NEW YORK SOCIETY FOR GASTROENTEROLOGY & ENDOSCOPY

48th Annual
NEW YORK COURSE
December 12-13, 2024 • New York, NY

NYSGE
New York Society
for Gastroenterology
and Endoscopy

CHUM

Maximizing the Yield of EUS Tissue Acquisition

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OBJECTIVES

1) Understand the variables associated with successful EUS-guided tissue acquisition

2) Understand the role of FNA vs FNB

PLAN

- EXPECTED YIELD
- FNA vs FNB: PROS-CONS
- SCRAPING vs CUTTING NEEDLES
- HOW TO MAXIMIZE FNA-FNB YIELD

TAKE HOME POINTS

- Due to development of <u>cutting</u> FNB needles, the issue of EUS-guided tissue acquisition has been SOLVED

- Suboptimal results are due to poor technique

- **YOU MUST MOVE THE NEEDLE ADEQUATELY and BROADLY IN THE TARGET LESION**

- The techniques for maximizing the yield of FNA and FNB are the **<u>same</u>**.

- ROSE may still be helpful for FNA, but not needed for FNB.

EUS-FNA ACCURACY: META-ANALYSIS

- Identified studies, in which the pooled sensitivity, specificity, likelihood ratios for a positive or negative test (LR+, LR-) and summary receiver-operating curves (SROC) could be determined for EUS-FNA of the pancreas for ductal adenocarcinoma

- 34 distinct studies (3644 patients)

- pooled sensitivity and specificity for EUS-FNA for pancreatic ductal adenocarcinoma:

    - SENSITIVITY 88.6% [95% confidence interval (CI): 87.2-89.9]
    - SPECIFICITY 99.3% (95% CI: 98.7-99.7),

- ROSE (P = 0.001) remained a significant determinant of EUS-FNA accuracy after correcting for study population number and reference standard.

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CYTOLOGY

- "EASY" cases: >95% (Sn + special stains)
  - Obvious cancers
    - Huge masses and nodes
    - Large SMTs

- "HARDER" cases: ?
  - Questionable masses (Ca vs CP, AIP, etc.)
  - Small lesions (esp SMTs)
  - Difficult positions
  - Metal stents

IS FNA SUFFICIENT?

- Most EUS-FNA is for diagnosis <u>epithelial</u> cancers and ancillary tests are needed in a <u>minority</u> of cases.

- There is evidence that getting a core increases the diagnostic yield for <u>epithelial</u> cancer, but by only about 5%

- FNB may also however reduce the number of passes required.

- *QUESTION: **Instead of using a more expensive needle, why not do another pass +/- cell block?***

FNA + CELL BLOCK: AS GOOD AS FNB?

	CELL BLOCK	CORE BIOPSY
MEDIUM	ETOH	FORMALIN
PARRAFIN	✔	✔
IMMUNO	✔	✔
TUMOR MARKERS	✔	✔
GENETICS	✔	✔
MITOTIC INDEX	✓	✔
ON SITE READ	✔	✔
STRUCTURE	✖	✔
OTHER BENEFITS**	**?**	**?**

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FNA vs FNB: WHY GET A CORE?

- PATHOLOGIST INSISTS

- NEED <u>STRUCTURE</u>
  - Lymphoma, AIP, etc.
  - Liver**

- FAILED CYTOLOGY ("Dry" pass)
  - LINITIS
  - SCLEROTIC TUMORS
  - Small SMTs (Really???)
  - Etc.

- **NO ROSE?

FNB (CORE): UNFORSEEN BENEFITS

- The "positive" negative result…
- The surprise positive…
- The serious pathology report…

# WHY NOT GET A CORE?

- **SUMMARY**:
  - In selected difficult EUS tissue sampling cases, the 22ga Franseen tip needle:
  - 1) Provides samples adequate for histological analysis in 92%,
  - 2) The sensitivity for malignancy is 91.7%.
  - These results were obtained without ROSE.

