

THE BICENTENNIAL OF THE STETHOSCOPE: A REAPPRAISAL

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Abstract

Background and aim. Two hundred years ago Laennec, a young French physician discovered the stethoscope, in order to improve the lung auscultation. The stethoscope became the emblematic appendix of the physicians. Nurses use it also to monitor patients and medical students are proud to use it. We critically review the significance of the stethoscope 200 years after its discovery.

Methods. Pertinent literature was searched on PubMed and Google about the stethoscope, using also other terms: auscultation, Laennec, medical education, clinical diagnosis. Data were collected in a narrative review.

Results. Two centuries after its invention, the stethoscope still remains a major tool in the hands of healthcare professionals. It is routinely used by medical doctors and has become a mark of their status. Nurses use it also to monitor heart rate and blood pressure. Medical students get familiarized to use it during the medical faculty. Patients perceive the stethoscope as an important symbol of the medical profession.

Conclusions. Two hundred years ago the stethoscope was invented by Laennec. Despite the advent of X rays, CT, ECG, echocardiography and more recently of the electronic stethoscope, the classical stethoscope invented by Laennec still has its major role in the representation of healthcare providers and is a major utility in clinical diagnosis.

Keywords: clinical practice, education, history of medicine, stethoscope

Introduction

The medical world has recently celebrated the second centennial of the stethoscope.

The need to get as many signals from the body as possible was expressed from the beginning of the scientific medicine, even from the time when history taking was considered of limited use for diagnosis, by the first maestros of the medicine, who put emphasis on observation [1,2]. A clinical diagnosis includes beside the anamnesis, the physical examination, and this is not complete without the auscultation [3,4]. Auscultation of the thorax was the first performed and remains very important in the diagnosis of respiratory and heart diseases. Beside these, auscultation is used for the clinical diagnosis of the peripheral vessels, and of the abdomen [5,6].

Clinical auscultation of the lungs required the

approach of the ear to the thorax of the patient. This approach was also unhygienic and represented a hazard for infectious diseases. Also, the accuracy of this method was rather poor. And even more, the method incorporated a moment of social embarrassment for patient and physician.

It is the merit of Laennec who proposed a method to improve the auscultation.

The invention of the stethoscope

The invention of the stethoscope is traditionally attributed to the French physician Laennec. Rene-Theophile-Hyacinthe Laennec (1781-1826) was born in Quimper (North-Western part of France, traditional province of Bretagne). He was interested by a medical carrier and volunteered as military physician during the numerous battles given in France by the end of the 18th century, during the Napoleonic times. He studied medicine in Paris with the great physicians Bichat and Corvisart. After graduation, he worked in the prestigious Paris hospitals

Beaujon and Necker. He got a reputation of skilled doctor and had many clients. The experienced accumulated as practitioner allowed him to extrapolate the knowledge he acquired in daily practice and to invent a tool to improve the lung auscultation. He described in a very interesting way the circumstances of his invention [7]:

“When I was treating a girl suffering from cardiac disease, I could not make a diagnosis from palpation or the percussion method because she was overweight. I hesitated to put my ear directly onto her chest, because she was a young girl. I remembered the auditory phenomena in which a scratching sound on one end of a stick can be clearly heard at the other end. I made a cylindrical tube from a piece of paper. One end of the tube was placed on her chest and I put my ear on the other end, making it possible for me to hear her heart beat”.

It was not easy to give a name to this new tool. Laennec opted for “Stethoscope” meaning “look into the thorax” in Greek. The description of the stethoscope who helped him better find access to the heart beat of a young overweight lady was described in his seminal book: “Traite de l’ auscultation mediate” published a little later, in 1819. Due to the success of the book, Laennec issued a second edition in 1826. This book contributed to the spread of the auscultation method mediated by the stethoscope and represented a revolutionary step of the time.

Laennec used himself the instrument not only for heart auscultation but also for lung auscultation. He worked indeed with many pulmonary patients, mainly after becoming full professor of medicine at the Hospital Charite. There he contracted tuberculosis disease and died from it in 1826 at the age of only 45 years.

The impact of the invention of the stethoscope

In the beginning, the use of the stethoscope had enemies, who considered that mediated auscultation was ridiculous and useless [8,9]. Some believed it would lead to using the capabilities to establish a diagnosis with accuracy, others blamed it as a “guessing tube” [9]. It was also speculated that the stethoscope would move the attention from clinical symptoms to physical sounds frequently without clinical expression. However, its use spread worldwide and lasts until now. It became the representative symbol of the physicians, along with the white coat, most frequently wearing them both together.

