

**Michigan Sonographers Society 40th Annual Kickoff Meeting Minutes; September 23, 2015
Southfield Marriott**

Sponsor: John Blough; Samsung Medical Consulting & Solutions

Featured Speaker: Dr Lami Yeo; Wayne State University

Topic: 5D Fetal Heart Ultrasound; Fetal Intelligence Navigation Echocardiography (FINE)

MSS President Liz Lawrence welcomed everyone to the **September Michigan Sonographers Society Kickoff Meeting** as we celebrate our **40th year as a society**. Liz shared how fortunate we are to have such excellent speakers and sponsors; and how appreciative we are of them and their continued support. Without them, we could not provide the quality meetings and interesting and pertinent sonography lectures year after year.

Interesting Case : Importance of Patient Medical History in Sonography ; Presented by: Denise Drumm, RT(R); RDMS -DMS Clinical Coordinator Lansing Community College~~

Denise talked about the importance and legal obligation we have to present a complete, concise and pertinent patient medical history (PMH.) *Standard of care* refers to the degree of prudence and caution required of an individual who is under a duty of care for another. The SDMS (www.sdms.org) standard for patient information/assessment/evaluation is as follows: "Sonographer interviews and gathers relevant information and acts as their representative, and gathers pertinent information from the patient's medical records."

We have the capability nowadays to access our patient information from the EMR (electronic medical records systems.) This coupled with an interview of the patient allows us to answer the question posed: Are we providing enough information for our interpreting physician? Standard questions for the Abdomen US include : NPO status; location of pain; N&V duration and food triggers; surgical history; DM or HTN; changes in weight and bowel habits; cardiac history; jaundice; alcohol use; personal history of cancer and previous imaging/lab values.

Denise's *first case* involved a 59yo male who presented for RUQ US with PMH hernia surgery; MI 2 months ago with stent insertion. Pt had positive history of RUQ pain x 10 days and difficulty with digestion. Pt had a negative history of HTN/DM/ and all other areas outlined in prior paragraph. US images showed an area in the pancreas that mimicked a mass with no dilatation of bile ducts or pancreatic ducts and patient had elevated amylase/lipase. The diagnosis was focal pancreatitis confirmed by CT. *Discussion:* a mass more than 3 cm in the head of pancreas would have dilatation of the pancreatic ducts and intra/extra hepatic bile ducts. The takeaway: If your initial thought of the diagnosis (i.e. possible pancreatic mass) doesn't make sense, look further.

The *second case* involved a 22yo male with fatigue x 3 months and intermittent fevers with a 10# weight loss x 3 months, with no hx DM/HTN/jaundice. Labs: elevated WBC/decreased RBCs. US order diagnosis: splenic enlargement. US showed enlarged spleen but also showed masses/mass-like areas throughout the spleen. Pt was asked if he realized swelling in his armpit/lumps near clavicle. He did and mentioned a recent biopsy was performed. The diagnosis: Hodgkin's Lymphoma confirmed by biopsy. *Discussion:* Pt is young; healthy prior to last few months; pt is correct age for Hodgkin's lymphoma. The takeaway: keep asking patient's questions; in this example the patient didn't realize the significance of axilla swelling/biopsy – and it was not stated on the physician's order.

John Blough; MBA–President of Medical Consulting & Solutions Inc. Distributor of Samsung products.

John stated as he travels nationally that our MSS society of one of the largest and longest established in the country; as evidenced by over 100 attendees in the audience tonight.

Samsung is the 6th most recognized brand globally; the 2nd highest patent holder~ spending \$15 billion/yr in R&D. Samsung Electronics has contributed to the digital revolution through products that encompass innovative technologies, original designs, convenience, and customer values, and has always been a leader in this area. Since then, Samsung Electronics is continuously presenting new products that predict the demands of tomorrow and thus is leading the global digital market. Long before the merger with Medison, Samsung Electronics had a continuing interest and investment in the medical equipment industry. By branching out into the medical equipment industry, Samsung Electronics aims to become a global leader as a healthcare corporation through joining together its display, semiconductor, and mobile businesses.

