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Feasibility and utility of novel AI-tools in the daily obstetric ultrasound: Live ViewAssist™ and QualityCheck

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Introduction

A fetal obstetric scan, even when aiming for a “simple” growth assessment, can be time consuming. In fact, there is nothing simple about it. Identifying the correct, pre-specified fetal planes is paramount for fetal weight estimation within acceptable accuracy,[1] and basic anatomy should also be checked.[2] This demands complex cognitive functions and actions, known as “the sonographer loop”[3]: the process of identifying a correct plane, finely adjusting the image to it, then measuring and labelling fetal structures and storing the corresponding image demands a high number of manual tasks by the ultrasound examiner.

Ultrasound systems have been progressively equipped with artificial intelligence (AI) tools that are designed to reduce workload and potentially increase scan efficiency.[4] As deep-learning algorithms have evolved, so have these tools. The Live ViewAssist™ is one of these novel resources that aims to improve the workflow of obstetric scans. QualityCheck, as the name suggests, is a standardized quality assessment of the acquired images. It is an integral part of Live ViewAssist™, but can also be used by itself, on manually acquired images (i.e., not AI-assisted).

Methods And Results

The HERA Z20 high-resolution ultrasound system (SAMSUNG MEDISON Co., Ltd., Seoul, Korea) incorporates AI features such as Live ViewAssist™. This is a deep learning-based function that selects views of acceptable quality during live scans. It also integrates with existing software features, such as ViewAssist™, BiometryAssist™ and HeartAssist™, to provide anatomical annotations and measurements. While the examiner is performing a live scan, it can automatically recognize standardized fetal planes, annotate and measure structures, and store images, as the transducer is swept through the desired planes, with no need to freeze the scan (as depicted in Table 1). The system can be set-up to capture as many images of the same plane as desired and at a specific level of quality. Noticeably, the ultrasound operator can predefine which of these features will be used (annotation and measurement).

QualityCheck is another AI feature that analyzes a still image and recognizes the landmark structures that are meant to be displayed in that predefined plane according to international guidelines.[1, 5-8] It shows on the touch screen which of these structures have been identified and lacking (if any). If all criteria are satisfied, then the image is classified with a green label. However, if any of the criteria are not satisfied, the image is classified with a yellow label, meaning the plane is suboptimal. As stated above, Live ViewAssist™ uses the QualityCheck intelligence to assess the quality of acquired fetal standard plane images. Figures 1 and 2 show examples of the feature.

Figure 1. A transthalamic plane (TTP) was obtained from(a), and QualityCheck was applied to it, with results displayed in (b). The list of landmarks is shown on the right-hand side of the screen with green circles, meaning these landmarks were observed in the picture. Since all landmarks were met, the image was deemed to be of good quality (green label).

