Research Article

Japanese Journal of Medical Research

The Art of Heart Auscultation with Stethoscope in Extinction

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Received: 29 Nov 2022; **Accepted:** 18 Jan 2023; **Published:** 25 Jan 2023

Citation: José F. Guadalajara Boo. The Art of Heart Auscultation with Stethoscope in Extinction. Japanese J Med Res. 2023; 1(1): 1-5.

ABSTRACT

Auscultation of the heart is a clinical art that allows the doctor to make accurate diagnoses with the skills after formal training. The technology efficiently complements the clinical diagnosis, so that the latter is insufficient without a clinical approach; on the other hand, when the clinical practice is replaced by technology, diagnosis and treatment is equally ineffective. The cult of technology has led to the gradual loss of the ability of cardiac auscultation, and the doctor has lost a powerful tool with diagnostic potential.

Auscultation of the Heart

Auscultation of the heart is a clinical art that allows the physician to make accurate diagnoses at the patient's nod when proficiency is achieved after formal training.

Keywords

Cardiac auscultation, Physical examination, Medical technology.

Introduction

From the mid-19th century and the second decade of the 20th century, the art of auscultation flourished in different latitudes of the world, greatly increased clinical diagnosis in cardiology.

The doctor was able to recognize a large number of heart diseases at the patient's bedside, or else the diagnosis of heart disease was eliminated when the presence of "innocent or not pathologic murmurs" was identified.

Masterfully performed auscultation of the heart is truly an art [1], which flourished in the 19th century in France [2] and was inherited by English cardiology [3-8], North American [9-15], Argentina [16] and, especially, by the Mexican, with Manuel Carpio (1791-1860), who translated the Book Pectoriloquio (1819), by Claude Marat, and his disciple Miguel Francisco Jiménez (1813-1876). Fascinated by the publications of French clinicians, both mastered, practiced, and disseminated heart auscultation, and thus, in the city of Puebla, they founded Mexican clinical cardiology [17]. However, the most important influence in Mexico was the one initiated by Dr. Ignacio Chávez after receiving the teachings of Vaquez and Laubry [18] in France, followed by Manuel Rivero Carvallo and Rafael Carral, who, through their teaching work at the National Institute of Cardiology, in Mexico, generalized it to the entire republic. From the mid-19th century and in the second decade of the 20th century, the art of auscultation flourished in different latitudes of the world, with which it was enormously enriched clinical diagnosis in cardiology. The physician could recognize the heart diseases at the patient's bedside [7,14]. The richness of data offered by the clinical examination of the heart and especially the auscultation made the doctor make sometimes complex diagnoses with the simple physical examination. In 1894, Wilhem Einthoven made the world's first phonocardiographic recording [19]. The development of this method was due to Otto Frank, in Munich, Carl J. Wiggers, in Cleveland, and I. Ories and Braun-Menéndez in Argentina. This type of study, which was called a phonocardiogram [15] was perfected by Paul Wood [8] in the 1950's and by Leatham [20] at the National Heart Hospital in London. The advent of phonomechanocardiography in Mexico in the 1950's made it possible to make objective the clinical signs of both inspection (recording of the jugular and hepatic pulse) and palpation (recording of the morphology that produces the apical beat, of the right precordiogram, lung impulse when there is small circuit hypertension, etc.) and heart auscultation (registration of normal heart sounds, splitting of the second sound, valve opening clicks and, of course, heart murmurs). With this, not only was the clinical diagnosis made objective [21], but this method made it possible to enrich the teaching of clinical examination of the heart

and especially auscultation like no other. Thus, in that Institution, beginning in the 1950's, the teaching of physical examination of the heart flourished. All cardiology residents receive tutorial teaching at the patient's bedside by the great cardiology teachers. This teaching is complemented with graphic records that allow visualize what the doctor palpates and auscultates (Figure 1). Phonomechanocardiography (a term coined by the Dr. Bernardo Fishleder) flourished in Mexico and Latin America, and spread to Europe thanks to the mastery from Fishleder [21] himself, who cultivated, taught and promoted it for more than 30 years.

