Ultrasound in Tropical Diseases
“A Curriculum”

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For the “Working Group”
Goals and Objectives

- Present a “body of knowledge” and curriculum for those interested in scanning outside the western (or developed) world
  - Especially in “Tropical” environments
  - Taught this many times

- No conflict of interests.
They All Just Want to Go and Scan and Help

What do they need to know before they go?

February 2015- students on “International Ultrasound Elective”

What do they need to know before they go?
Are There “Specific” Things We Need To Know (before we go)?

Drs. Enrico Brunetti and Matt Lyon- members of the “Working Group”
Tropical Infectious Diseases

3 categories of Diseases for Ultrasound

1. **Accepted** or **Established** Utility in Diagnosis, Treatment or Screening
   a. I see you and know what you are and know what to do with you

2. Demonstrated or Accepted Use as an **Adjunct** to Diagnosis or Treatment
   a. I see you and with another piece of information, know what you are and what to do with you

3. **Unknown** or Unexplored Utility for Diagnosis, Management or Treatment
   a. I see you, know what you, are but don’t know what to do with you (the information)
#1 Accepted or Established Utility in Ultrasound Diagnosis, Treatment or Screening

I see you and know what you are and what to do with you
(clinically integrate the information)
I see you and know what you are and what to do with you

Hepatic Echinococcus

Images courtesy of Francesca Tamarozzi
Accepted or Established Utility

Population Screening for Cystic Hydatid Disease

Scanning in Tibet

Photo from Amy Hou

Scanning in Peru
Accepted or Established Utility

- Liver abscess

E histolytica abscess
Liver Abscess
Drainage of liver abscess

Ultrasound guided drainage
Splenic Abscess
I see you and know what you are and know what to do with you
Tropical Pyomyositis

Rural Thailand
Diagnostic- Tropical Pyomyositis

Video Clip courtesy of Dan Kaminstein
I see you and know what you are and know what to do with you

*Therapeutic-Tropical Pyomyositis*

Video courtesy of Monica Kumar
Accepted or Established Utility
Post-Rheumatic Fever Complications

Rheumatic valvular heart disease
Affects young in productive years
This man has end-stage mitral valve disease

PSL- large LA and billowing mitral valve
Adjunct to Diagnosis Or Treatment
Rheumatic Valves and Endocarditis

Presumed endocarditis aortic valve
“Where there is smoke, there may be fire”
Accepted or Established Utility
Cardiomyopathies and
Endomyocardial Fibrosis (EMF)

Video clip from Raghu Venugopal from Chad
Accepted or Established Utility

Myiasis

Video Clip from Joachim Richter

Bot Fly

Image from DPDRx
Dermatobia hominis
Accepted or Established Utility

Myiasis

Image from Joachim Richter- Heinrich Heine University, Dusseldorf, Germany

Sonographic Detection of Subcutaneous Fly Larvae in Human Myiasis
#2 DEMONSTRATED OR ACCEPTED USE AS AN ADJUNCT TO DIAGNOSIS OR TREATMENT

I SEE YOU AND WITH ANOTHER PIECE OF INFORMATION, KNOW WHAT YOU ARE AND WHAT TO DO WITH YOU
I see you and with another piece of information, know what you are and what to do with you (Niamey-Belo Horizonte)

Diagnosis and **Grading Schistosomiasis**

Echogenic ruff  
S japonicum

Images from Joachim Richter- Heinrich Heine University, Dusseldorf, Germany

Ultrasound in Schistosomiasis, Second international workshop Niamey, Niger  
1996, WHO
WHO Classification of Peri-portal Fibrosis (Ultrasound Criteria)

- A = normal
- B = diffuse echogenic foci - starry sky
- C = Ring echos around vessels - pipe stems
- D = echogenic ruff around portal bifurcation
- E = Hyper-echogenic patches extending into parenchyma
- F = echogenic bands and streaks extending from main portal vein to liver surface
- X, Y, Z = other liver disorders
Finding Eggs in Stool or Urine
Diagnosis and *Grading* Schistosomiasis

*Live Schistosomiasis Eggs (Flame Cells) in stool specimen*

*S. Mansoni egg from DPDRx*
Diagnosis, Treatment or Screening

Schistosomiasis (Niamy B)

WHO schistosomiasis classification “B”- diffuse echogenic foci- e.g. starry sky
Diagnosis, Treatment or Screening

**Schistosoma haematobium**

(Grading criteria)

Polyps, hydronephrosis, hydroureter, thickened bladder wall, bladder cancer

*S. hematobium* egg in urine from DPDRx
Don’t Swim in Fresh Water in Africa! (and parts of Asia and South America)

Kids Jumping into the Niger River - endemic for schistosomiasis
See you next year!!!!