- **CONCLUSION**:
  - The 22ga Franseen tip needle is an excellent choice in cases where traditional EUS-FNA results are inadequate.
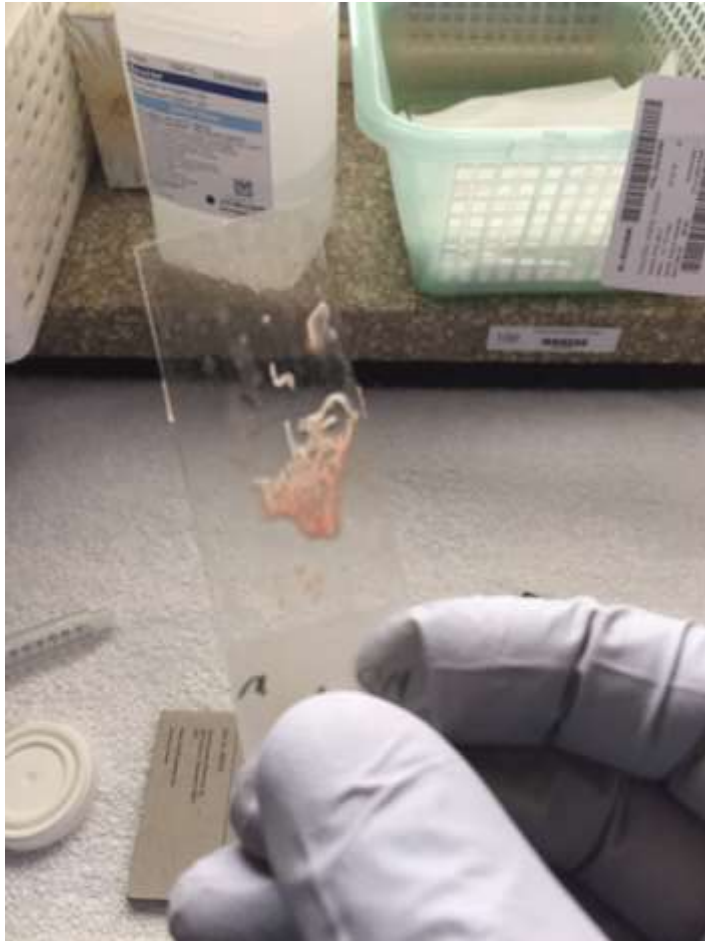
FNB NEEDLES:
SCRAPING vs CUTTING
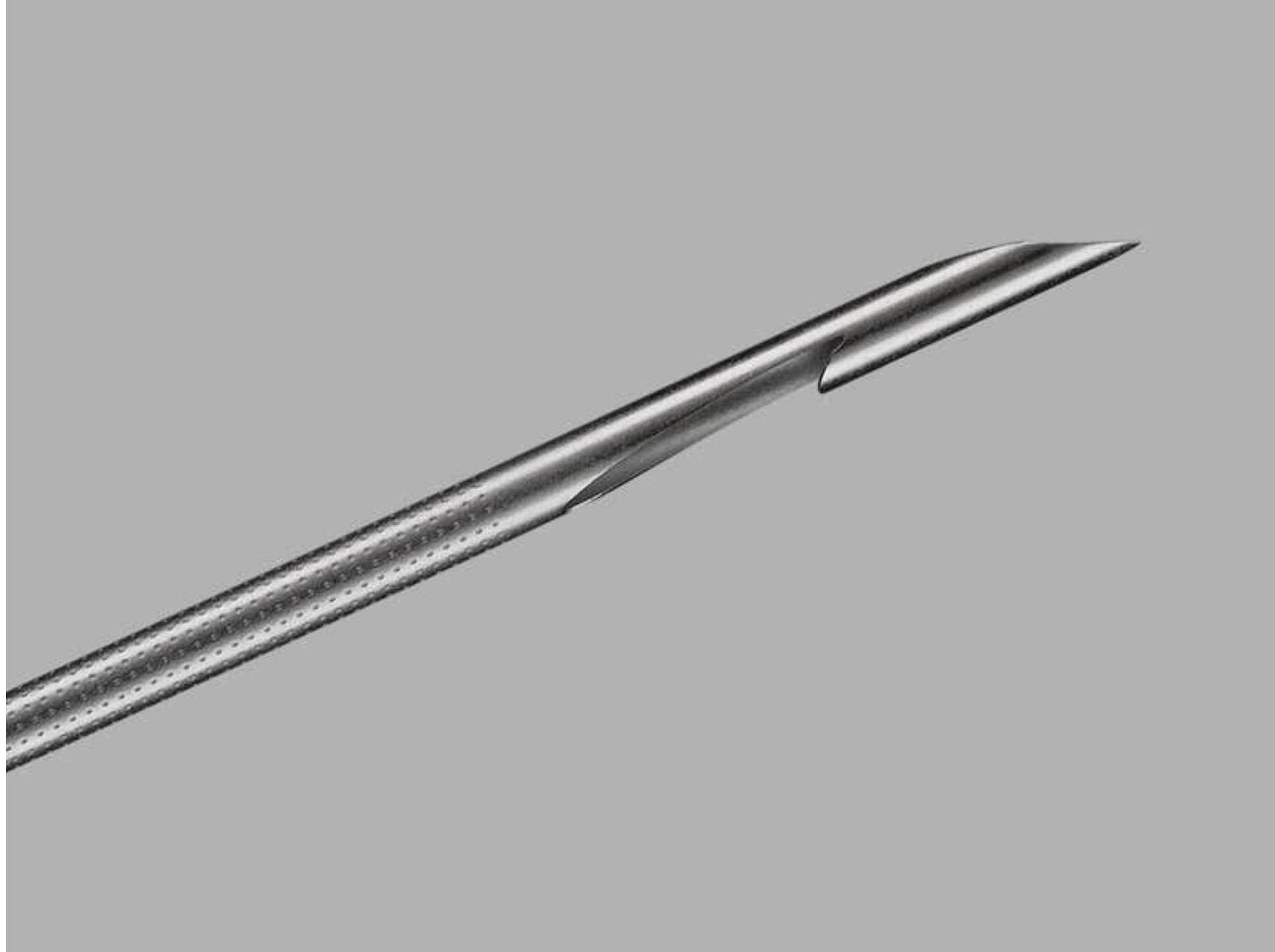
SCRAPING

