Journal of the American Society of Cytopathology (2015) 4, 232–238

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.jascyto.org/

ORIGINAL ARTICLE

Urine cytology: does the number of atypical urothelial cells matter? A qualitative and quantitative study of 112 cases

Fadi Brimo, MD[a,*], Bin Xu, MD[a], Wassim Kassouf, MD[b], Babak Ahmadi-Kaliji, MD[a], Michele Charbonneau, CT[a], Ayoub Nahal, MD[a], Yonca Kanber, MD[a], Derin Caglar, MD[a], Manon Auger, MD[a]

[a] *Department of Pathology, McGill University Health Center and McGill University, Montreal General Hospital, 1650 Cedar Avenue, Montreal, Quebec, Canada*
[b] *Department of Urology, McGill University Health Center and McGill University, Montreal, Quebec, Canada*

Received 1 December 2014; received in revised form 8 January 2015; accepted 8 January 2015

KEYWORDS
Urine;
Cytology;
Atypical;
High-grade;
Correlation;
Number

Introduction This study presents a detailed and systematic morphological and quantitative analysis of urine cytology specimens in order to determine which qualitative and quantitative features are mostly associated with high-grade urothelial carcinoma (HGUCA).

Material and methods This study included 112 urine cytology cases with a surgical follow-up within 1 year that were originally reported as "atypical," "suspicious for HGUCA," or "positive for HGUCA." The morphological characteristics as well as the number of abnormal cells were correlated with a diagnosis of HGUCA on follow-up biopsy.

Results Multivariate analysis showed that the presence of hyperchromatic atypical cells with nuclear-cytoplasmic ratio ≥ 0.7 was an independent predictor of HGUCA. Similarly, irregular nuclear membranes, single cells, and pleomorphism correlated with surgical outcome whereas eccentric nuclear location, prominent nucleoli, nuclear-cytoplasmic ratio between 0.5 and 0.7 did not. Cases with ≤ 10 atypical cells had significantly lower rates of subsequent HGUCA than did those with >10 atypical cells (58% versus 77%). Cases with ≤ 5 atypical cells ($n = 26$) showed similar prediction rates (58%) for HGUCA than did those with 6 to 10 atypical cells ($n = 12$).

*Corresponding author: Fadi Brimo, MD; Department of Pathology, McGill University Health Center, Montreal General Hospital, 1650 Cedar Avenue, Montreal, Quebec, Canada, H3G 1A4; Tel.: (514) 934-1934 ext. 43843; Fax: (514) 934-8296.
E-mail address: fadi.brimo@muhc.mcgill.ca (F. Brimo).

2213-2945/$36 © 2015 American Society of Cytopathology. Published by Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.jasc.2015.01.003

Conclusions The number of atypical urothelial cells is an important criterion that should be taken into account when assigning cases to the "positive" or the "suspicious" categories. A preliminary cutoff of 10 cells appears to be easily applicable and valid from the clinical standpoint.
© 2015 American Society of Cytopathology. Published by Elsevier Inc. All rights reserved.

Introduction

Urine cytology remains one of the most valuable tools in the detection of new or recurrent urothelial tumors. The low sensitivity and specificity of urine cytology for low-grade urothelial lesions, coupled with the observation that those lesions rarely progress and are not part of the aggressive "molecular unstable pathway" of bladder tumors have resulted in a shift of perspective for the role of urine cytology in the contemporary era.[1-5] Currently, the main clinically relevant goal of cytology is the detection of high-grade urothelial carcinomas (HGUCAs) because they correspond to the lesions that carry a high risk of progression and mortality, therefore warranting early detection and treatment. It is in this context that a recent major international and multi-institutional effort has been undertaken to develop a uniform urine cytology reporting system, known as the "Paris System," which puts as a core priority the preservation of the specificity of urine cytology for HGUCA. In this system, the 4 main cytological categories proposed are negative for HGUCA, atypical, suspicious for HGUCA, and positive for HGUCA. The adoption of consensual and evidence-based criteria for different categories is empowered by the multi-institutional nature of the project and by a large amount of data accumulated by many significant studies evaluating the association of different cytological features with HGUCA. In that regard, whereas the vast majority of related studies were qualitative-based, the findings of 2 recent studies seem to indirectly suggest that the number of atypical urothelial cells in a given specimen may determine the histological outcome.[6,7] We herein present a detailed and systematic morphological and quantitative analysis of a large set of urine cytology specimens in order to determine which qualitative and quantitative features are mostly associated with HGUCA.

Materials and methods

Cohort characteristics and study design

The study was approved by the institutional review board. All urine cytology cases originally signed-out as "atypical," "suspicious for HGUCA," or "positive for HGUCA" were included. A total of 112 consecutive cytological specimens from 97 patients collected in the year 2012 were included. Of those, 15 patients had 2 consecutive cytological samples, whereas the remaining 82 patients had only 1 specimen each. For patients with multiple follow-up surgical specimens, the diagnosis from the immediate surgical follow-up was used as long as the time interval between the cytology and biopsy was shorter than 1 year. Cases with an interval longer than 1 year l between cytology and histology were excluded. The surgical diagnoses were categorized into 3 groups: HGUCA (which included urothelial carcinoma in situ, high-grade noninvasive papillary urothelial carcinoma, and invasive urothelial carcinoma); low-grade noninvasive papillary urothelial carcinoma (LGUCA); and benign/reactive diagnoses.

All cytological slides were evaluated by 1 cytologist blinded to cytological diagnoses and surgical outcomes. All specimens were processed using ThinPrep preparation (Hologic, Inc, Marlborough, Mass). Atypical cells were defined as cells with a nuclear-cytoplasmic (N/C) ratio $>$ 0.5 (single cells or in clusters) and were classified into 3 main categories based on the chromatin details: 1 = indistinct chromatin details; 2 = coarse irregular clumpy chromatin; and 3 = fine evenly distributed chromatin. Cells with indistinct chromatin details were further divided into 2 groups: type A cells showing regular nuclear membranes, and type B cells showing irregular nuclear membranes. Cells with coarse clumpy chromatin were also divided into type C cells showing regular nuclear membranes, and type D showing irregular nuclear membranes. The cytological features of type E cells were as follows: increased N/C ratio, fine chromatin, regular nuclear membranes, and prominent nucleoli (Figs. 1-2). By definition, type E cells had an N/C ratio $\geq$ 0.7 because cells with similar cytological features and lower N/C ratio would be considered "reactive" by most cytologists. In comparison, types A to D cells were included based on the nuclear characteristics independent from their N/C ratio as long as it exceeded 0.5. Of note is that this classification was only done for ease of evaluation for the study and is not reflective of routine practice. In addition, the presence/absence of all the following cytological features was captured: hyperchromasia, eccentric nuclear location, prominent nucleolus, necrotic background, mitosis, and pleomorphism. The number of atypical cells belonging to each subgroup was counted and recorded for each cytological specimen.

Statistical analysis

All analyses were performed using the SPSS software (version 22.0; IBM Corporation, New York, NY). The presence or absence of each subgroup of atypical cells, as well as individual cytological features was compared between cases with different surgical outcomes using the Fisher exact test. $P < 0.05$ was considered to be statistically

Download English Version:

https://daneshyari.com/en/article/2776605

Download Persian Version:

https://daneshyari.com/article/2776605

Daneshyari.com