

Life with ultrasound: A career perspective

Then



And now



1

Been there, done that

Sometimes, "wish I hadn't done that"

2

History of Obstetric Ultrasound

A stroll down memory lane



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Evolution of Ultrasound Imagery

A mode 1960s

B mode 1970s—real-time at the end

Gray scale 1980s

Doppler 1980s

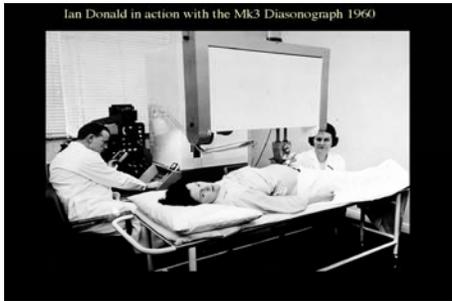
Sophisticated Color Doppler 1990s

3-D and 4D 2000s

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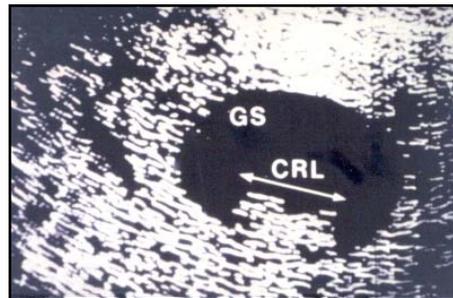
Ian Donald and Early US System

Ian Donald in action with the Mk3 Disonograph 1960



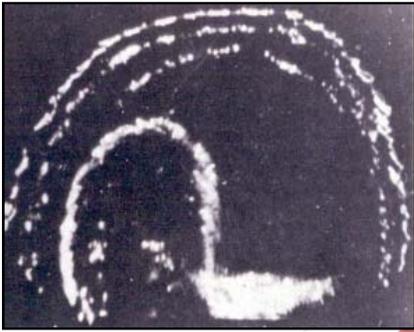
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The first images required some imagination



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Another vintage image



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A breakthrough in U/S imaging



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Now: even facial expressions



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The Role of Ultrasound Today

Now:

Virtually every pregnant woman in the USA has at least one scan
Dating pregnancy should no longer be an issue

Most of the major fetal anomalies can be diagnosed early in pregnancy

Beneficial in every complication of pregnancy

The management of under-grown fetuses can be optimized

Needles can be placed into 3 mm targets (CVS, amnio, PUBS, IU transfusion)

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The menu from here: helpful hints and a few gripes

1. Use the technology to its fullest, including clips and 3-D.
2. Make the most of the first trimester scan
3. Take control of your ultrasound training.
4. Don't let skills languish
5. Conveyor belt operations
6. The benefits and dangers of rigid protocols (dicta).
7. Watch for trends rather than relying on one snap-shot for decision making

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The first trimester scan

There has been a justifiable emphasis on nuchal translucency but that is just a small part of it.

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Obesity



Big Mac 576 Calories
Large Coke 310 Calori
Large fries 500 Calori

Total: 1386 calories

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First trimester Ultrasound

Reasons to underscore the importance of this exam:

1. Best time to date pregnancy
2. Maybe the only chance to get information
 - a. Obesity
 - b. Inconsistent patient compliance

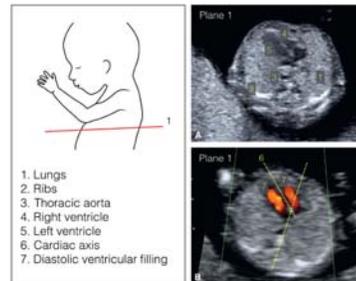
Experience has allowed for a more comprehensive approach

Advantage of transvaginal approach:

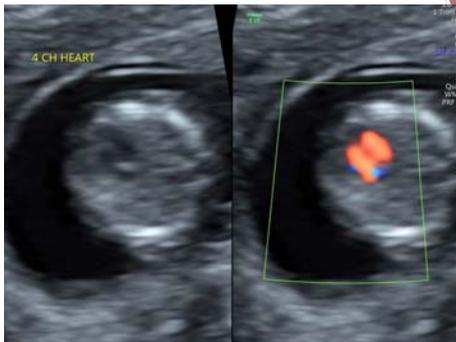
Advantage of color Doppler: especially in cardiac evaluation.