CUTTING NEEDLES

Images Owned by Boston Scientific

CUTTING NEEDLE

Table 3. Comparison of procedural details and outcomes

		FNB (n=46)	FNA (n=46)	p-value
ROSE - Diagnostic adequacy: n (%)		46 (100)	44 (95.7)	0.495
ROSE - Total no. of passes for diagnostic adequacy:*	Mean (SD)	1.15 (0.47)	1.18 (0.58)	0.929
	Median	1	1	
	IQR	1 - 1	1 - 1	
	Range	1 - 3	1 - 4	
	1	41 (89.1)	38 (86.4)	0.778
	2	3 (6.5)	4 (9.1)	
	3	2 (4.3)	1 (2.3)	
	4	0	1 (2.3)	
Specimen bloodiness: n (%)	Mild	12 (26.1)	16 (34.8)	0.736
	Moderate	29 (63.0)	26 (56.5)	
	Severe	5 (10.9)	4 (8.7)	
Cell block - Diagnostic adequacy: n (%)		45 (97.8)	38 (82.6)	0.030
Cell block - Diagnostic accuracy: n (%)		43 (93.5)	37 (80.4)	0.063
Adverse events: n (%)		0	0	0.999

Abbreviations: FNA, fine needle aspiration; FNB, fine needle biopsy; IQR, interquartile range; ROSE, Rapid onsite evaluation; SD, standard deviation

* n=44 for calculation of the total no. of passes performed in the FNA group as sample was not diagnostically adequate on ROSE in two patients

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FRANSEEN 22 VS REVERSE BEVEL 20

22G Acquire vs. 20G Procore needle for endoscopic ultrasound-guided biopsy of pancreatic masses: a randomized study comparing histologic sample quantity and diagnostic accuracy

David Karsenti, Laurent Palazzo, Bastien Perrot, Jacqueline Zago, Anne-Isabelle Lemaistre, Jérôme Cros, Bertrand Napoléon

Background Endoscopic ultrasound-guided fine-needle biopsy (EUS-FNB) has been suggested for obtaining high quality tissue samples from pancreatic tumors. We performed a multicenter randomized crossover trial comparing EUS-FNB with a 20G Procore needle vs. a 22G Acquire needle. The aims were to compare the quantity of targeted tissue (pancreas) and diagnostic accuracy for the two needles.

Methods 60 patients admitted for EUS-FNB in three endoscopy units were included. One pass was performed consecutively with each needle, in a randomized order. Histologic material was studied in a blinded manner with respect to the needle. The primary end point was mean cumulative length of tissue core biopsies per needle pass.