Their ultrasound systems utilize LED high definition technology~~ some of the other vendors/systems utilize LCD. This gives Samsung the ability to go from 85% piezoelectric capability to near 100%; which allows for better visualization. The advanced technical capabilities that the RS80A with Prestige features are built on the successes of Samsung technologies, including superior image quality, while offering exclusive options. The features such as S-Fusion and S-Shearwave provide diagnostic confidence and user convenience in challenging practices. The WS80 Womens health system with upgraded 3D imaging engine, allows for clearer and more detailed images. Furthermore, advanced S-View transducer technology provides enhanced vision of the scanned areas, ensuring confidence in clinical decisions.

Dr Lami Yeo-Associate Professor -Dept OB/Gyn; Wayne State University School of Medicine; Maternal Fetal Medicine *Dr. Yeo has authored over 140 peer-reviewed publications, is the first author of 15 book chapters and co-author of 8 additional chapters in the fields of ultrasound, fetal cardiology, and Maternal-Fetal Medicine. Due to her involvement in fetal cardiology, she has also contributed to 5 media presentations produced by the AIUM. Dr. Yeo has developed and published over 15 fetal cardiac algorithms using four-dimensional sonography; one such method to examine the fetal heart has led to the filing of a patent through the U.S. Patent and Trademark Office, in which she is a co-inventor. As an employee of Wayne State University and in the interest of full disclosure, Wayne State University holds all rights and ownership of Dr Yeo's contribution to this technology.*

Diagnosing Congenital Heart Defects prenatally with 5D US technology.

In the U.S. the ratio of births with congenital heart disease (CHD) is 7-9:1000 depending on the literature source. As one of the more common fetal anomalies, it still remains one of the most difficult to diagnose in utero. To put things in perspective, the fetal heart at 20 weeks is about the size of a nickel; a VSD is about the size of Jefferson's nose on the nickel.

Fetal 4 chamber heart views were once thought to rule out up to approximately 75% of fetal anomalies (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1767391>.) However, in the past decade or so, case analysis has proven the success rate is a dismal 15-39% globally when utilizing fetal 4-chamber view only, depending on the literature source.

When adding outflow tracts to the interrogation, the percentage of diagnosis of CHD is increased to approximately up to 70-85%-depending on the literature source.

Utilizing Fetal Intelligent Navigation Echocardiography (FINE) 5D Heart Technology can help improve the performance of fetal echocardiography by shortening the examination time, providing the nine standard cardiac planes which are necessary to examine the fetal heart thoroughly.

5D workflow refers to semi-automated identification of specific diagnostic image planes and measurements from a volume data set. 5D Heart is an innovative application designed to simultaneously display nine standard fetal cardiac views by applying intelligent navigation technology to volume datasets of the fetal heart.

As we understand that 2D is essentially an axial image, and 3D US is obtained by volume and 4D US is volume with time, 5D US workflow refers to semi-automated identification of specific diagnostic image planes and measurements from a volume data set.

5D US technology is a form of automation where once the data points are input, the results are auto-populated for diagnosis. 5D technology takes a more complex exam and provides assistance in getting that exam done or finding a way to semi-automate that exam, which improves the Ultrasound department workflow dramatically. This will allow physicians to diagnose those fetal cardiac anomalies that were previously not visualized with conventional 2D or 3D/4D US.

The other big advantage is that once standardization is introduced in obtaining those fetal cardiac images that have been traditionally difficult to obtain~~measurements—and how the fetal heart is interrogated is improved by volume data analysis. This will improve consistency and will increase the ability to diagnose the most difficult fetal cardiac anomalies~~as proven by evidence-based outcome trials globally.