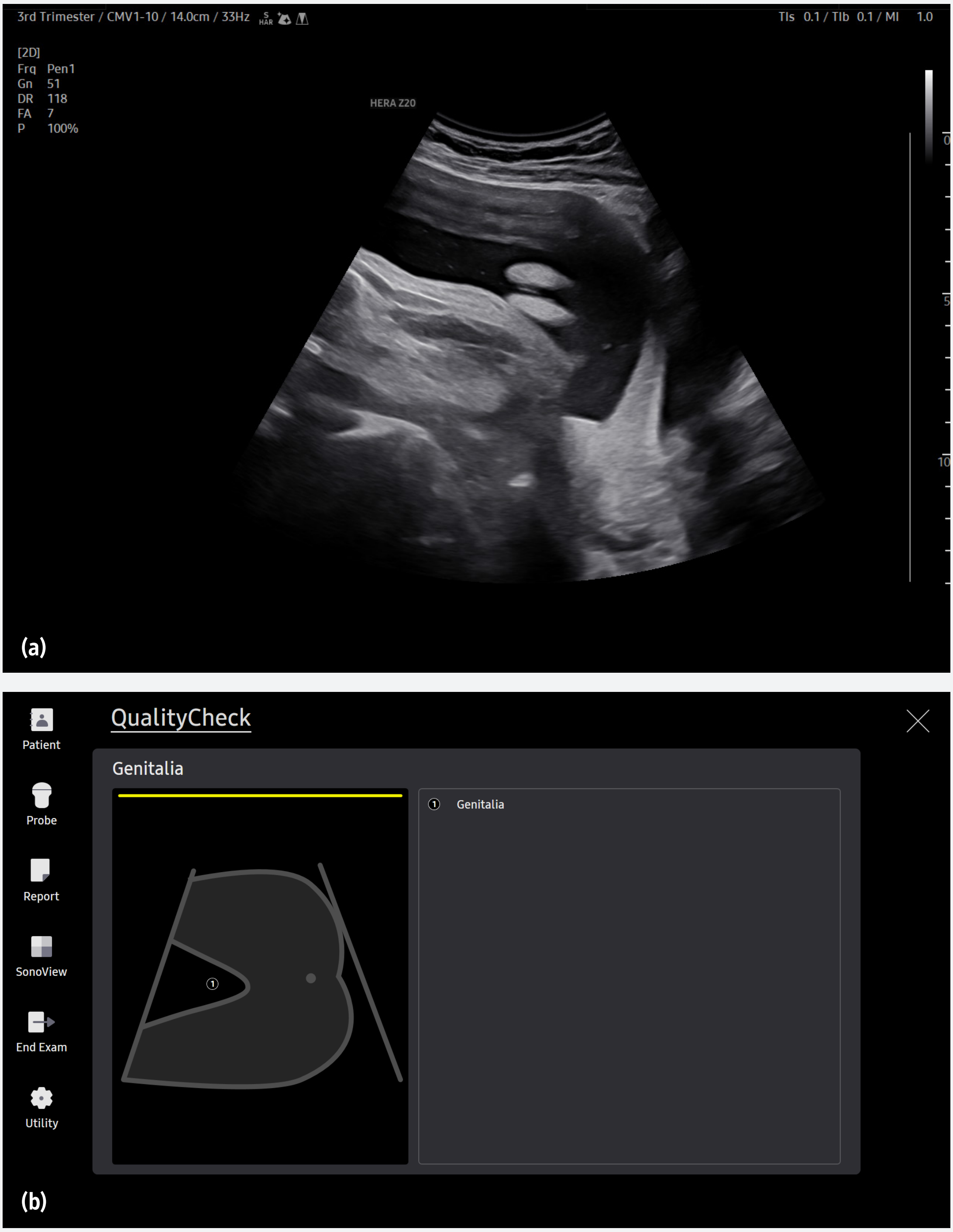

Figure 2. A suboptimal plane showing fetal female genitalia was obtained in (a), and QualityCheck was applied to it, with results displayed in (b). The system identifies this as a genitalia plane, but since the plane is not completely accurate, the landmark is shown in a dark circle, and the image classified with a yellow label.

A thorough fetal heart examination must correctly identify and measure some cardiac structures either in systole or diastole – e.g., the AV valves should be measured in diastole.[9] Figure 3 shows 4-chamber views captured by Live ViewAssist™ in 2 different moments of the heart cycle. While scanning in real time, the optimal view – including annotations and measurements – is automatically updated in sync with the cardiac cycle as soon as it is detected. Notice the 6-second difference between the two images.

Plane and cardiac structures labelling, and heart circumference measurements were also made automatically. For comparison purposes, manual performance of the same tasks was conducted and a total of 89 seconds was needed to achieve the same results (pictures not shown).