Results Final diagnosis was adenocarcinoma (n=46; 77%), neuroendocrine neoplasm (n=11; 18%), autoimmune pancreatitis (n=2), and mass-forming chronic pancreatitis (n=1). The mean cumulative length of tissue core biopsies per needle pass was significantly higher with the 22G Acquire needle at 11.4mm (95% confidence interval [CI] 9.0–13.8] vs. 5.4mm (95%CI 3.8–7.0) for the 20G Procore needle ($P<0.001$), as was the mean surface area (3.5mm^2 [95%CI 2.7–4.3] vs. 1.8mm^2 [95%CI 1.2–2.3]; $P<0.001$). Diagnostic adequacy and accuracy were 100% and 87% with the 22G Acquire needle, and 82% and 67% with the 20G Procore needle ($P=0.001$ and $P=0.02$, respectively).

Conclusions EUS-guided biopsy of pancreatic masses with the 22G Acquire needle provided more tissue for histologic evaluation and better diagnostic accuracy than the 20G Procore needle.

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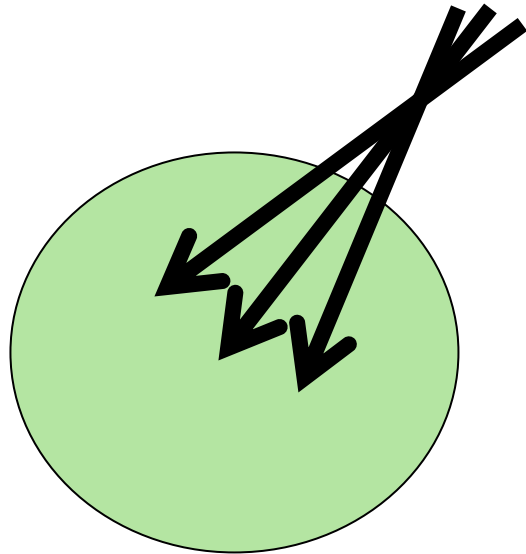# FNA-FNB: HOW TO MAXIMIZE YIELD

- TECHNIQUE FOR FNA-FNB ARE THE SAME
- VARIABLES THAT **DO** IMPACT:
  - WHO?
    - OPERATOR
    - CYTOLOGIST (EXPERIENCE, ON SITE)
  - WHAT?
    - LESION TYPE
  - WHERE?
    - LESION SITE
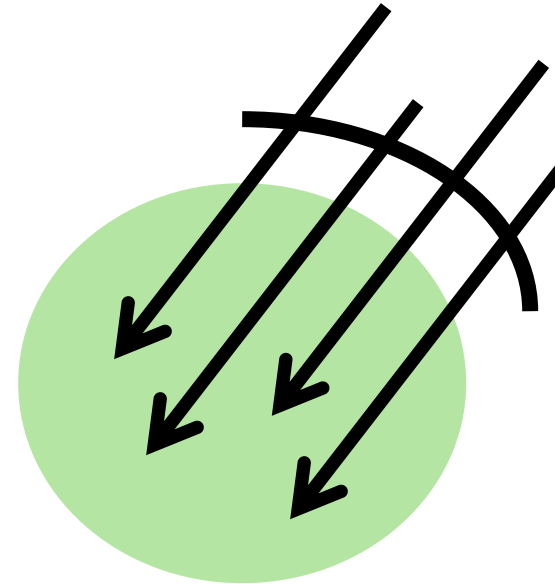 - WHEN?
    - POST OP, STENTING? CHEMO-XRT?

