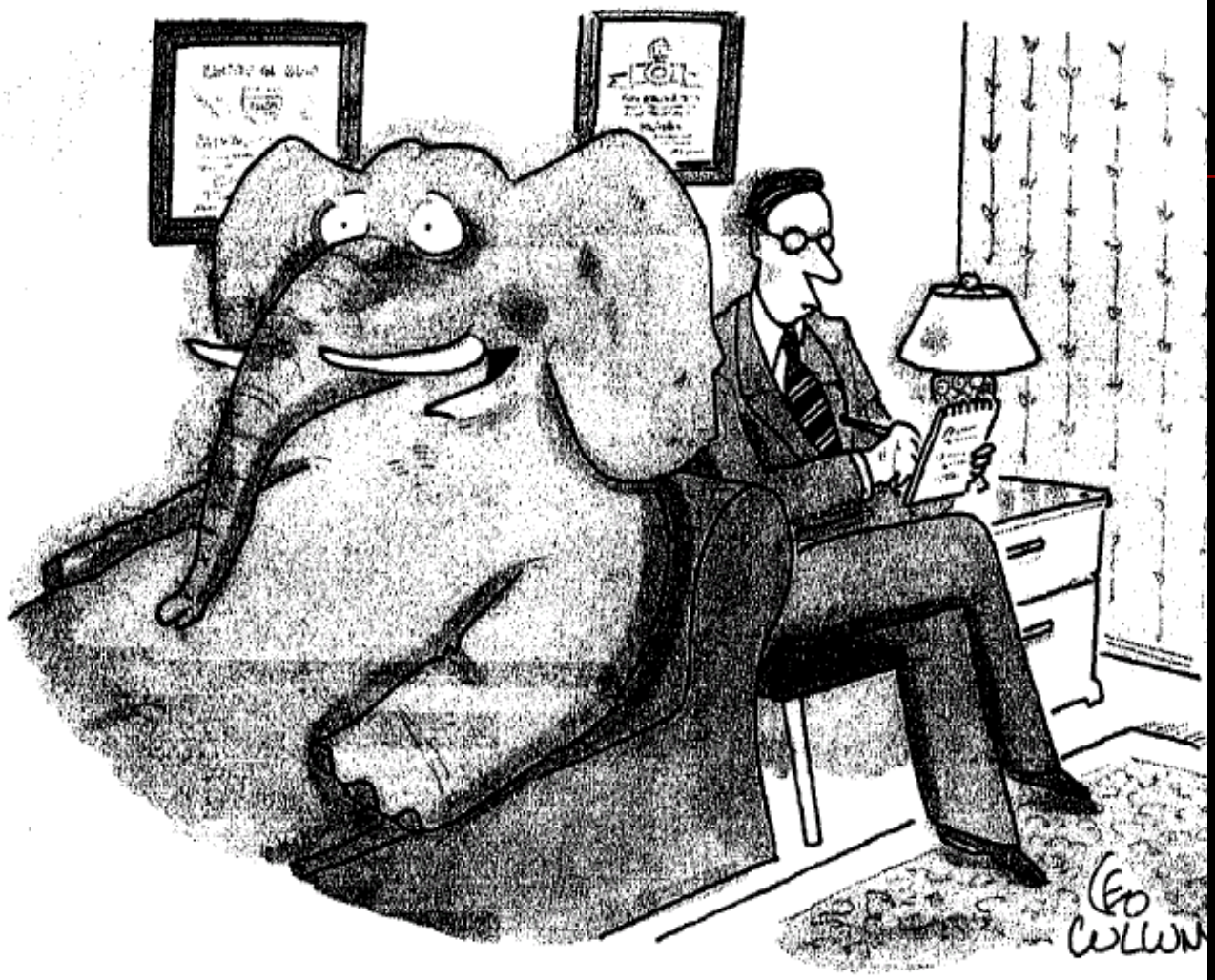
Training for the performance of thyroid FNA sampling

Britt-Marie Ljung, MD Chair

Jill Langer, MD
Ernest Mazzaferri, MD
Yolanda Oertel, MD
Jerry Waisman, MD
Samuel Wells, MD

REVIEW

Training in FNA
using palpation and US



"I'm right there in the room, and no one even acknowledges me."

Variability in FNA sampling via palpation

- Non dx 1.9% (0%*) ---- 41%
- Susp/Follicular Lesion 4.3% ---- 27%
- Combined 6.4% (4.6%*) ---- 68%

* Based on repeat sampling in sub-set of cases.