The praziquantel leap of faith
Adjunct to Diagnosis Or Treatment
Biliary Colic or RUQ Pain due to Helminth infection

Fasciola of liver
Adjunct to Diagnosis Or Treatment- worms in the gall bladder

- Fasciola hepatica of the Gall Bladder

Video Clip from Adnan Kabaalioğlu
Accepted or Established Utility

or **Adjunct** to Diagnosis

- Ocular larva migrans

**Toxocara in a 5 y.o- Cayetano**
Adjunct to Diagnosis - Pulmonary TB

Fluorescent microscopy for TB in the field
Adjunct to Diagnosis - Extra-Pulmonary TB (by ultrasound)

- Ultrasound + positive smear or culture for TB
  - TB lymphadenitis
  - Renal TB
  - TB peritonitis
  - Ocular TB
  - Potts’ Disease
  - TB Psoas abscess

TB Lymphadenitis
FASH- Focused Assessment with Sonography for HIV/TB

- Smear negative or EPTB are common in the immunosuppressed patient. Diagnosis is difficult in smear negative patients in areas with limited resources for culture.

- Help with diagnosis of extra-pulmonary and disseminated forms of TB which are frequently seen in patients with HIV.
  - Useful in HIV prevalent settings
  - Smear negative for TB and EPTB
  - HIV rate > 5% among TB patients
FASH Objectives

- Detect **effusions** which might suggest pleural, pericardial or abdominal TB
- Detect enlarged abdominal **lymph nodes**
- Detect **focal lesions** in the liver and spleen which might suggest disseminated TB or miliary TB in immunocompromised patients
“Other” Uses of Ultrasound in HIV disease

- Malignancy- lymphoma- Kaposi’s
- Focal Lesions of liver
- HIV nephropathy
- PCJ infection in liver and kidney

HIV nephropathy
Adjunct to Treatment
Hemorrhagic fevers (Dengue, Yellow Fever)

Positive tourniquet test

White Islands on a Red Sea
Use as an **Adjunct to Diagnosis or Treatment**

Adjunct in hemorrhagic fevers (hemoperitoneum)

- Free fluid in abdomen
- Right sided pleural effusion
Use as an **Adjunct to Diagnosis or Treatment**

- Pulmonary Echinococcus

Missed with linear probe
Seen only with sector probe)
Use as an **Adjunct** to Diagnosis or Treatment  
Lymphatic Filariasis

Is filarial dance common enough to be helpful???
Use as an **Adjunct** to Diagnosis or Treatment

Lymphatic Filariasis (*Bancroftian*)

- Echo-dense Hydrocele > 2 mm
- Filarial Dance Sign

Floating particles in hydrocele skin thickness > 4.5 mm

Video clip from Francesca Tamarozzi (This is filariasis)
Unknown or Unexplored Utility for Diagnosis, Management or Treatment

I see you, know what you, are but don't know what to do with you
(clinically integrate the information)
I see you but don't know what to do with you
Systemic Granulomatous Disease

- Splenic, hepatic and pleural microcalcifications
  - In absence of other chronic diseases
I see you, know what you are but don't know what to do with you

- **Onchocerciasis**: worm movement inside nodule

*Image from Francesca Tamarozzi*
I see you, know what you, are but don’t know what to do with you

- Nerve enlargement in leprosy

Peripheral nerves are frequently enlarged in Tuberculoid and borderline leprosy

Testing peripheral nerve sensation with cotton in tuberculoid patient
I see you but don’t know what to do with you

Scanning at Leprosy hospital, Thailand

Thickened sural nerve - longitudinal
I see you but don’t know what to do with you

● Hypertrophic Splenomegaly Syndrome
  ● Chronic malaria or visceral leishmaniasis?
I see you but don't know what to do with you

Mycetoma

Mycetoma/Madura Foot (Treated for 6 months)
I see you but don’t know what to do with you

Evaluation of Tropical Ulcers

Buruli Ulcer
We Have Scanned the World

Myanmar border
We Have Scanned the World

Mt. Everest
We Have Scanned the World

Not pregnant - large abdominal mass

Bangladesh Delta
We Have Scanned the World for You

Mali, West Africa

Dr. Dan Kaminstein
We Have Scanned the World

Southern Cambodia
We Have Scanned the World

Central Belize
We Have Scanned the World

Guinea, West Africa
We Have Scanned the World

Panama
We Have Scanned the World

South Asia
We Have Scanned the World for You

Scanning at Cayetano, Lima, Peru 2015
We Have Scanned the World for You

Francesca Tamarozzi and Tom Heller, members of “Working group”

“Working Group” on bus in Lima, Peru
And This is A Good ….. Start!

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Questions???????

The end- or the beginning-for you?