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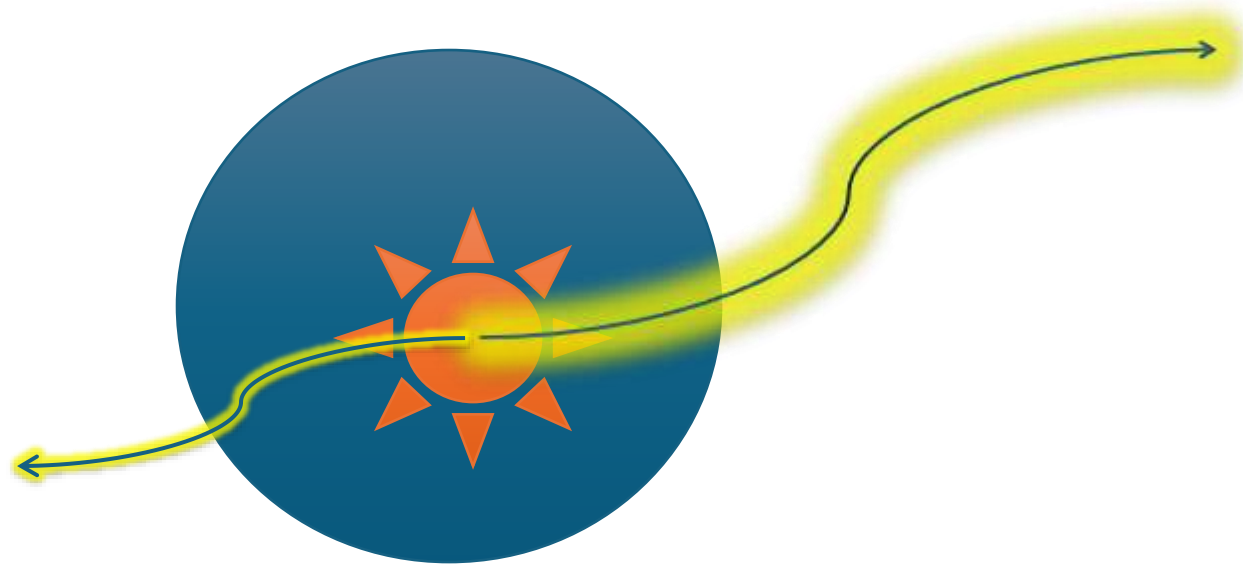
FANNING vs MULTI-PASS

FANNING

MULTIPASS

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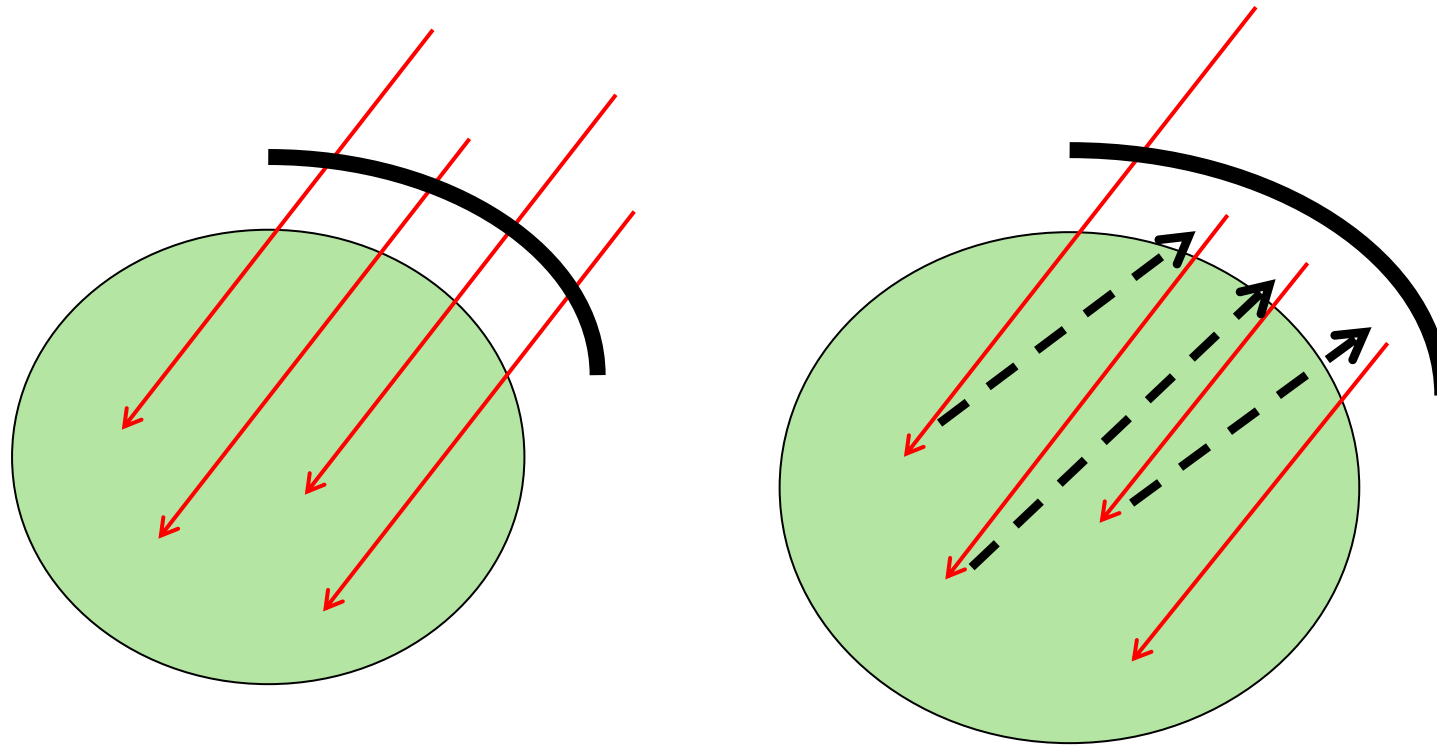
LIMITING WALL CELL CONTAMINATION WITH "MULTIPASS" TECHNIQUE