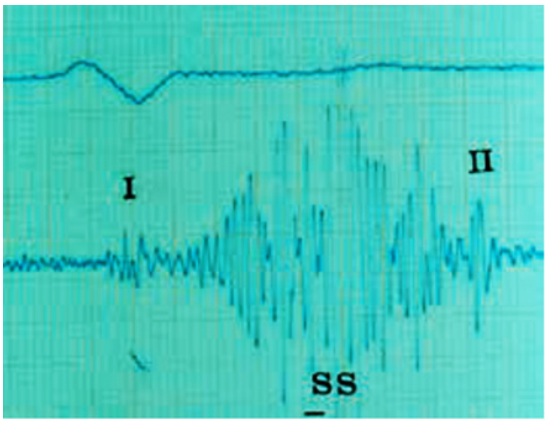

Figure 1. Aortics Stenosis (AOS). The record shows that between the first (I) and the second (II) noise is an Systolic Murmur (SM) with «rhomboid» morphology; note that the maximum intensity of the murmur is very far from the first noise: denotes gravity of valve obstruction . The record allows the doctor can "see" what is listenig.

Fishleder produced a extensive treatise on phonocardiography, adding and emphasizing the simultaneous recording of movements precordial pulses, arterial and venous pulses, and clinical and pharmacological maneuvers, with which he introduced the study of ventricular function, as well as the quantification of valvular and congenital lesions, which is why he called his treatise Exploration cardiovascular and clinical phonomechanocardiography. Unfortunately, in the 1990's, with the appearance of the clinical echocardiogram in 1965 [22], the devices for recording the phonomechanocardiogram they gradually disappeared, since the new study far exceeded the information obtained with the graphical record of the physical examination. In effect, the echocardiogram offers clinicians the possibility of directly calculating transvalvular gradients and regurgitant volumes, visualizes the congenital heart defects and also allows the measurement of the dimensions of the cardiac cavities, the thickness of their walls, the valve áreas and various more complex parameters of the function such as the degree and type of hypertrophy, systolic and diastolic function of the heart, pre- and afterload, etc. [23], therefore, it is undoubtedly far superior to phonomechanocardiography to obtain this information (with this last procedure these data are also obtained, but indirectly). Without However, clinicians did not realize that by disappear the phonomechanocardiographic record, the best way to objectively learn the physical examination of the cardiovascular system was also losting this regard, it should be noted that there have never been able to reproduce the sounds and heart murmurs of a reliable way with the simulators, so currently the only way to receive this training is by bedside physical examination of the patient, performed by the cardiology resident under the face-to-face direction of an expert cardiologist that transmits the way of recognizing, through inspection, palpation, percussion and auscultation, the cardiovascular diseases through questioning and physical examination. To carry out this learning process, it is necessary to find oneself in an institution that houses a high concentration of patients with a variety of cardiovascular diseases. The necessary process to learn auscultation of the heart can be compared to what is needed to learn to play a musical instrument. The auscultation of the heart takes between two or three years for the clinician to achieve sufficient skill to allows you to recognize by this clinical method and accurate diagnosis of various cardiovascular diseases. Indeed, it is initially necessary to know and understand the cardiac cycle (Figure 2); in Next, you must make a mental image of it. When the doctor is clear, he places the stethoscope on the patient's chest, and identifies the first and second heart sounds, moving reception acoustics to the frontal lobe, thus locating the I and II sound (systole) followed the II and I sounds (diástole); when the brain identify and recognize these phenomena. The doctor must also know the pathophysiology of cardiovascular diseases and, once again, make an mental image of these phenomena, by way of As an example, I will mention aortic stenosis (AOS): the aortic valve opens in systole and when it is narrowed, generates a turbulent blood flow that translates on a "rough" murmur (Figure 1); as the aortic valve projects into the thorax at the level of the second right intercostal space, that is where the murmur is Heard more intense, and since the turbulent flow travels from the ventricle towards the ascending aorta and the carotid vessels, the murmur has precisely this irradiation.

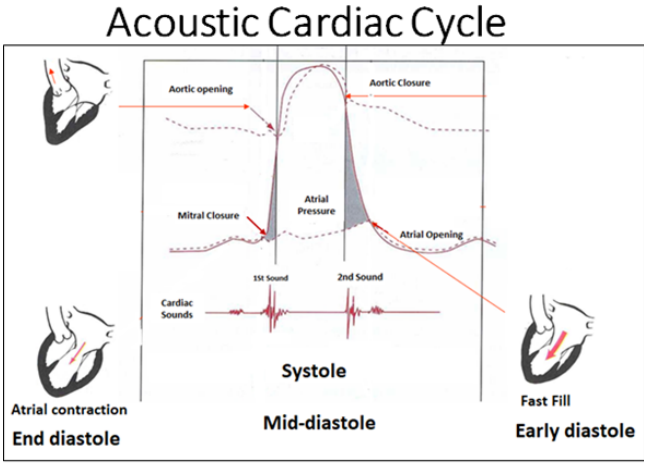

Figure 2. See text

When the doctor hears an AOS, to recognize it, he must have the mental image of the entire process.

