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The Paris System for Reporting Urinary Cytology: early review of the literature reveals successes and rare shortcomings

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The Paris System for Reporting Urinary Cytology (TPS) provides recommendations for the diagnosis of urinary tract cytology (UTC) specimens and has found acceptance on an international level. Since the official release of TPS in 2016, numerous research studies have been published analyzing its impact. This review summarizes the studies published since the release of TPS, highlighting areas in which TPS has performed well and other areas in which TPS may need improvement.

Contents

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Introduction

The Paris System for Reporting Urinary Cytology (TPS) emerged following discussions of urinary tract cytopathology at the 2013 International Cytology Congress in Paris, France.[1,2] The need for a coherent and consistent system became apparent to anyone observing the great variability by which urinary tract cytology (UTC) specimens were assessed, both between individuals and institutions. Of particular concern was the inconsistent and high rate of indeterminate diagnoses, such that an "atypical" diagnosis implied only a low risk of malignancy, which greatly diminished the utility of the diagnosis for clinicians. To develop this system, expert international working committees assessed the evidence for certain practices, and practicing cytopathologists were surveyed regarding their practice patterns and preferences. Goals of the working committees included: (1) introduce and define a set of practical diagnostic categories using a standardized nomenclature; (2) define cytomorphologic criteria associated with each diagnostic category; and (3) raise awareness of unusual or striking findings that can be dismissed rather than being classified as atypical.

The finalized recommendations of TPS were officially released in 2016, both published fully in book format, and presented at the 2016 International Cytology Congress in Yokohama, Japan. Several institutions have published studies to describe the impact of TPS on their practice in the brief period since its release. Additionally, some institutions have applied TPS criteria to archival UTC specimens in order to increase the number of specimens available to study.

Early results

Alterations in institutional diagnoses based on TPS criteria

Most studies have focused on the impact TPS has had on indeterminate diagnoses. TPS committees recognized both the variability in frequency (ranging from 1.9% to 26%) and predictive value (ranging from 8.3% to 37.5%) of "atypical" diagnoses among institutions.[3-13] To address this variability, TPS developed strict criteria to define the *Atypical Urothelial Cells (AUC)* category, intending to reduce the number of unnecessary indeterminate diagnoses (ie, false positive). It should be noted that institutions with higher risk populations are likely to have a corresponding increased frequency of *AUC* diagnoses. The rate of malignancy (ROM), meaning the percentage of patients with an indeterminate diagnosis who go on to a frankly malignant diagnosis with subsequent testing, is one way to monitor the utility of the indeterminate category. An ideal ROM for the *AUC* category has not been defined, although under ideal conditions, the ROM would be high enough to affect clinical decision-making without reducing the high ROM of the *Suspicious for High Grade Urothelial Carcinoma (SHGUC)* category.

In 4 prospective studies comparing the assignment of specimens to diagnostic categories both before and after establishment of TPS, TPS resulted in a decrease in the rate of atypical diagnoses, with the decrease in rate ranging from 0.9% to 13% (Table 1).[14-17] In these studies, the overall rate of an atypical diagnosis post-TPS ranged from 14.4% to 26%. Two studies reported a small decline in their "suspicious" rates (declines of 1.3% and 0.6%) with total *SHGUC*

Table 1 Published changes in diagnosis rates by institution following institution of The Paris System for Reporting Urinary Cytology (TPS).

	Hassan et al		Torous et al		VandenBussche et al		Wang et al	
	Pre TPS, %	Post TPS, %	Pre TPS, %	Post TPS, %	Pre TPS, %	Post TPS, %	Pre TPS, %	Post TPS, %
Negative	NR	NR	64.3	70.7	64.9	66.1	75.4	80.0
Atypical	39	26	29.5	21.8	23.9	23.0	18.6	14.4
Suspicious	NR	NR	3.3	4.4	5.8	4.5	3.0	2.4
Malignant	NR	NR	2.9	3.0	3.8	5.0	3.0	3.2

Abbreviation: NR, not reported.