SIZE DOES MATTER

- **<u>SMALLER</u> APPEARS BETTER**
  - EASIER TO MANIPULATE
  - LESS BLOOD
  - 19G NO VALUE (EXCEPT LIVER BX)
  - FNA
    - 25g > 22g
  - FNB
    - 22g>25g

The diagnostic accuracy of 22-gauge and 25-gauge needles in endoscopic ultrasound-guided fine needle aspiration of solid pancreatic lesions: a meta-analysis.
Madoun MF, et al.

- 8 studies
- 1292 patients:
  - 799 22 G
  - 565 25 G

The pooled sensitivity and specificity:

22 G 0.85 (95%CI 0.82-0.88)
25 G 0.93 (95%CI 0.91-0.96)

FNA: ON-SITE CYTOLOGY?

- NOT SURE IT INCREASES YIELD OF MULTIPASS TECHNIQUE

- YES: IF YOU CAN
  - RAPID REPONSE
  - SAVES PASSES/TIME
  - SHOWS WHETHER SUPPLEMENTARY ANALYSIS NEEDED
  - PARTICULARLY GOOD FOR PANCREATIC LESIONS
  - IF TUMOR SEEDING IS A CONCERN

- NO:
  - POLYADENOPATHY (SUSPECTED LYMPHOMA)
  - SMTSs
  - LOW PROBABILITY LESIONS

Table 1 Studies evaluating the role of onsite cytopathology support for EUS-guided FNA procedures

Author (ref.)	No. patients	Diagnostic yield OP vs no OP	Indeterminate/Inadequate samples OP vs no OP	Unsatisfactory OP vs no OP
Klapman et al.[2]	195	78% vs 32%, P = 0.001	10% vs 12%, P = 0.9	9% vs 20%, P = 0.003
Iglesias-Garcia et al.[3]	182	97% vs 86%, P = 0.01	2.1% vs 10.3%, P = 0.02	1 vs 13%, P = 0.002
Alsohaibani et al.[4]	104	77% vs 53%, P = 0.01	23% vs 47%, P = 0.001	0 vs 17%, P = NS
Wani et al.[21]	131	87.9% vs 70.8%, P = 0.01	6.1% vs 18.5%, P = 0.03	NA
Hayashi et al.[22†]	138	91.8% vs 69.2%, P < 0.001	26.4% vs 8.2%, P = 0.004	NA

†Endoscopists interpreted specimens themselves after being proctored in cytopathology.
EUS, endoscopic ultrasound; FNA, fine-needle aspiration; NA, data not available; OP, onsite cytopathology.

FNB: ROSE NOT NEEDED

Endoscopic Ultrasound-guided Fine-needle Biopsy With or Without Rapid On-site Evaluation for Diagnosis of Solid Pancreatic Lesions: A Randomized Controlled Non-Inferiority Trial

Abstract

Background and aims: The benefit of rapid on-site evaluation (ROSE) on the diagnostic accuracy of endoscopic ultrasound-guided fine-needle biopsy (EUS-FNB) has never been evaluated in a randomized study. This trial aimed to test the hypothesis that in solid pancreatic lesions (SPLs), diagnostic accuracy of EUS-FNB without ROSE was not inferior to that of EUS-FNB with ROSE.

Methods: A noninferiority study (noninferiority margin, 5%) was conducted at 14 centers in 8 countries. Patients with SPLs requiring tissue sampling were randomly assigned (1:1) to undergo EUS-FNB with or without ROSE using new-generation FNB needles. The touch-imprint cytology technique was used to perform ROSE. The primary endpoint was diagnostic accuracy, and secondary endpoints were safety, tissue core procurement, specimen quality, and sampling procedural time.

