



## EUS teaching and training




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Brussels,  
January 27-29 th 2011

## Are currently EUS resources sufficient to meet the hypothetical demand ?

Number of indications of EUS investigations still growing up : France 50 000/year 1999 80000/year 2008	Number of articles devoted to EUS 3689 papers in 65 journals (1980-2010)
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Lowest number of EUS procedures per year requested for accurate diagnosis :  
200-250 / year

Endoscopy units performing EUS have to be increased

Training programs for EUS have to be increased

Fusaroli Endoscopy 2002; Ainsworth Endoscopy 2002

## EUS learning curve

- Value of EUS directly proportionnal to the training, skill experience of the operator
- Experience : 200-250 procedures per year (close to ERCP 300-350/year)
- Training : requires 6 months minimum in a center performing > 300 EUS/year

Ainsworth Endoscopy 2002; Sivak Gastrointest Endosc 2002

## EUS learning curve

- Achieving competence for mucosal or submucosal anomalies : minimum 125 procedures (ASGE guidelines)
- Achieving competence for EUS : minimum 150 EUS proc.  
 75 for pancreatico-biliary diseases  
 50 for FNA

Eisen ASGE Gastrointest Endosc 2001; Savides Gastrointest Endosc 2000


## Impact of EUS training on EUS accuracy

- Accuracy of EUS staging for esophageal cancer improved for T staging from 64 % to 90 % but not for N staging
- Short training (2 months) improved FNA accuracy in pancreatic masses from 33 % to 91 %
- Significant increase in sensitivity after 30 cases (>80 %) for FNA in pancreatic masses

Schlick T Surg Endosc 1999; Harewood Gastrointest Endosc 2002  
 Mertz H Gastrointest Endosc 2004; Eloubeidi Gastrointest Endosc 2005; Barthet Endoscopy 2007

## Therefore ...

- EUS training is required to improve the accuracy of EUS
- The availability for EUS training is weak requiring large centers and long period training



But how to teach and train EUS ?

### When, how EUS learning ?

- International survey :  
 18 % > 6 months dedicated hands-on EUS training  
 one third learned to perform EUS
- US survey :  
 14 % EUS trained during GI fellowship;  
 67 % during advanced endoscopy fellowship

Das Gastrointest Endosc 2004; Wasan Gastrointest Endosc 2005

### EUS in France

- What is the number of available centers ?
- Number of center/ EUS practitioners  
 217
- => 360 EUS practitioners  
 Thus 11 % of the 3159 french gastroenterologists

French EUS club investigation 2008

### 2008 survey

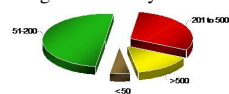
217 centers (360 users) → 1 / 275000 inhabitants  
 - throughout national territory  
 - 66% private practice / 33% hospital

70000 EUS/year : 10% FNA  
 63% BP, 25% Anorectal, 13% Oesogast

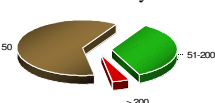
Questionnaire to the CFED members :  
 176 answers / 360 users

### 2008 what experience ?

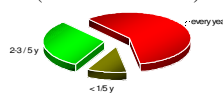
Diagnostic EUS/year



Puncture EUS/year



Participation to French Club meeting (live/conventionnal)



### EUS credentialing in France 2004

Which credentialing ?

- 36% : University qualification
- 63% no qualification of a licensed practitioner

When did they learn EUS ?

- 33% : During the GI fellowship
- 66% : During their professional activity

Godchaux JM and the French Club of EUS 2004

### 2008 : which training ?

Questionnaire to the CFED members :

How did you learn ?

- 33% diploma
- 49% compagnonage
- 17% alone

When did you learn ?

- 1/3 as resident,
- 2/3 as gastroenterologist

Godchaux JM and the French Club of EUS 2008

### Characteristics of the first EUS course

- Started in 1993
- To give practical and theoretical EUS procedural data for providing good images and accurate EUS diagnosis
- About 20-30 students each year
- The duration of the formation was 2 years :
  - 4 weeks of theoretical teaching
  - 20 one-day sessions/year for practicing with an EUS experiment teacher and to realize an EUS clinical study

### Credential Evaluation in 2000

- Over the years 1995-1999; 57 respondents over 147 questionnaires
- - 2/3 had done EUS before the diploma
- - More useful for the trainee :
  - Theoretical courses, videosession, clinical practice
- - Would want : simulator, video library
- - 91 % would recommend the diploma

