

PD50-02

**Urine Cytology Diagnostic Patterns Before and After Implementing
The Paris System for Reporting Urine Cytology:
A Single Institutional Study of More Than 27,000 Cases**

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Disclosure of Relevant Financial Relationships:
No relevant financial relationships



Background



- Management of urothelial carcinoma (UC) is expensive
 - High recurrence rate, long disease course, intensive surveillance strategies
- Urine cytology is a noninvasive and cost-effective screening/diagnostic test
 - Surveillance intervals and hematuria workups
- Urine cytology diagnostic classification: a long journey
 - None had gained wide acceptance: lack of standard terminology and diagnostic criteria
 - A variety of terminologies are currently utilized in different pathology labs
 - High percentage of indeterminate (atypical) diagnosis: may lead to unnecessary procedures



The Paris System (TPS) for Reporting Urine Cytology

- 2013 International Cytology Congress in Paris: recognized the need to standardize terminology and reporting
- TPS was developed, presented in conferences and published in 2016
- Advantages:
 - More definite morphological and numerical diagnostic criteria
 - Aims to improve sensitivity and specificity in detecting high-grade UC (HGUC)
 - Decrease indeterminate/atypical diagnosis



The Paris System (TPS) for Reporting Urine Cytology

- Unsatisfactory

- **NHGUC** (negative for high-grade UC) —————
- **AUC** (atypical urothelial cells): **N/C ratio > 0.5** + one of the following
 - Hyperchromasia/Irregular clumpy chromatin/Irregular nuclear contours
- **SHGUC** (suspicious for HGUC): **N/C ratio > 0.7** **<10 abnormal cells**
 - Hyperchromasia + one of the following
 - Irregular clumpy chromatin/Irregular nuclear membranes
- **HGUC** (high-grade UC): **N/C ratio > 0.7** **>5-10 abnormal cells**
 - Similar to SHGUC

Pre-TPS terminology

NUC (negative for UC)

AUC, included MAUC
(Mildly atypical
urothelial cells, favor
reactive changes)

- **LGUN** (low-grade urothelial neoplasm): papilloma, PUNLMP, LGUC
- Other malignancies



Aim

- To study the impact of TPS on the urine cytology diagnostic patterns in our high-volume community practice.
- Introduce TPS to urologists and demonstrate its potential impact on urological practices.



Methods

Pre-TPS	Learning Period	Post-TPS
Jan 2013 to Dec 2014 (two years, 7,658 cases)	Jan 2015 - April 2016 <ul style="list-style-type: none">• Initial grand rounds presentation• Change terminology• Daily pathology consensus conference• Urine cytology case conference /2 wk.	May 2016 to April 2018 (two years, 20,027 cases)

- The comparison was made between Pre- and Post-TPS diagnostic categories and different collection methods
- Each diagnostic category was correlated with UroVysion results



Results

Table 1. Urine cytology diagnostic categories Pre- and Post-TPS

Diagnosis	Pre-TPS		Post-TPS		P Value
	n	%	n	%	
NUC/NHGUC	5,293	69.2%	18,507	92.4%	<0.00001
AUC (MAUC)	2,227 (1,437)	29% (65% of AUC)	1,237	6.2%	<0.00001
SHGUC/HGUC	138	1.8%	282	1.4%	0.0057
Total	7,658	100%	20,026	100%	



Table 2. Diagnostic categories in voided vs instrumented urine in Pre- and Post-TPS

Collection method	Voided Urine n (%)		Instrumented urine n (%)	
Diagnosis	Pre-TPS	Post-TPS	Pre-TPS	Post-TPS
NUC/NHGUC	71.5%	92.7%	60.9%	88.5%
AUC	26.9%	6%	36.6%	9.1%
SHGUC/HGUC	1.6%	1.3%	2.5%	2.4%
Total %	100%	100%	100%	100%
Total n	5,951	18,877	1,707	1,149



Table 3. AUC Rate Among Pathologists Pre- and Post-TPS

Pathologists	A	B	C	D	E	Average
Pre-TPS AUC %	24	26	37	39	23	29
Post-TPS AUC %	5.8	5.3	7.2	N/A	6.4	6.2

All pathologists showed significant decreases in AUC ($P < 0.00001$)
with less interobserver variation (23-39% vs 5.3-7.2%)



Figure 1. Urine Cytology Diagnosis Demonstrated Superior Correlation with UroVysion Results in Post-TPS

