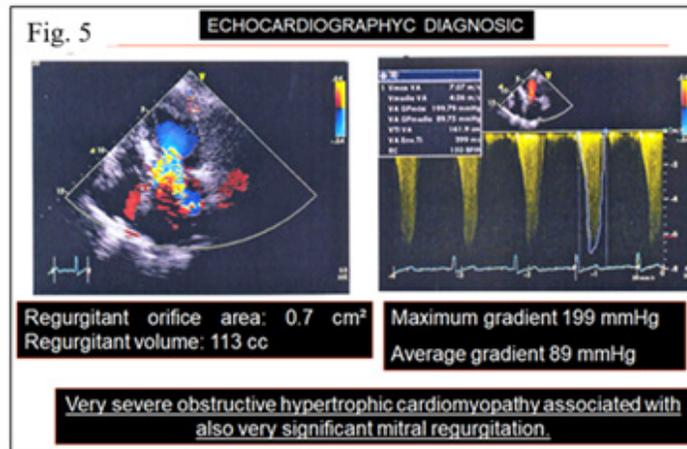


The study corroborates the increase in the expulsive systolic murmur in the pressure phase and the carotid pulse acquires a digitiform morphology, thus establishing the clinical diagnosis of Hypertrophic Obstructive Cardiomyopathy. The clinical

examination led to a deliberate search for a diagnosis of obstructive hypertrophic cardiomyopathy which was corroborated with a non-invasive study; thus, a 2D echocardiographic study with continuous and color Doppler is requested (figure 4).

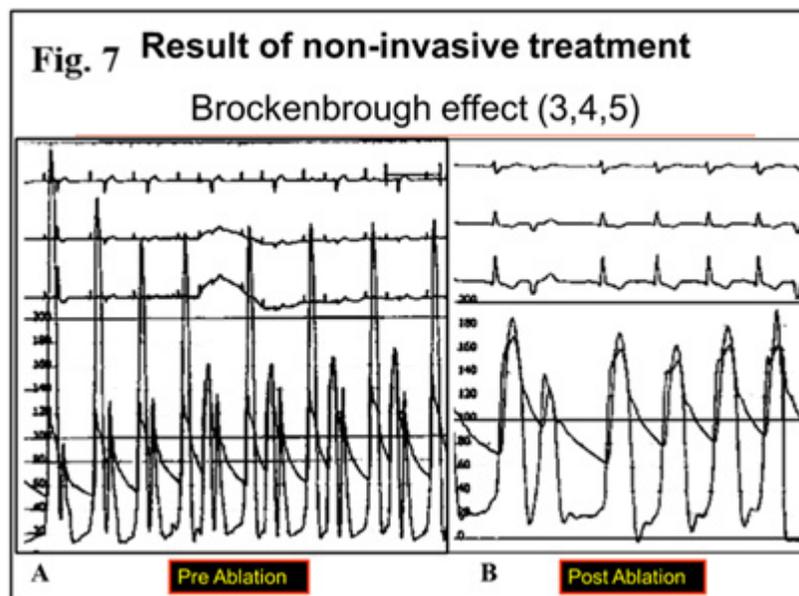
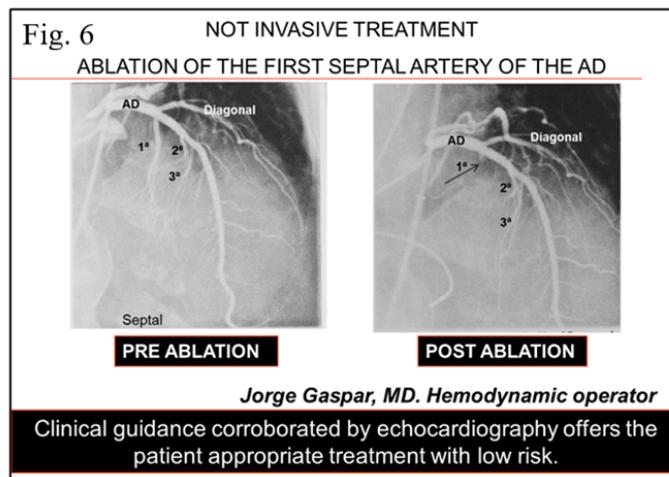


