A hand-carried cardiac ultrasound device in the diagnosis of cardiac abnormalities. A comparison to physical examination.

E.C. Vourvouli1, V. Rizzello2, A.F.L. Schinkei2, M. Bontioulou3, E. Blagni2, F.J. Ten Cate1, J.R.T.C. Roelandt2.1Cardiology Department; Thoraxcenter Erasmus MC, Rotterdam, Netherlands; 2Thoraxcenter Erasmus MC, Cardiology Department, Rotterdam, Netherlands

Aim: To determine the diagnostic potential of a hand-carried cardiac ultrasound (HCU) device (OptigoTM, Philips Medical Systems) in a cardiology outpatient clinic. A full-featured standard echocardiographic system (SE) was used as a reference.

Methods: 300 consecutive patients referred for the first time to the cardiology outpatient clinic were studied with the HCU device by an experienced investigator prior to their visit to the cardiologist. The echocardiographer noted whether the HCU was able to confirm or reject the referral diagnosis, which pathology was detected and whether SE investigation was necessary. Physical examination by a cardiologist followed and thereafter, an echocardiographer performed a complete study with a SE whenever the cardiologist required it. Both were blinded to the results of the HCU. HCU and SE data were independently evaluated for major and minor cardiovascular abnormalities. The HCU data were compared to the clinical diagnosis by the cardiologist and the SE diagnosis.

Results: The cardiologist referred 203 patients for a SE study, 13 patients for transesophageal echocardiography, and in 84 patients no further examination was considered necessary. The most frequently question the SE was asked for, was the assessment of left ventricular function (60%), followed by the evaluation of valvular abnormalities (30%), congenital abnormalities (7%) left ventricular hypertrophy (11%), and endocarditis (3%). HCU echocardiography was able to confirm or reject the suspected clinical diagnosis in 159 of 203 patients (78%) whereas in 44/203 patients (22%) a hemodynamic assessment with SE Doppler was needed after the HCU. HCU data that were not referred for SE study by the cardiologist in 83% of the patients there was an excellent agreement with the clinical diagnosis (100%) and in 17% of the patients, unsuspected major findings were detected by the HCU and missed with the physical examination. Those findings were verified with the SE after request of the HCU echocardiographer. The agreement between the HCU and SE for the detection of major abnormalities was 98%, k=0.95. The HCU device missed 25% of minor and 4% of major abnormalities.

Conclusions: It is shown in this study that the introduction of new patients at the outpatient cardiology clinic often allows an instant diagnosis, the detection of unexpected cardiovascular abnormalities and may avoid referral to the expensive diagnostic ultrasound facilities in a considerable number.

A high diagnostic accuracy of hand-held echocardiography with cw/pw Doppler and tissue harmonic imaging. F. Knebel1, A.C. Borges2, T. Walde2, G. Baumann2. 1Berlin, Germany; 2Charité University Hospital, Berlin, Germany

Background: Previously developed hand-held echocardiography was evaluated with divergent results due to inherent technical limitations. New hand-held devices with CW/PW Doppler as well as tissue harmonic imaging were introduced in identical clinical settings. Comparisons were drawn between standard echocardiography and the gold standard and these new devices.

Methods: In 315 patients, two consecutive echocardiographic examinations were performed by experienced and independent examiners using hand-held echocardiography and standard echocardiography. The standard device used was a Sonosite 180plus (Sonosite Inc. Washington, USA) with a C15/4-2 (15 mm broadband, 4-2 MHz) transducer. Standard devices employed included Vingmed Vivid 5 &7 (GE, Horten, Norway).

Accuracy of the hand-held device according to underlying defects

Conclusions: Although there are at the moment restrictions about the use of HC machines in pediatric cardiology our study showed that about 80% of clinical questions could be answered. This is even better for certain categories as pericardial effusion and the presence of a VSD. Furthermore, because of its low weight and compactness the present HC machine was very easy to handle. Therefore, this machine certainly merits a place in pediatric cardiology.

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Sophia Children's Hospital, Pediatric Cardiology, Rotterdam, Netherlands

Introduction: In clinical practice several questions can be answered without ex- tensional echocardiography. Recently, hand-carried (HC) echocardiography devices have been introduced. These devices are attractive because of their size, portability. To test the utility of these devices we were not evaluated in pediatric cardiology.

Methods: In the present study we compared a HC device (Optigo; Philips Medical Systems) with a standard echo (SE) machine. (Sonos 5500, Andover, Massachusetts; Philips Medical Systems). Thirty-one consecutive patients were examined with both the HC device and the SE machine.

Results: Median age of the patients was 2.5 years (range 1 month to 17 years), median body weight was 16 kg (range 4 to 62 kg). Among the 31 patients 69 ques- tions (1-4 per patient) had to be answered. The HC machine gave a correct result in 65/69 questions, while 13 were false (19%). We subdivided the questions into six categories: the presence or absence of valvular stenosis or valvular insufficiency, the presence and location of a ventricular septal defect, ventricular function, the presence or absence of pericardial effusion and a rest-group. The rate of missed di- agnoses ranged from 0% in diagnosing ventricular septal defect (VSD) or pericardial effusion to 24% in diagnosing valvular insufficiency (Table 1).

Table 1

<table>
<thead>
<tr>
<th>Correct diagnosis</th>
<th>Incorrect diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular insufficiency</td>
<td>16</td>
</tr>
<tr>
<td>Vascular stenosis</td>
<td>9</td>
</tr>
<tr>
<td>Ventricle function</td>
<td>10</td>
</tr>
<tr>
<td>Ventricular septal defect</td>
<td>7</td>
</tr>
<tr>
<td>Pericardial effusion</td>
<td>7</td>
</tr>
<tr>
<td>Otherwise</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

Accuracy of the hand-held device according to underlying defects

Conclusions: Although there are at the moment restrictions about the use of HC machines in pediatric cardiology our study showed that about 80% of clinical ques- tions could be answered. This is even better for certain categories as pericardial effusion and the presence of a VSD. Furthermore, because of its low weight and compactness the present HC machine was very easy to handle. Therefore, this machine certainly merits a place in pediatric cardiology.