Variability in FNA Sampling via ultrasound

- Non dx 0.7% ---- 53%
- Susp/Follicular Lesion 4.5% ---- 23%
- Combined 6.4% ---- 53%

Impact of use of US-guidance on non-diagnostic rates of FNA thyroid samples

Palp. FNA	US-FNA
46.8%	15.6%
Many clinicians	One radiologist Mehrotra et. al Cytopath 2006 Aug;17(4)
8.7%	3.5%
Endocrine group	Endocrine group + radiologist Danese, et. al Thyroid Vol 8,No 1 1998

Impact of use of US-guidance on non-diagnostic rates of FNA thyroid samples

Palp. FNA	US-FNA
1%	7%
Cytopathologists	Radiologist + immediate eval Schmiege et al, Abstract ASC
16%	7%
Many operators, mostly clinicians	Single radiologist Carmeci, et. al Thyroid Vol 16 No 6 2006

Impact of use of US-guidance on non-diagnostic rates of FNA thyroid samples

Palp. FNA	US-FNA
32%	21%

Same, single operator, prospective study, difference only in small masses (<15mm)

Cesur, et al
Thyroid Vol 16 No 6
2006 p. 555

Impact of use of US-guidance on palpable thyroid masses

- Modest improvement when operators were the same (only small lesions <1.5 cm impacted in one of two studies)
- Training/experience of operators may have more impact on sample quality than use of US sampling palpable masses

Errors in Thyroid FNA

- Almost all errors non-committal, over and under interpretation of poor specimens (palpable)

Raab et al
Amer J Clin Pathol 2006;125:873-882

Interpretation	Sampling	(palpable)
52%	48%	

Sidawy et al
Cancer 1997 Aug 5; 81(4): 253-9

Errors in Thyroid FNA

Interpretation Sampling (palpable)

53% 47%

All false neg dx due to sampling error

Hall et. al.
Cancer Vol 63 No. 4 Feb 15, 1989 p. 718

50% 50% (palpable)

Burch et. al.
Acta Cytologica Vol 40 No 6 Nov-Dec 96, p 1176

Errors in Thyroid FNA

- Interpretation 0%

Sampling (US-guided) 100%

De Vos Tot Nedereen
Cappel et al
Cytopathology Vol 12, Issue B
page 399, Dec 2001

Errors in Thyroid FNA

- Follicular lesions only

Interpretation	Sampling
76%	24%

Greaves et. al

Cancer (Cytopathology)

Dec 25, 2000/ Vol 90/No 6

Factors that improve FNA sampling/diagnostic success

Establishment of FNA Clinic Setting

Non-dx before
32%

No impact of
immediate exam

43%

Non-dx after
12%

N Sing et al
Cytopathology 2003, 14, 327

9%

G Kocjan
Cytopathology 1991; 2(1): 13-8

Establishment of FNA Clinic Setting

Non-dx before	Non-dx after
29%	9%
	F Mayall et. al. J. Clin Pathol 1998;51:541-544
32%	6%
	T Hall et. al. Cancer 1989; 63 (4): 718

Impact of training in FNA procurement

Formally Trained

Non dx

2%

Missed Cancers

2%

No Formal Training

Non dx

37%

Missed Cancers

25%

Ljung et al

Cancer 2001:93 (4):263-68

Staining for Adequacy

- Literature mixed on impact on accuracy
- Important tool in teaching sampling technique
- Helps to limit number of samples
- Most likely not a big factor for diagnostic material when operator is highly proficient

Ljung, personal opinion
based on 30 y experience

Levels of training, FNA sampling

- See one, do one, teach one ~ 50% dx
- 10 cases in training ~ 60% dx
- 50 cases in training ~ 85% dx
- 100 cases in training ~ 90% dx
- 200 cases in training ~ 95% dx

Multiple persons' experience

CONCLUSION

TRAINING IS ESSENTIAL

Controversies Round I

No controversies, few entries, some confirmatory statements and some concerns.

Confirmations

- Should trainees learn to make smear preparations?
  - Multiple Yes
- Concern: Handing off samples for smearing to various types of assistants with little or no training resulting in poor results

Confirmations

Supervision of all training with feedback

and

Mandatory microscopic review onsite by operator of samples collected.

YES

Confirmations

- What components should be included in training; texts, DVDs, lectures, hands on bench practice, sampling real patients
  - Multiple yes to all of the above
- And emphasis that real patient experience has to be included

Controversies Round II

Dr. E. Cibas and Dr. H. Wang stated that direct smears were not preferable to thin layer technique. Both use exclusively Thin prep for thyroid FNA specimens.

Dr. Cibas felt refs used in the original Review and Conclusions were weak due to small studies and poor design. He suggested for consideration 3 additional new references and a new large study in press from his own institution. Dr. Wang agreed with Dr. Cibas concern and added 2 references as support for her view.

Total cases 724

	CS (327)	Thin Prep (401)
Inadequate	50%	41%
Susp./Follic. neo	25%	27%
Bg dx	24%	31%
Mal dx	1%	1%

Scurry J and Duggan M
Cytopathology 2000;
11:104-105

- Thin prep and smears from 41 surgically resected thyroid lesions sampled on bench. Similar dx yield, some variation in features: colloid, preservation of cytoplasm and nuclear detail.

Biscotti *et. al.*

Am J Clin Path 1995;

104:150-153

Total cases 459

"Trends toward lower proportion of inadequate specimens and lower false negative rate."