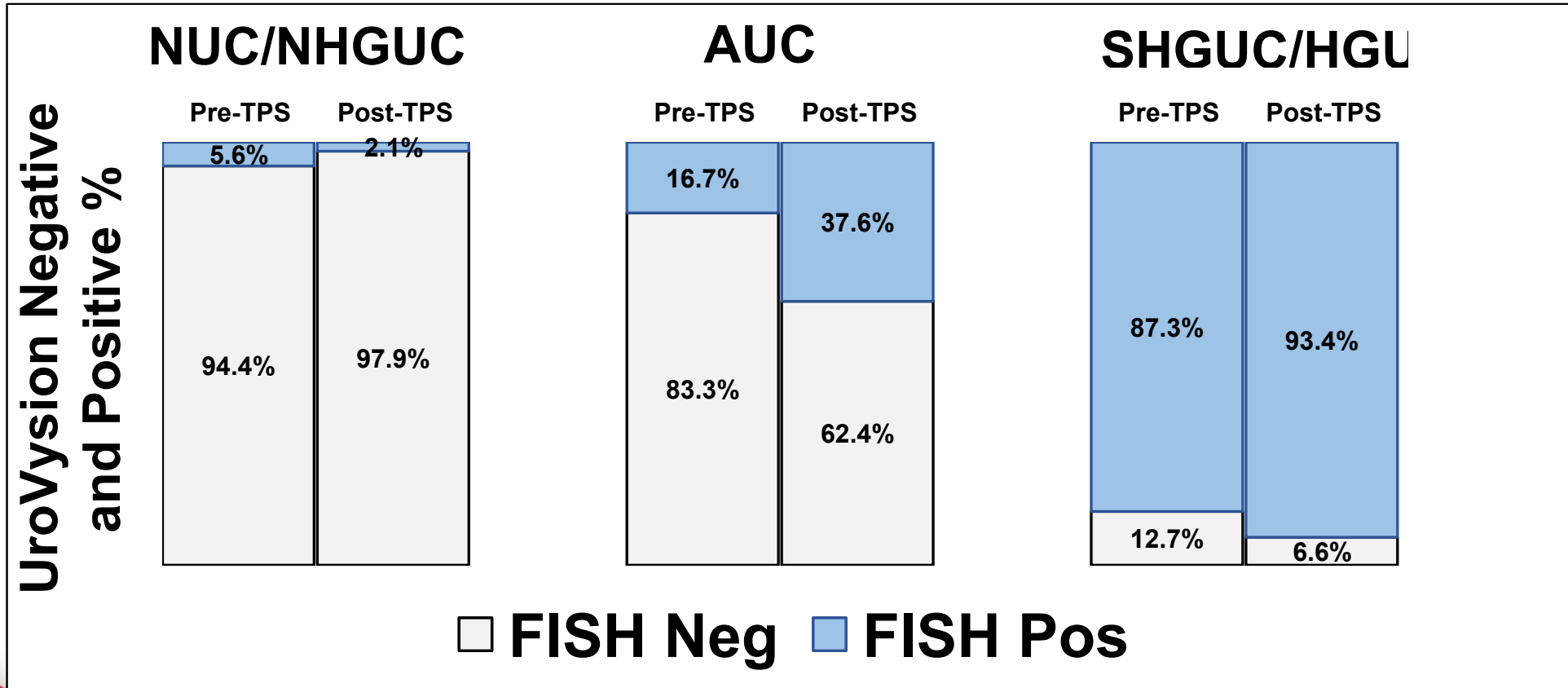


Table 4. Utilization of UroVysion test was significantly decreased Post-TPS for AUC category

AUC with UroVysion	Pre-TPS	Post-TPS
Total urine cytology	7,658	20,026
AUC n (atypical rate)	2,227 (29%)	1,237 (6.2%)
AUC with UroVysion n	980	550

Presumptive: UroVysion requests in AUC if we didn't implement TPS:
20,026 cases x 29% atypical rate x 44% requests in AUC= 2,555 UroVysion tests
Compared to 550 → a significant decrease in UroVysion requests and medical cost



Conclusion

- Implementation of TPS resulted in a significant decrease in atypical diagnoses with less interobserver variation.
- AUC was significantly better correlated with UroVysion results
 - Decreased UroVysion requests
 - Saved medical cost
- AUC should be considered a clinically relevant group, and requires more serious clinical workup in the TPS era.



References

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