The auscultation of the heart also allows to perform with accurate differential diagnosis of rapid arrhythmias. The normal electrical activation sequence of the heart makes the atrium always contract before the ventricle; so, in a tachycardia of 200 beats per minute, auscultation will reveal that the first sound always has the same intensity, and thus way the doctor will be sure that the sequence atrioventricular is normal (supraventricular tachycardia) [23]. On the other hand, when auscultating a patient who has a tachycardia with the same frequency, recognize that the first sound is variable in intensity of beat by beat informs the clinician that the sequence atrioventricular has been lost, and we will be in the presence of a atrial fibrillation [23]. These examples demonstrate that auscultation of the heart has based on the mental image of what is heard, how is the physiology and pathophysiology of heart disease in the mind of the doctor trained. In other words, the diagnosis is made when the cardiologist sees in his mind what is happening inside the heart of the sick through of auscultation, in the same way that Beethoven, being completely deaf, heard in his mind the musical notes and, displaying his genius, he was able to write the participation of each one of the musical instruments and all the voices that made up the choral part that gave life to the poem from Schiller's Ode to Joy on the Pentagram (Figure 3) of his mighty Ninth Symphony [24].

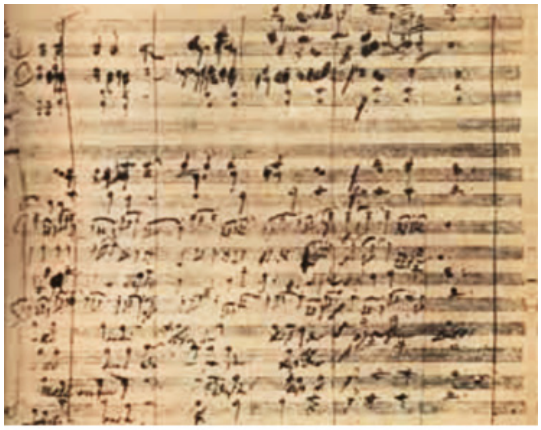

Figure 3. Fragment of the stave of the last movement of the Beethoven's Ninth Symphony; original manuscript (adapted from Orlando24).

As you can see, this process is complex and it requires time, knowledge, and dedication to acquire the clinical skill of cardiac auscultation. Since the 1990's the great masters of cardiology [25] have viewed with great concern the gradual decline in the physician's ability to recognize heart disease by auscultation of the heart. The poor ability of doctors to listen to the heart has been demonstrated in training since medical students until cardiology residentes (Figure 4), so experts have recommended increase teaching time in this regard [26].

The modern physician, instead of including the solid knowledge of the new technology to his complete clinical preparation, to complement the diagnosis and therapeutics [27], has made a simplification of knowledge to an unacceptable level, to such a degree that Physiology and pathophysiology are gradually forgotten, which are replaced by algorithms, which irrationally dictate diagnostic and therapeutic behavior, following the guidelines practical and forgetting the clinical picture, physical examination and pathophysiology, thus losing the highest quality that a doctor should have: CLINICAL JUDGMENT, and this frequently culminates in a poor diagnosis, wrong treatment (Figure 5) and unnecessary increase in the cost of medicine [28]. This phenomenon has caused a stagnation in the clinical cardiologist that Donato [29] has called stunned cardiologist (hibernating cardiologist).