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Cardiac axis: excellent screening feature



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First trimester screening for cardiac defects

152 patients with BMI > 30.

Each had first trimester and second trimester standard screening (situs, 4 chamber views, outflow tracts, and 3 vessel views)

Results:

77% completion rate in first trimester and 70% with 2nd trimester scan. 96% when combined.

If BMI > 40, the success rates were 69% in first trimester vs 38% in second trimester

Majeed et al. J Ultrasound Med 2019;38:2057-63.

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First Trimester Anatomy: Intra-cranial Translucency

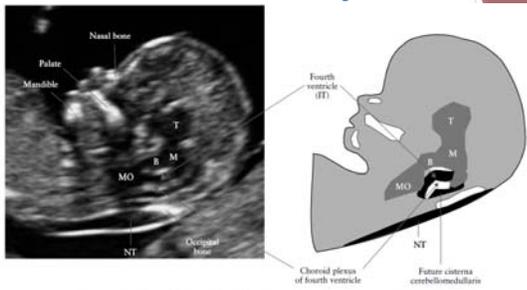


Figure 1 Ultrasound image in the mid-sagittal plane of the fetal face showing the nasal bone, palate, mandible, nuchal translucency (NT), thalamus (T), midbrain (M), brain stem (B) and medulla oblongata (MO). The fourth ventricle presents as an intracranial translucency (IT) between the brain stem and the choroid plexus.

Chaoui R, et al. Ultrasound Obstet Gynecol 2009; 34: 249-252

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The beauty of clips

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Clip of posterior fossa



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Example of clip in possible agenesis of the corpus callosum



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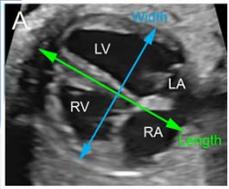
Fetal cardiac
function: where
clips offer the
greatest benefit

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Is There A Screening Test That Would Identify Fetuses With an EFW <10th Centile Who Would Be At Risk For Cardiac Dysfunction?



50 Fetuses With An EFW <10th Centile
IRRESPECTIVE OF DOPPLER FINDINGS

86% Had One or More of the Following End-Diastolic Abnormalities Of the 4-Chamber View

- 1 Increased area
- 2 Increased width
- 3 Decreased GSI

86% Had Abnormal Ventricular Contractility Using Speckle Tracking Analysis

(Hobbins JC et al. in Press AJOG, 2019)

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The Brain

When a possible CNS abnormality arises, always attempt the transvaginal approach.

Best example: "mild" ventriculomegaly where midline structures may play a central role

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The Brain Stem and Vermis

Leibovitz UOG 2014: 43: 147

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2D and 3D of brain: TVS may afford the only adequate views

3D Volume

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MRI vs U/S in mild to moderate ventriculomegaly

A meta-analysis from 16 centers

U/S first followed by MRI in 1159 patients

Overall: 10% missed by U/S were picked up by MRI

BUT

Only 5% missed by dedicated TVS (vs 16.8% by TAS axial acquisitions)

Very few missed by U/S when ventricular width 1.0 cm- 1.25 cm

DiMascio et al Ultrasound Obstet Gynecol 2019; 54: 164-71.

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Comments by Paladini regarding meta-analysis

1. Most misses with U/S occurred when radiologists were first authors.
2. Best predictive value when OB/perinatologist was first author and transvaginal approach was used

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Need to catch up with our European colleagues with 3-D

Paladini, US
Obstet Gynecol
2019;54:151

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Today's protocols

They help to keep everyone on the same page in a patient's management, especially in an era of shift medicine.