Results: Eight hundred patients were randomized over an 18-month period, and 771 were analyzed (385 with ROSE and 386 without). Comparable diagnostic accuracies were obtained in both arms (96.4% with ROSE and 97.4% without ROSE, P = .396). Noninferiority of EUS-FNB without ROSE was confirmed with an absolute risk difference of 1.0% (1-sided 90% confidence interval, -1.1% to 3.1%; noninferiority P < .001). Safety and sample quality of histologic specimens were similar in both groups. A significantly higher tissue core rate was obtained by EUS-FNB without ROSE (70.7% vs. 78.0%, P = .021), with a significantly shorter mean sampling procedural time (17.9 ± 8.8 vs 11.7 ± 0.0 minutes, P < .0001).

Conclusions: EUS-FNB demonstrated high diagnostic accuracy in evaluating SPLs independently on execution of ROSE. When new-generation FNB needles are used, ROSE should not be routinely recommended. (ClinicalTrial.gov number NCT03322592.).

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FNA: YIELD

- VARIABLES THAT **DO NOT** IMPACT:
  - SAMPLE PREPARATION
  - SUCTION
  - STYLET
  - NEEDLE TYPE

TABLE 5. Summary of randomized controlled trials evaluating the role of suction during EUS-FNA of solid lesions

Author	Study design	No. of patients/lesions	EUS-FNA with suction	EUS-FNA without suction	P value
Puri[14]	RCT	52/52			
		19% pancreas			
		66% lymph nodes			
Adequate specimens			100%	100%	NS
Bloodiness			76.9%	88.5%	.14
DY of malignancy			85.7%	66.7%	.05
Wallace[16]	RCT	43/46			
Adequate specimens			Higher	NA	.01 (OR 2.8; 95% CI, 1.2-6.6)
Bloodiness			Higher	NA	.0004 (OR 4.7; 95% CI, 1.9-11.2)
DY of malignancy			No difference		.19 (OR 1.5; 95% CI, 0.8-2.8)
Lee[11]	RCT	81/81			
		Pancreas only			
Adequate specimens			72.8%	58.6%	.001
Bloodiness			6.2%	0.6%	< .001
DY of malignancy			82.4%	72.1%	.005

EUS-FNA, EUS-guided FNA; RCT, randomized controlled trial; NS, not significant; DY, diagnostic yield; NA, not available; OR, odds ratio; CI, confidence interval.

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EUS-FNA, EUS-guided FNA; *RCT*, randomized controlled trial; *NS*, not significant; *DY*, diagnostic yield; *NA*, not available; *OR*, odds ratio; *CI*, confidence interval.