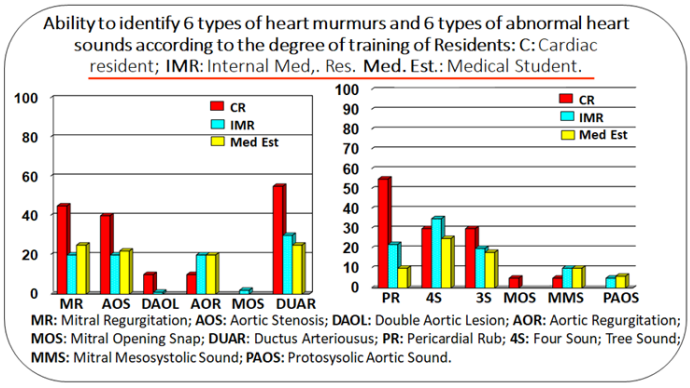

Figure 4: See text

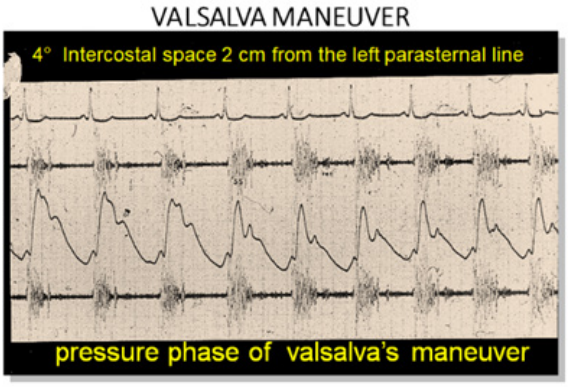

Figure 5: 83-year-old female scheduled for double valve replacement with an echo diagnosis of tight valvular AoS and severe mitral regurgitation. Auscultation of the heart with "pressure phase" of Valsalva's maneuver shows that the murmur increases intensity in the and carotid pulse, it adopts a "digitiform" morphology: **severe obstructive hypertrophic cardiomyopathy.** (dynamic subaortic stenosis).

Today, with the advancement of technology, has been abandoned almost imperceptibly auscultation of the heart. Thus, the cardiologist with a lack of clinical training is dragged down by the misinterpretation of a deficient study, and, Although we are in the 21st century, paradoxically diagnosis and treatment are carried out in a less successful way than 30 years ago. Now the Doctor must base his practice on medicine high-level clinic (the cardiologist must be an expert in heart auscultation) and now requires a greater effort to prepare for and understand the new technology [27], to use it and interpret it properly, in such a way that it really serves

to obtain the information that cannot be obtained with the clinical history carried out by an expert. How much more High technology becomes more complex, more necessary they are the skills that the doctor needs to understand and interpret it [27]; Combining both knowledge, a more effective diagnosis can be integrated, which will lead to making a therapeutic decision much more The holistically well-trained physician should recognize the state of the cardiovascular system, in a high percentage of patients, through a history well-carried out clinic (with special emphasis on the auscultation of the heart) [23], appropriately using the new modern diagnostic methods that we currently have and that, chosen rationally, according to the suffering of the sick, must be interpreted and judged by the own treating physician to analyze whether the study is technically satisfactory and if your performance is well supported, whether it supports or rules out the diagnosis clinical or if, on the contrary, the study discovers other unsuspected diagnosis. If there is a discrepancy between the clinical picture and the result of the study, the cause must be sought, and if it is not found, must be investigated through other means of diagnosis, including angiotac, magnetic resonance and cardiac catheterization. In other words, the diagnosis and therapeutic decision for each patient should be governed by clinical judgment, which is the product of the solid professional preparation of the cardiologist, along with their experience, and both must be confronted with evidence-based medicine to take the final decisions. Thus, as there is currently less and less expert cardiologists in auscultation of the heart, there are also few hospital centers that house a concentration of patients with a variety of cardiovascular diseases. the doctor in training diverts his interest and is dazzled by the wonderful modern technology, which we have today, tries to master the technique to handle the device, but not to learn to explore the patient [27], and less to master auscultation of the heart, for the effort and time required learn to master this clinical maneuver in these conditions, if you do not change the way you are Practicing medicine today, the clinical art of cardiac auscultation will gradually continue to be lost, until it becomes a merely historical fact.

In conclusion, it is necessary to return to the path of solid clinical teaching of medicine, supported by in the pathophysiology of diseases, to improve the patient's medical care, as well as using the modern methods rationally, not "routinely," and, finally, use as support the interpretation proper use of evidence-based medicine. All this, in order to achieve personalized care for each patient and, by all accounts, more effective for the treatment and prevention of human diseases. Only in this way can we say that we really practice modern medicine, in which human and technological resources are added to help the patient, and not substituting some by others and thus wasting the resource that has been omitted.

Epilogue

"Medicine as scientific knowledge has always demanded from the doctor a fine spirit of observation and rigth judgment in the interpretation of the data. Logical reasoning has been his best support to develop a diagnosis; for this the cultivation of intelligence is the base and the brain, its best instrument" [27].

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