The discovery of Laennec was improved successively by other doctors: first, the rigid tube was replaced by a flexible one, than was adapted to biauricular auscultation. The flexible tube was either gutta-percha or rubber. These developments happened in the 19th century thanks to doctors with initiative like George Camman or Austin Flint [10,11].

The progress of science led to the advent of the electronic or digital stethoscope. This is facilitating very much the auscultation and represents a good stool for the

practitioner. But nobody could use it without previously learning the skills of heart auscultation with the “standard” stethoscope. Besides, the standard stethoscope helps in emergency, allows measuring blood pressure, is easy to transport and will never be replaced by the digital stethoscope.

Nowadays it is inconceivable to see a medical student, a trainee or a trained physician without the stethoscope. It became the attribute of medical practice. The detractors of the classical stethoscope have been shown to be wrong! Recent data show the elevated diagnosis value of heart auscultation vs. echocardiography in cardiac diagnosis in an emerging setting [12].

However, the digital stethoscope has its own advantages. In children it performs better in lung auscultation than classical auscultation [13]. A systematic review of more than 200 studies comparing classical auscultation to electronic auscultation and computer driven lung sounds analyses showed the reliability of the electronic stethoscope. This method avoids the well-known interobserver variation of the results [14].

For teaching, different projects were elaborated to learn auscultation using simulators and computerized programmes [15].

Attention has to be given to the hygienic aspect: passing the stethoscope from someone’s skin to another is frequently neglected and stethoscopes are not always disinfected. This issue has been recently addressed by papers emphasizing the role of disinfection of stethoscopes and its education [16,17].

The use of stethoscopes by nurses

Recently a social event caused an emotional public debate. During the Miss America contest 2015, one of the candidates presented her talent probe dressed in her nurse uniform and with a stethoscope around her neck [18]. This moment was the starting point of a debate: should nurses wear, use or display stethoscopes? The retrograde opinion was immediately combated in social media. But this event really shows that many do not believe that nurses need stethoscopes. This obsolete conception is rebutted by daily activity of nurses using stethoscopes mainly for assessing the heart rate and the blood pressure, not for the diagnosis of some elusive valvular or congenital heart diseases [19,20]. Thus, stethoscopes are an appendix of the activity for nurses as well as for the physicians. The industry produces stethoscopes with designs adapted for nurses.

Nurses are also involved in maintaining the hygiene of medical devices including stethoscopes [16]. A Japanese survey of nurse images on Google showed that nurses were displayed with stethoscope in 2/3 of the situations; they were smiling and looked compassionate [21]. Thus, the social image of the nurse involves mainly her empathy and care [21]. More should be done to diversify the stereotype of the nurse image in the social conscience.

There is a need to analyze in depth the relationship between nurses and stethoscope in different settings and medical branches.

Unusual matters around the stethoscopes

The bicentennial of the stethoscopes offer the possibility to recollect some unusual issues on stethoscopes and auscultation.

Wearing around the neck the stethoscope may cause a neuropathy [22]. This is caused by the compression of the flexible tube and auricular pieces on the cervical spine. It is therefore recommended to not keep stethoscope very tight around the neck.

A so-called sick stethoscope syndrome has been described: it means that a broken tube may impair the auscultation and give the impression of the absence of lung/heart sounds [23,24]. These situations may be corrected by checking the integrity of the tubes of the stethoscopes.

Stethoscopes can be used also by thieves, as this new read at Radio France shows [25]: *“French police have arrested two men suspected of stealing safes from hotel rooms by posing as Gulf tourists.*

The thieves allegedly pretended to reception staff they were guests who had lost keys, in order to gain access to the rooms.

The thieves used a stethoscope to listen at the door to ensure the coast was clear, police said, then used a hammer and chisel to remove the safes.

High-end hotels were targeted, including in Paris and on the Riviera.

The two suspects, aged 56 and 31, were arrested at a hotel in the central French town of Saint-Etienne on 24 August.

Police said they had been identified using surveillance video images from a previous theft.

According to officials, the removed safes were carried out of the hotels in suitcases.

France’s RTL radio said police had now recovered jewellery, luxury clothes and foreign currency worth about €80,000 (£58,000).

They are also reported to have found 20 hotel room key cards, a stethoscope, a hammer and a chisel. ”

Conclusions

The bicentennial of the invention of the stethoscope by Laennec (discovery 1816, publication 1818) is a moment to analyze the applications of this discovery by physicians and nurses. Stethoscopes maintain their major role in practice and teaching, despite the concurrence of X rays and other imaging techniques. The stethoscope remains the major element in the representation of healthcare providers.

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