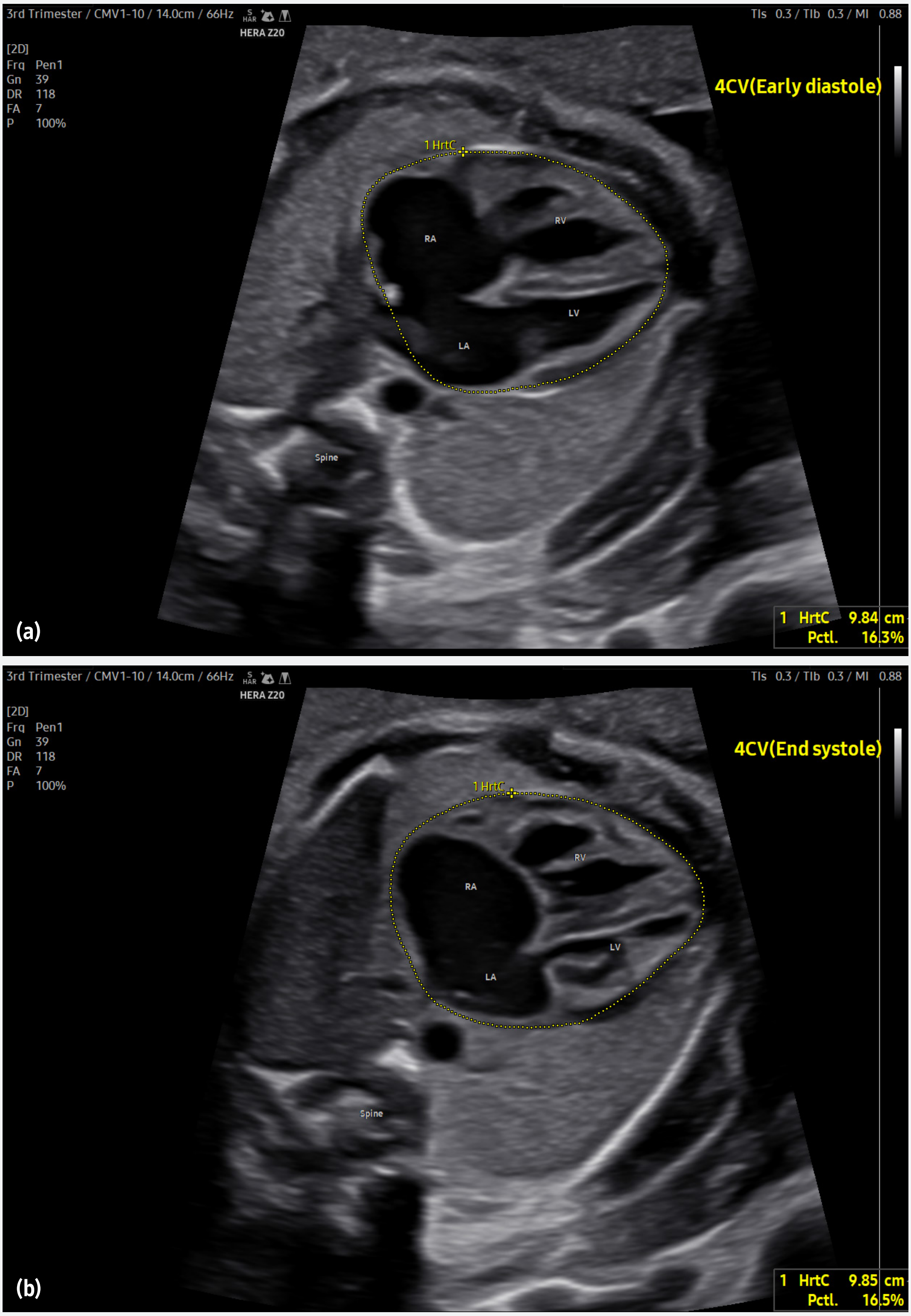

Figure 3. Four-chamber views in diastole (a) and systole (b), captured using Live ViewAssist™. The structures have been labeled and measured automatically. Within 6 seconds, 5 structures have been labeled (RA, RV, LA, LV, and Spine) in each image, both images were named, and both heart circumferences were measured. RA: right atrium, RV: right ventricle, LA: left atrium, LV: left ventricle

With Live ViewAssist™, the overall scanning time and workload of regular growth scans can be reduced – ultrasound operators can focus on finding and adjusting the correct plane, and the system will conduct the necessary steps to save, label and even measure the fetus. Images and measurements require examiner's review and approval before they are stored or sent to PACS. If necessary, examiner can adjust measurements or acquire new planes as needed, ensuring full clinical control and accuracy.