"Easier and less time consuming to read one slide with cells in limited area and lends itself to immunohistochemistry"

Malle *et. al.*

Acta Cytol 2006;50:23-27

4545 FTH
466
UCSF Cytology
4545 FTH
466
UCSF Cytology
4545 FTH
466
UCSF Cytology

Thyroid FNA

Thin Prep	vs	Smears
Total Cancers 373		Total Cancers 147
35% definitive dx		78% definitive dx
2nd surgery needed in most cases		One surgery only needed in most cases
Primarily screening test		Primarily diagnostic test
Yassu and Cibas et. al. In Press, Cancer		Werga et. al. World J. Surg 24, 907-912. 2000

Morphologic predictors of Papillary cancer on FNA using Thin prep

40 papillary ca + 17 non-cancers

50% of cancers – no definitive dx on FNA with Thin prep

Zhong, Fraser *et. al.*

Diagn. Cytopathol

24(6): 378-83

Follicular lesions, Thyroid

	Thin Prep	Smears
	Cancer	Cancer
Follicular neo	12.6%	23%
Indeterminate	2.8%	9%
Hurtle cell neopl.	n/a	19%

Tulecke and Wang
Diagn Cytopath 30 (1):7-13.

Sipple *et. al.*
In press, Surgery Dec 2007

Thyroid FNA vs. Core bx

	FNA	Core	Combined
Adequacy	70%	82%	89%

Renshaw and Pinnar

Am J Clin Path 2007; 128: 370-74

Editorial by D. Jordan concludes: **DO BOTH !!!!**

THE FULL BENEFIT OF CONVENTIONAL SMEARS IS ONLY REALIZED IN A SETTING OF EFFECTIVE FNA SAMPLING, SMEAR PREPARATION AND INTERPRETATION

Future, Plan A

- FNA with sufficient training in all aspects and consistent agreed upon terminology
- Direct conventional smears
- US guidance for non-palpable lesions, difficult to palpate lesions and failed first attempts
- <1cm lesions only if concerning clinical or imaging issues

MOST COST EFFECTIVE

Future, Plan B

- FNA with less than adequate training
- Compensate by adding routine US guidance, Core bx, Cell block, Thin layer technique, molecular tests, immunocytochemistry + ?
- Greatly increased cost and delayed results
- Still most likely suboptimal accuracy

Implementation of FNA in the USA ~ 1980 – current

Deceptive simplicity

DISCUSSION

Who should get training?

- All residents/fellows in endocrinology, radiology, pathology, ob-gyn, ENT, surgery?

or

- Endocrinologists heading for thyroid practice, interventional radiologists, cytopathologists, etc ?

Setting for training

- Interdepartmental integrated training using local resources most effectively?
- Each department independently?
- Combination of the above?
- Or?

Levels of training, FNA sampling

- See one, do one, teach one ~ 50% dx
- 10 cases in training ~ 60% dx
- 50 cases in training ~ 85% dx
- 100 cases in training ~ 90% dx
- 200 cases in training ~ 95% dx

Multiple persons' experience

Credentialing

- Listing as a separate credential
- Several ACGME accredited training programs require FNA procurement training.

Conclusions: Credentialing

- Complete residency/ fellowship training including FNA procurement or equivalent should suffice for initial credentialing.
- For re-credentialing documentation of a preset/agreed upon number of procedures per year (between 10 and 100 procedures/year have been suggested) and documented non-diagnostic sample rate may be considered (10%).

Credentialing Controversies: Round I and II

- Within the committee – “we have no business getting involved. Should be done by each specialty for themselves.”
- Web site – one comment questioning acceptable % non-dx at completion of training 50, 70, 80%? Read like a question not a statement.

Credentialing

Questions sent to multiple RRC's 2003 regarding FNA procurement training

- Is the goal of the training to make all residents in training proficient, and if so, to what extent, in fine-needle sampling? Or, is the goal of the training to make residents familiar with the basic concept of the technique (advantages and limitations of the test) but not necessarily to become proficient in the sampling?

Credentialing

Questions sent to multiple RRC's 2003 regarding FNA procurement training

- What methods for evaluation of this skill do you suggest for residents?
- How many procedures will residents be required/expected to observe or perform during the training?
- What percentage of non-diagnostic samples would you consider acceptable during training?

Credentialing

Questions sent to multiple RRC's 2003 regarding FNA procurement training

- What percentage of false-negative diagnosis, due to sampling error, would be considered acceptable:
  - By residents during training and
  - Among the faculty teaching?

Responses - Credentialing

In regard to fine needle aspiration technique, it is meant to imbue the trainee with sufficient skill to perform such on a neck, parotid or thyroid mass if the cytopathologist is not readily available. The technique is simple, head and neck masses are usually quite close to the skin surface (and readily

Responses - Credentialing

palpable), and therefore after brief instruction and a few observations, a dozen or so “hands on” aspirations should suffice for the basic needs of our trainees – and if the trainee can’t get five diagnostic aspirations in succession, they should keep practicing.

Otolaryngology

Responses - Credentialing

The RRC does not have any minimum numbers for this procedure

OB GYN

Responses – Credentialing

1. Goal – safely perform the procedure.

2 & 3 Method for eval – procedure log with dx, < 5-10 successful procedures to document proficiency, procedure is technically simple.

4. Expectation of 3-5% non-dx samples.

5. Acceptable false neg. rate – general answer that it would be expected to be low but no specific number cited.

DISCUSSION