STIC (Spatial Temporal Image Correlation) allows the rendering of the fetal cardiac system so that 5D technology and intelligent navigation can process the data to mark/plot a set group of certain areas of the fetal heart for diagnosis of fetal cardiac anomalies. STIC volume is accomplished by taking a cine clip of the upper mediastinum to the stomach of the fetus.

The fetus should be in a cephalic position and the fetal spine must be imaged between 5:00 and 7:00 with no fetal movement in the image in order for STIC to successfully evaluate for the more difficult fetal cardiac diagnoses including tetralogy of fallot; transposition of the great vessels, hypoplastic left heart syndrome; pulmonary atresia; TAVPR (totally anomalous pulmonary venous return); coarctation of the aorta; VSD etc.

The system will plot/visualize and annotate the fetal cardiac structures and will also let the sonographer/sonologist know if the fetus is in any position other than cephalic and will allow the operator to correct for this variation.

It is necessary to mark these seven fetal anatomical structures for the 5D technology to be utilized successfully: **1)** Aorta at the stomach **2)** Aorta at 4-chamber view **3)** Cardiac crux (i.e. where lower part of atrial septum meets upper part of ventricular septum) **4)** Rt atrium **5)** Pulmonary valve **6)** Superior vena cava **7)** Transverse view of aortic arch.

Once these components are met, it is our understanding that 5D imaging technology will safely and quickly allow visualization of the following fetal structures allowing for required rendering to evaluate for even the most difficult to diagnose fetal anomalies.

The nine necessary fetal views are: **1)** 3 vessels and trachea view (3VT) (i.e. superior vena cava; ascending aorta; and main pulmonary artery) **2)** 4-chamber view **3)** 5-chamber view **4)** left ventricular outflow tract (LVOT); **5)** Pulmonary artery (PA) **6)** Abdomen/stomach **7)** ductus **8)** aortic arch; **9)** vena cava. The 5D system will plot/mark these areas as part of the software capability for the sonographer and will render/post process these areas to evaluate for fetal cardiac anomalies.

In conclusion: the standard ultrasound examination of the fetus has been agreed upon between three professional organizations, the American Institute of Ultrasound in Medicine (AIUM) (2003), the American College of Radiology (ACR) (2003), and the American College of Obstetricians and Gynecologists (ACOG) (2004). All three organizations recommend identical protocols for imaging the fetus; irrespective of whether the examination is performed by a radiologist, obstetrician, or specialist in fetal-maternal medicine.

“Fetal cardiac anomalies are common, with half of them being lethal or requiring complex surgeries. Early detection of these anomalies enables early referral to tertiary care centers with adequate expertise. Fetal cardiac ultrasound performed between 18 and 22 weeks enables detection of many of these malformations. Further comprehensive evaluation can be performed with a dedicated fetal echocardiography, particularly in high-risk pregnancies and in cases with extra-cardiac anomalies.” (source: <http://www.ajronline.org/doi/full/10.2214/AJR.10.7287>)

It is important to note: The American College of Radiology (www.acr.org) has added outflow tracts as part of a level one fetal ultrasound screening (www.acr.org amended 2014; Resolution 39) as a minimum standard of care in the ultrasound interrogation of the fetal cardiac system.

The MSS meeting was adjourned by Liz Lawrence after free raffles/drawings. Two 42” Samsung flat screen TVs and one Samsung tablet were donated to three lucky MSS attendees by our sponsor John Blough; President Medical Consulting & Solutions. Refreshments and dinner were also provided.

Attendees were encouraged to join us for the **next MSS Meeting**: Wednesday, October 21, 2015 at St. Mary Mercy Hospital in Livonia. Our guest speaker will be: **Dr. Sunil Bajaj**; Radiologist Karmanos Cancer Institute: **Topic: Breast Ultrasound**.



Respectfully submitted by:

Julie Atkinson, MPA, BBA, RDMS, RVT;
Secretary; Michigan Sonographers Society