

2nd Global Congress and Expo on

Pediatric Cardiology & Healthcare

September 22-24, 2016 Las Vegas, USA



Amir A Sepehri

CAPIS, Belgium

Heart sound auscultation, past, present and future

Heart sound auscultation has been used as a screening technique for investigating cardiac condition over thousand years. There are evidences showing that this technique was used during ancient Persian and Egyptian civilization to verify heart condition but, the biggest breakthrough came on 1816 when the French physician, René Laennec, invented the first stethoscope by curving a wooden cylinder. After the invention of stethoscope, many diagnostic features of this technique were understood by the physicians and later, the phonocardiography became an important tool for cardiac diagnosis in the 1950s. This tool provides a plot of heart sound recording on a rolling paper. However, after the creation of cardiac ultrasound imaging in Lund, Sweden, phonocardiography became less appreciated by the cardiologists due to the informative graphical representation, provided by echocardiography, which is still recommended by the pertinent associations as the tool with central role in diagnosis. In Doppler echocardiography, disease diagnosis is based on the direct and indirect measurement and calculation of the operator. This attributes a subjectivity to the approach, even though it has been objectively accepted by the cardiology community, which is considered as a drawback of the approach that limits its application to the expert clinicians, and access to such expert clinicians is not easy especially in the rural places. Heart sound auscultation is therefore, employed in all the medical settings as the first screening approach, which is by far a less expensive method. Due to the progresses in signal processing and artificial intelligence, many studies aimed to associate intelligence with the heart sound auscultation technique in order to improve screening accuracy in cardiac auscultation specially, in children, where the accuracy is substantially impaired by innocent murmurs. A study in Johns Hopkins University, USA, showed that the screening accuracy in pediatrics cases is as low as 40% in family doctors, which can be rather improved by using computer-assisted auscultation. Our previous study revealed that development of an automated tool for screening congenital heart disease in children is achievable by using our unique processing method, named Arash-Band that has been internationally patented. Such a processing method was incorporated into appropriate graphical user interface and installed on a portable processing unit, to be employed by the practitioners or nurses in primary healthcare centers for an improved screening. This automated system, which we called digital phonocardiograph, was tested by a trained layman operator over a large number of voluntaries from nursery and elementary schools and, also from a referral hospital, and the results showed a great compliance of more than 90% with the echocardiography. Our proposed digital phonocardiograph is now available on the market.

Biography

Amir A Sepehri has received his PhD from Faculte Polytechnique de Mons, Mons University, Belgium in Digital Audio Signal Processing. He has worked on a special research program 'Computerized Screening of Congenital Heart Disease'. The program was aimed toward obtaining a special diploma 'l'Agregation de l'Enseignement Superieur in the same university. The result of his research work is formulated as Arash-Band and it is internationally patented. He has several publications on the CHD screening and detection. He is currently the Director of CAPIS Biomedical R&D Department.

sepehri@capis.be