Excellent agreement between clinician opinion and QualityCheck opinion for correct plane and landmarks was obtained for the TTP, AC, and FL, which are important components of the fetal biometry, as they provide the estimated fetal weight. One could argue that experienced, well-trained professionals may benefit little from this feature, as they are usually aware of the landmarks required for a good image. However, ultrasound operator trainees can benefit from QualityCheck in real-time, with just one button click, and achieve better images while still scanning the patient. It is expected that the final result presented to the attending physician will be of better quality than that of traditional teaching methods.

Moreover, Live ViewAssist™ can also aid in ultrasound scans performed in regions where properly trained professionals are not available, increasing the benefit of ultrasound scans in these settings.

However, AI tools still need operators to run the transducer through the adequate planes – a cross-section of the fetal abdomen cannot be acquired if the sonographer only scans the fetus in a sagittal position. Additionally, reports should not rely solely on AI tools without human review. Reporting professionals should still verify that all images are accurate to reduce the risk of false diagnoses or incorrect measurements, as AI can also make mistakes.

Conclusion

AI-assisted scanning is now a reality in obstetric ultrasound and should be embraced not only as a technological advancement but also as a valuable clinical tool. Live ViewAssist™ streamlines the workflow by automating key steps in real-time — such as recognition of standard planes, annotations, measurements, and image storage — thereby reducing scanning time and examiner workload without compromising accuracy. QualityCheck assists with adherence to international imaging guidelines by providing instant, visual feedback on image quality, helping both experienced users to audit their scans and trainees to improve their technique on the spot. Together, these tools offer tangible clinical benefits: enhancing the consistency and reproducibility of fetal biometry, supporting standardized data acquisition, and expanding the reach of high-quality ultrasound, especially in resource-limited settings or in the hands of less experienced operators. On the other hand, limitations still exist regarding AI performance, and human skills and review are still necessary. Nonetheless, the integration of Live ViewAssist™ and QualityCheck into daily practice may thus contribute not only to efficiency but also to improved diagnostic confidence and training quality.

Table 1. List of Standard Fetal Planes, Annotations and Measurements with Live ViewAssist™.

<table>
<tr><th>Anatomical Area</th><th>Standard Plane</th><th>Annotation</th><th>Measurement</th></tr>
<tr><td rowspan="3">The fetal head</td><td>TTP</td><td>Thalamus
CSP</td><td>BPD
HC
OFD</td></tr>
<tr><td>TVP</td><td>Atrium
CP
CSP
Midline</td><td>Vp</td></tr>
<tr><td>TCP</td><td>CEREB
CM
Thalamus</td><td>CEREB
CM
NF</td></tr>
<tr><td rowspan="3">The fetal face</td><td>Nose/Lips</td><td>Nose / Lip</td><td></td></tr>
<tr><td>Orbit</td><td></td><td></td></tr>
<tr><td>Profile</td><td>Nasal bone</td><td></td></tr>
<tr><td rowspan="15">The fetal chest and heart</td><td>4CV (Early diastole)</td><td rowspan="3">RA
LA
RV
LV
Spine</td><td rowspan="3">Cardiac Axis
Thoracic Area
Heart Area
Thoracic Circumference
Heart Circumference
Thoracic Diam Trans
Heart Diam Trans
LV Width
RV Width
LA Width
RA Width
LV Area
RV Area
LA Area
RA Area
LV Length
RV Length
MV Annulus
TV Annulus</td></tr>
<tr><td>4CV (End diastole)</td></tr>
<tr><td>4CV (End systole)</td></tr>
<tr><td>LVOT (Systole)</td><td rowspan="2">LV
Asc.Ao</td><td rowspan="2">Aorta
AV Annulus</td></tr>
<tr><td>LVOT (End diastole)</td></tr>
<tr><td>RVOT (Systole)</td><td rowspan="2">RV
PA</td><td rowspan="2">PV Annulus</td></tr>
<tr><td>RVOT (End diastole)</td></tr>
<tr><td>3VV PA</td><td>PA
Ao
RPA</td><td>MPA Diam
RPA Diam</td></tr>
<tr><td>3VV</td><td>PA
Ao
SVC
Thymus</td><td>PA Diam
Ao Diam
SVC Diam
Thymus Diam</td></tr>
<tr><td>3VV Trachea</td><td>Darch
Aarch
Trachea</td><td>Ao Isthmus (3VT)
DA Diam</td></tr>
<tr><td>Ao Arch</td><td>Asc.Ao
Branch
Desc.Ao</td><td>Asc. Aorta
Ao Transverse
Ao Isthmus (Arch)
Desc. Aorta</td></tr>
<tr><td>Duct Arch</td><td></td><td></td></tr>
<tr><td>Bicaval</td><td>IVC / SVC</td><td></td></tr>
</table>