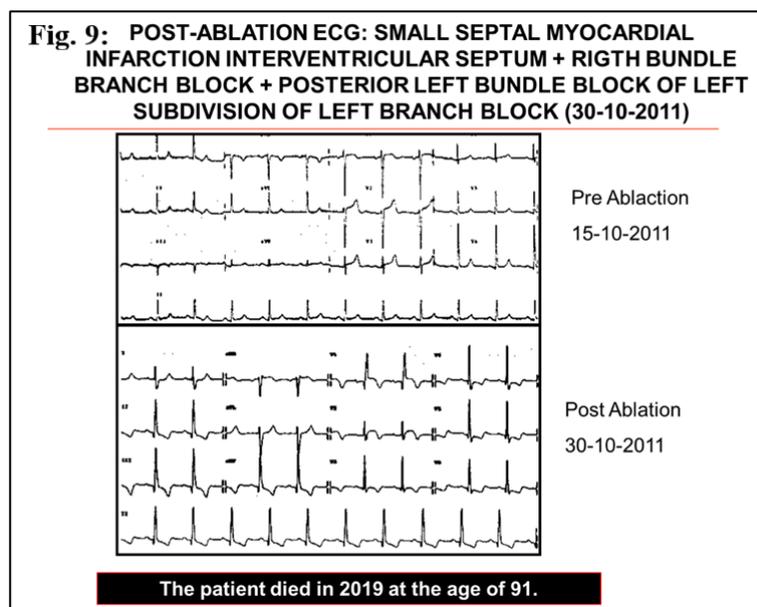
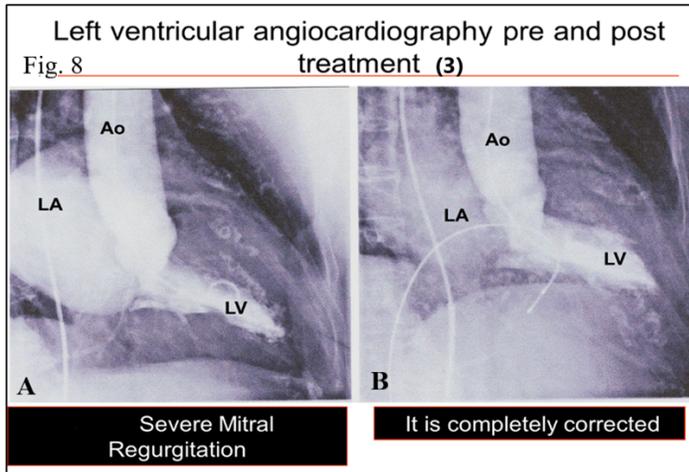
Once the diagnosis is correct, the appropriate treatment is indicated for obstructive hypertrophic cardiomyopathy, without catheterization (figure 5).



In Figure 6, simultaneous intracavitary pressures between the LV and Ao are analyzed. Ventricular extrasystoles are induced with a catheter to determine the Brockenbrough effect, and it is shown that after the extrasystolic beat, the transaortic gradient increases

to 200 mmHg (Figure 6-A). In Figure 6-B, it is shown that, after ablation of the first left anterior descending coronary septal branch, the transaortic gradient is significantly reduced to 30 mmHg, demonstrating the beneficial effect of coronary ablation.





## Epilogue

**Fig. 11: The contemporary physician in the face of technological development**



**"Medicine was clinical at birth, and it will always be clinical, no matter how profound its scientific transformation. Otherwise, it wouldn't be medicine."**

**Ignacio Chávez Sánchez, MD<sup>(6)</sup>**

### 5. Conclusion

A cardiologist must be an excellent physician who masters clinical judgment in diagnosis and also has mastery of immediate-care techniques such as the electrocardiogram and chest X-ray and echocardiogram. They will prescribe the most complex techniques, seeking an accurate approximation of the diagnosis and thereby designing individualized treatment for each patient. Ultimately, they will aim for a cure or chronic management of the specific diagnosis, prioritizing prevention. If not, when they ONLY master technology, they may be a GREAT TECHNICIAN, but they will NOT be a Clinical Cardiologist. Artificial intelligence is not applicable to INDIVIDUALIZED MEDICAL CARE [1-6].

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