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Badreldeen Ahmed

Weill Cornell Medical College, Qatar

The introduction of 3D/4D based spatio – Temporal Image Correlation (STIC) during routine fetal anomaly scan improves rate of completion of fetal cardiac examination and decreases referral for fetal Echocardiogram

Objective: To assess STIC's contribution to the completion of the fetal cardiac examination during a standard abnormality scan.

Methods: This is a longitudinal observational study at a single center. One skilled feto-maternal specialist conducted all of the scans. 8750 patients had routine anomaly scan including fetal heart examination according to ISUOG practice guidelines. Scan time was kept to the time frame allotted to routine anomaly scan. Only when the examiner was unable to complete the list recommended by ISUOG (ISUOG practice recommendations), which includes demonstration of, was the STIC technique, both conventional and electronic probes, employment of Situs and general aspect, atrial chambers, ventricular chambers and atrioventricular junction and valves. For the conventional STIC we employed a multiplanar approach, tomographic ultrasound imaging (TUI) and rendering approach. For electronic STIC, in addition to rapid acquisition of the volume we have used Biplane and sonoVCAD.

Results: During the study time, 10750 patients were seen for routine anomaly scan 52 participants were identified as having congenital heart abnormalities during the investigation. The total number of fetal malformations diagnosed during the time of the study was 350 which mean cardiac anomalies constituted (4%) of all fetal malformation in this study. In 1312 patient (15%) of the total number of patients the examiner could not obtain the full images required as per ISUOG protocol. Accordingly both conventional and electronic STIC was used in this group, depending on the condition. In all these patients the obstetrician was able to complete the examination. STIC was also applied to patients where a cardiac anomaly was suspected. More information with regards to these abnormal cases was found in 10% of the cases.

Conclusion: In this study, we have demonstrated that the STIC technique enables us to collect a volume of sufficient

quality, enabling us to complete the cardiac assessment, lower the amount of cases sent to fetal cardiologists, and, ultimately, lessen patient concern. Although STIC did not affect our incidence of cardiac abnormality detection, it did contribute more information to the diagnosis, which aided in our early counseling.

Recent Publications

1. Ahmed B, Fakhry AB, Luetic AT, Kurjak A. Pattern and prenatal diagnosis of skeletal dysplasias in Qatar population. *J Matern Fetal Neonatal Med.* 2010 Dec; 23(12):1500-3. doi: 10.3109/14767051003678192. Epub 2010 Mar 30. PMID: 20350243.
2. Sufia Athar and Badreldeen Ahmad. Acquired Arteriovenous Malformation with Scar Pregnancy Causing Late Massive Uterine Bleeding: A Case Report. *Journal Of Case Reports: Clinical & Medical.* 2020; 3(3):156
3. Amnioinfusion in severe oligohydramnios with intact membrane: an observational study, Badreldeen Ahmed, <https://doi.org/10.1080/14767058.2021.1918081>

Biography

Ahmed is the Professor of Clinical Obstetrics and Gynecology and the Director of Feto-Maternal Medicine Centre in Doha, Qatar. He also served as Interim Director, Obstetrics and Gynecology Clerkship at Weill Cornell Medicine – Qatar. Additionally, he is a Consultant Obstetrician and Gynecologist (with special interest in perinatal medicine and high-risk pregnancy) at the Dorset County Hospital, Dorchester, Wessex, United Kingdom. Dr. Ahmed served in the capacity of Chairman, Obstetrics and Gynecology Department, Women's Hospital, Hamad Medical Corporation in Doha, Qatar for 10 years. He is a founding member of the 'International Society of Ultrasound in Obstetrics and Gynecology' (ISUOG) and the 'Academy of Medical Educators'. Dr. Ahmed's main areas of interests are fetal medicine and high-risk pregnancies. He has published over 50 papers in peer-reviewed journals. He has written chapters in several books and is the editor for 'Basic Book of Ultrasound in Obstetrics and Gynecology'. Dr. Ahmed has been an invited speaker at several international meetings and is a reviewer for many international peer reviewed journals.

profbadreldeen@hotmail.com