The fetal abdomen	Abdomen	Stomach UV Spine	AC APD TAD
	Abdominal Cord Insertion		
	Diaphragm		
	Kidney (Axial)	Renal Pelvis	
	Kidney (Sagittal)	Kidney	
	Kidney (Coronal)	Kidney	
	Bladder	Bladder	
The fetal musculoskeletal system	Spine	Cervical Spine Thoracic Spine Lumbar Spine Sacrum	
	Femur		FL
	Tibia/Fibula		
	Foot		
	Humerus		HUM
	Ulna/Radius		
	Hand		
The fetal gender	Genitalia		
Other structures	Placenta		
	Cervix		
The first trimester	CRL		CRL
	NT		NT NB IT
	Thorax	Thorax Heart	Cardiac Axis Thoracic Area Heart Area Thoracic Circumference Heart Circumference

3VV: 3 Vessel View; 4CV: Four-Chamber View; Aarch: Aortic Arch; AC: Abdominal Circumference; Ao: Aorta/Aortic; AoI: Aortic Isthmus; APD: Abdominal Antero-Posterior Diameter; Asc: Ascending; AV Annulus: Aortic Valve Annulus; BPD: Biparietal Diameter; CEREB: Transverse Cerebellar Diameter; CM: Cisterna Magna; CP: Choroid Plexus; CRL: Crown Rump Length; CSP: Cavum Septum Pelludicum; DA: Ductus Arteriosus; Darch: Ductal Arch; Desc: Descending; Diam: Diameter; FL: Femur Length; HC: Head Circumference; Heart Diam Trans: Heart Transverse Diameter; HUM: Humerus Length; IT: Intracranial Translucency; IVC: Inferior Vena Cava; LA: Left Atrium; LV: Left Ventricle; LVOT: Left Ventricular Outflow Tract; MPA: Main Pulmonary Artery; MV: Mitral Valve; NB: Nasal Bone; NF: Nuchal Fold; NT: Nuchal Translucency; OFD: Occipitofrontal Diameter; PA: Pulmonary Artery; PV: Pulmonary Valve; RA: Right Atrium; RPA: Right Pulmonary Artery; RV: Right Ventricle; RVOT: Right Ventricular Outflow Tract; SVC: Superior Vena Cava; SVC: Superior Vena Cava; TAD: Transverse Abdominal Diameter; TCP: Transcerebellar Plane; Thoracic Diam Trans: Thoracic Transverse Diameter; TTP: Transthalamic Plane; TV: Tricuspid Valve; TVP: Transventricular Plane; UV: Umbilical Vein; Vp: Posterior Horn of Lateral Ventricle

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