SUCTION PRESSURES
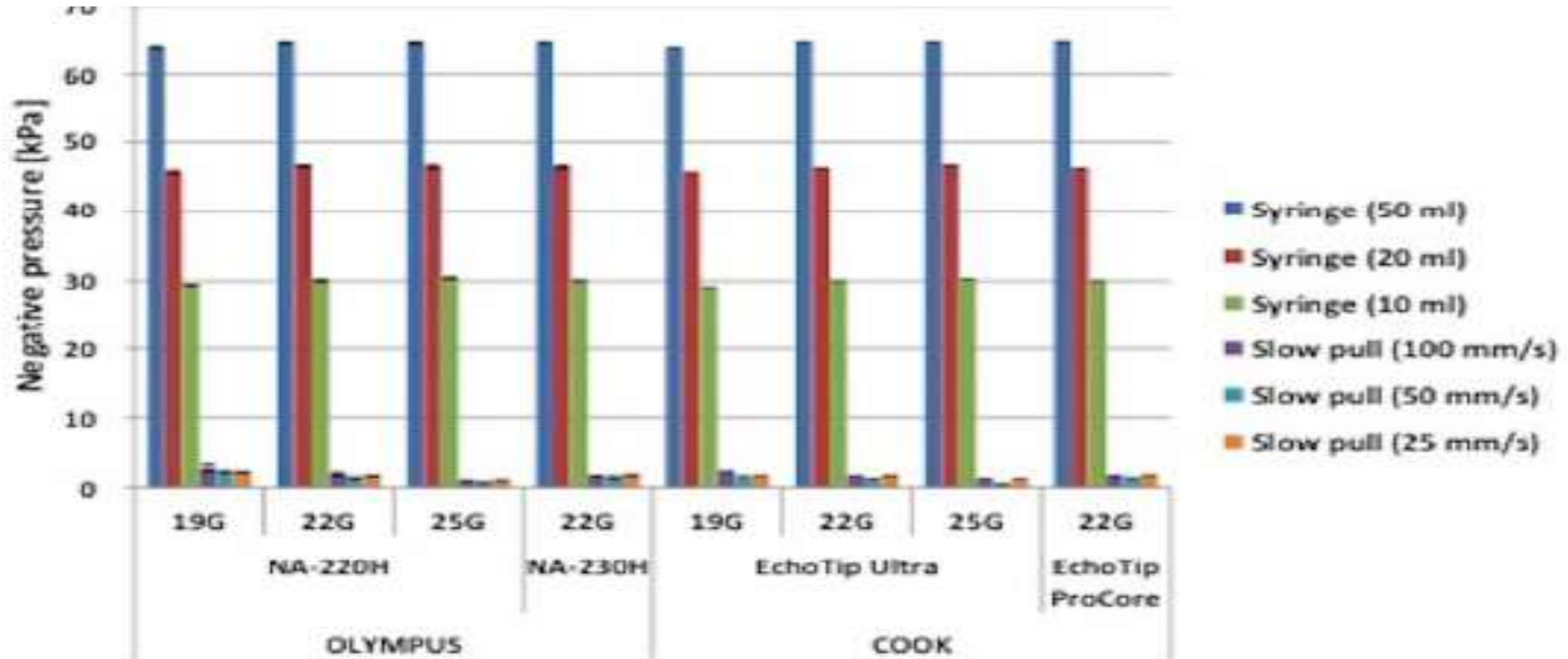
A prospective comparison of endoscopic ultrasound-guided fine needle aspiration results obtained in the same lesion, with and without the needle stylet

	With Stylet (S+) [95 % CI]	Without Stylet (S−) [95 % CI]	P
Yield for malignancy*			
Equal to or better than, n/N (%)	41/46 (89) [77–95]	40/46 (87) [74–94]	NS
Better than, n/N (%)[†]	5/46 (11) [5–23]	4/46 (9) [4–20]	NS
Sensitivity, %	87 [70–95]	83 [66–93]	NS
Specificity, %	100 [86–100]	100 [87–100]	NS
False negatives, n/N (%)			
Pancreatic masses	3/20 (15) [5–36]	4/20 (20) [8–42]	NS
Nodes	3/15 (20) [7–46]	2/15 (13) [4–38]	NS
Other masses	1/11 (9) [2–38]	1/11 (9) [2–38]	NS
Sample adequacy, n/N (%)			
Adequate samples	89/118 (75) [66–82]	16/191 (87) [81–91]	0.013
Bloody samples	89/118 (75) [66–82]	99/191 (52) [45–59]	<0.0001

Sahai et al., A prospective comparison of endoscopic ultrasoundguided fine needle aspiration results obtained in the same lesion, with and without the needle stylet . Endoscopy 2010; 42: 900–903.

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FNA-FNB:
HOW TO MAXIMIZE YIELD

- USE A MULTIPASS TECHNIQUE

- FNA:
  - 25g NEEDLE
  - MAKE SLIDES + CELL BLOCK
  - GET A CYTOLOGIST IN THE ROOM

- FNB:
  - 22g NEEDLE
  - MOSE (NOT ROSE)

- SUCTION (INCL. SLOW PULL), STYLET
  - ARE ALL A UNNECESSARY AND NEEDLESSLY WASTE TIME
  - EXCESS BLOOD MAKES MOSE MORE DIFFICULT

FNA vs FNB:
STATE OF THE ART

- We know Fine Needle Aspiration (FNA) works well, is cheaper than FNB, and is sufficient in many cases.

- If you need a core, now you can truly get a core with >95% success.

- People with access to both are migrating to CORE:
  - UNFORSEEN BENEFITS
  - OBVIATES ROSE

- "CORE" needles are not all equal:
  - CYTOLOGY VS SCRAPING VS CUTTING

THANK YOU

SAVE THE DATE
FOCUS 2025

The eleventh National Canadian EUS (FOCUS) meeting will be held in **Montreal** next year on:

April 4th and 5th, 2025