They can offer some medical-legal protection.

But they can also discourage any thinking outside the box

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Management guidelines and assessments of trends

Instructive case (s)

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Fellowship: Time to hone skills
Later on: When skills can be lost

Training in most residency programs is inadequate so those entering fellowships are starting short-changed.

Fellowship training is inconsistent

The time requirements of perinatal practice detract from an ability to maintain ultrasound skills.

But also: more dependence on sonographers

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Importance of ultrasound

1. It provides essential information regarding almost every problem that we encounter.
2. It engages patients collaboratively in their care
3. It occupies a majority of our time

It is our bread and butter

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Yet, by any measure the quality of training is woefully lacking

- ▶ Detection rates for fetal anomalies: 13%-82%, best is in Europe
- ▶ CREOG: 75% of residencies have < 4 weeks rotation in U/S
- ▶ Fellows: Only 20% of fellows knew about U/S safety standards

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U/S training is deficient

Survey:
Interviews with 15 applicants for perinatal fellowships.
“Rate the quality of your U/S training in your residency on a scale of 1 to 10”.
Results: One a 9, two a 6, average 4.*

* HHAS

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Special Report

Proceedings: Beyond Ultrasound First Forum on improving the quality of ultrasound imaging in obstetrics and gynecology
Beryl R. Benacerraf, Katherine K. Minton, Carol B. Benson, Bryann S. Bromley, Brian D. Coley, Peter M. Doubilet, Wesley Lee, Samuel H. Maslak, John S. Pellerito, James J. Perez, Eric Savitsky, Norman A. Scarborough, Joseph Wax, Alfred Z. Abuhamad

Obstetric and gynecologic ultrasound curriculum and competency assessment in residency training programs: consensus report
Alfred Abuhamad, Katherine K. Minton, Carol B. Benson, Trish Chudleigh, Lori Crites, Peter M. Doubilet, Rita Driggers, Wesley Lee, Karen V. Mann, James J. Perez, Nancy C. Rose, Lynn L. Simpson, Ann Tabor, Beryl R. Benacerraf

Expert Reviews

Premenstrual disorders
Kimberly Ann Yonkers, Michael K. Simoni

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Solutions to inadequate training

1. A comprehensive curriculum for residents and fellows
2. Competency assessment for both residents and fellows

But there is one essential ingredient required for these programs to work:
TIME!
This will require a thoughtful reappraisal of training priorities. Something has to give. Not ultrasound.

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Only 4 ways to learn ultrasound during fellowship

1. Didactic sessions - *the knowledge*
2. 1-on-1 with sonographers - *the basics*
3. 1-on-1 with attendings - *the art*
4. OJT - *the skill*

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In the end: It's up to you

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Also, don't let your skills languish

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Dependence upon sonographers

Common provider statements:

"I don't need to do much scanning. I have a great sonographer!"

Or

"I don't have enough time for that"

Rationalizations that don't cut it.

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Not enough time: a demand/supply mismatch

Demand (overuse):

1. Unnecessary scans
 - a. Well- intended, but misguided, diagnostic requests
 - b. Insecurity (malpractice fears)
 - c. Greed

Supply: simply inadequate resources

So, something has to give!

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The common solution to the supply/demand mismatch

"We need to see more patients in the same amount of time"

Ergo: speed up the conveyor belt

This results in burnout for everyone and repetitive movement injuries for sonographers and, most importantly, patient dissatisfaction.

So: the answer is no!

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An answer to today's occasional frustrations

BIBOMO

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Katrina- Buffett the poet

I bought a cheap watch from a crazy man floating down Canal.

It doesn't use numbers or moving hands.

It always just says "now".

You may be thinking that I've been had

But this watch is never wrong.

And if I have trouble, the warranty said,

Breath in, breath out, move on.

BIBOMO!



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Parting thought

This is the most rewarding
job anybody can have
and
Ultrasound contributes to
that enjoyment every day.

Relish it!