### Credential evaluation in 2000

- Evaluation of EUS activity after diploma:
- 22% → no activity or < 5 procedures /month
  - Main reasons : economic (too expensive) or insufficient number of indications
- 23% → between 5 and 10 procedures / month
- 55% → > 10 procedures /month

### New EUS course since 2004

- Aim : practical and theoretical learning of EUS
  - anatomy
  - pathology
  - clinical / radiological features of digestive diseases
  - oncological classifications
  - practical stages and learning with Simbionix
  - simulator model and live animal model (pig)



### For Who ?

- Devoted to qualified gastroenterologists :
  - at least two years after GI standard fellowship with EUS equipment available
  - speaking/understanding french (peoples : Canadian, Belgium, Romania, Morocco, Tunisian, Brazil, Syria, Vietnam, Italy, Algeria.....)
  - participants from 25 to 35 per year
  - total 195 since the beginning (19 Belgium)

### Who are the teachers ?

- Gastroenterologists wellknown for their competence, interest, experience in the field of EUS
- Private /hospital (University or not)
- pathologists
- Anatomists, surgeons, radiologists

### EUS learning program

- Benign and malignant disease
- Submucosal and mucosal tumor of the digestive wall
- Pancreatic and biliary disease (chronic and acute pancreatitis, biliary lithiasis, cholangitis, tumor)
- Non neoplastic ano-rectal diseases : incontinence and constipation, perianal abscesses and fistulas
- Future of EUS : 3D, high frequencies, therapeutic EUS

### Teaching organisation

- 2 weeks of theoretical formation emphasizing the role of EUS images (DVD, videotape...)
- 1 week of practical learning with virtual model (symbionix simulator model, live animal model (interventional EUS), hands-on EUS training
- Participation to the Francophone annual congress of EUS
- Participation to live demonstration of EUS which will be held in Marseille each year

### Learning interventional EUS on animal model (pig)

- One day session, sub group of < 8 fellows
  - Faculty laboratory (experimental surgical room)
- approval of the ethical committee (animal laboratory investigation)



Bhutani Gastrointest Endosc 2000; Matsuda Endoscopy 2004

### Learning interventional EUS on animal model (pig)

- Session program :
  - To follow anatomical structures : mesenteric and portal vein, veina cava , mesenteric artery and celiac tree, pancreatic gland, bile duct
  - To perform FNA on lymph nodes in the liver hilum
  - To perform celiac neurolysis
  - To perform cyst drainage
- Evaluation : pre and post test

Barthet M Endoscopy 2006;38:S60-61; Barthet M Endoscopy 2007;39: 1-5

### Following SMV, PV SV



**Significant improvement :**

**SMV**  
 1.1 vs 1.94;  
 p=0.01

**VC**  
 1.1 vs 1.7;  
 p=0.003

**SMA, CT**  
 0.8 vs 1.8;  
 p=0.008

**pancreas**  
 0.7 vs 1.8;  
 p=0.001

**bile duct**  
 1 vs 1.5;  
 p=0.04

Barthet M Endoscopy 2007;39: 1-5

### Lymph node FNA



**Significant improvement pre/post test :**


**% of technical error**  
 : 29% vs 6 % ;  
 NS

**Time :**  
 84 s vs 60 s;  
 p=0.01

**Precision :**  
 4.2 vs 1.8 mm;  
 p=0.009

Barthet M Endoscopy 2007;39: 1-5

### Celiac neurolysis



**Significant improvement pre/post test :**


**% of technical error :**  
 6% vs 6 % ;  
 NS

**Time :**  
 150 s vs 84 s ;  
 p=0.003

**Precision :**  
 4.2 vs 2.8 mm ;  
 NS

*Barthet M Endoscopy 2007;39: 1-5*

### EUS pseudocyst drainage



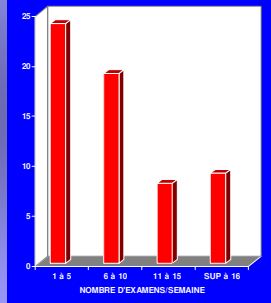
*Barthet M Endoscopy 2007;39: 1-5*

### Conclusion

- Only one third of the EUS practitioners got a university credentialing
- 11 % of the French gastroenterologists performed EUS
- University diploma is required to standardize EUS procedures and increase the EUS accuracy
- What about an EUS European teaching course ?

### EUS performers in France

- Number of examination/week



**113600 procedures/year**

Nombre d'examen/semaine	Approximate Number of Examinations/Week
1 & 5	24
6 & 10	19
11 & 15	8
SUP & 16	9