

Morphologic Updates in Prostate Pathology



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KEYWORDS

• Prostatic adenocarcinoma • Gleason system • Active surveillance • Immunohistochemistry

ABSTRACT

In the past several years, modifications have been made to the original Gleason system with resultant therapeutic and prognostic implications. Several morphologic variants of prostatic adenocarcinoma have also been described. Prostate pathology has also evolved over the years with the discovery and utility of new immunohistochemical stains. The topics discussed in this update include the Gleason grading system, prognostic grade grouping, variants of prostatic adenocarcinoma, and the application of immunohistochemistry to prostate pathology.

OVERVIEW: UPDATE ON THE GLEASON GRADING SYSTEM

Since the original Gleason grading system¹ was derived, so much has changed in the area of prostate pathology, with the discovery and utility of serum prostate-specific antigen (PSA), immunohistochemical stains, 18-gauge core needle biopsies, and improved surgical techniques. In 2005, the International Society of Urologic Pathology (ISUP) reviewed and made changes to the original Gleason grading system² and these changes have had a profound impact on contemporary pathology and urology practices worldwide.^{3–10} A second modification to the Gleason diagram entailed placement of cribriform adenocarcinomas into pattern 4 (Fig. 1).⁸ Conventional and modified Gleason grading both correlate with age, serum PSA, and cancer involvement in needle biopsies. It has been shown that the stage distribution of modified Gleason grades of radical prostatectomy (RP) specimens differs from that of conventional Gleason grades, but a good

correlation exists between grade and primary tumor (pT) stage.^{5,10} Some of issues concerning the various Gleason grades/patterns are as follows.

GLEASON GRADE 1

Gleason grade 1 glands consist of a circumscribed nodule of closely packed but distinct, uniform, medium-sized acinar structures, which are round to oval and usually larger than glands seen in pattern 3. It is recommended that Gleason score of $1 + 1 = 2$ should not be assigned to prostatic adenocarcinoma, regardless of the specimen, with rare exceptions. A majority of cases in this group are actually adenosis (atypical adenomatous hyperplasia).^{2,9,11–13}

GLEASON GRADE 2

The glands in the Gleason grade 2 group are fairly circumscribed but may have minimal infiltration at the edge. These glands are more loosely arranged than those seen in pattern 1. This pattern is characteristic of transition zone cancers, so should rarely be seen in needle biopsy sampling that typically targets the peripheral zone. This fact along with poor reproducibility has led to the recommendation that a diagnosis of Gleason score $2 + 2 = 4$ should be made “rarely, if ever” in needle biopsy.^{2,14,15} A majority of the cases assigned a Gleason score of 4 on core needle biopsies have a higher Gleason score on corresponding prostatectomies.

GLEASON GRADE 3

The glands in the Gleason grade 3 category are typically smaller than those seen in pattern 1 or

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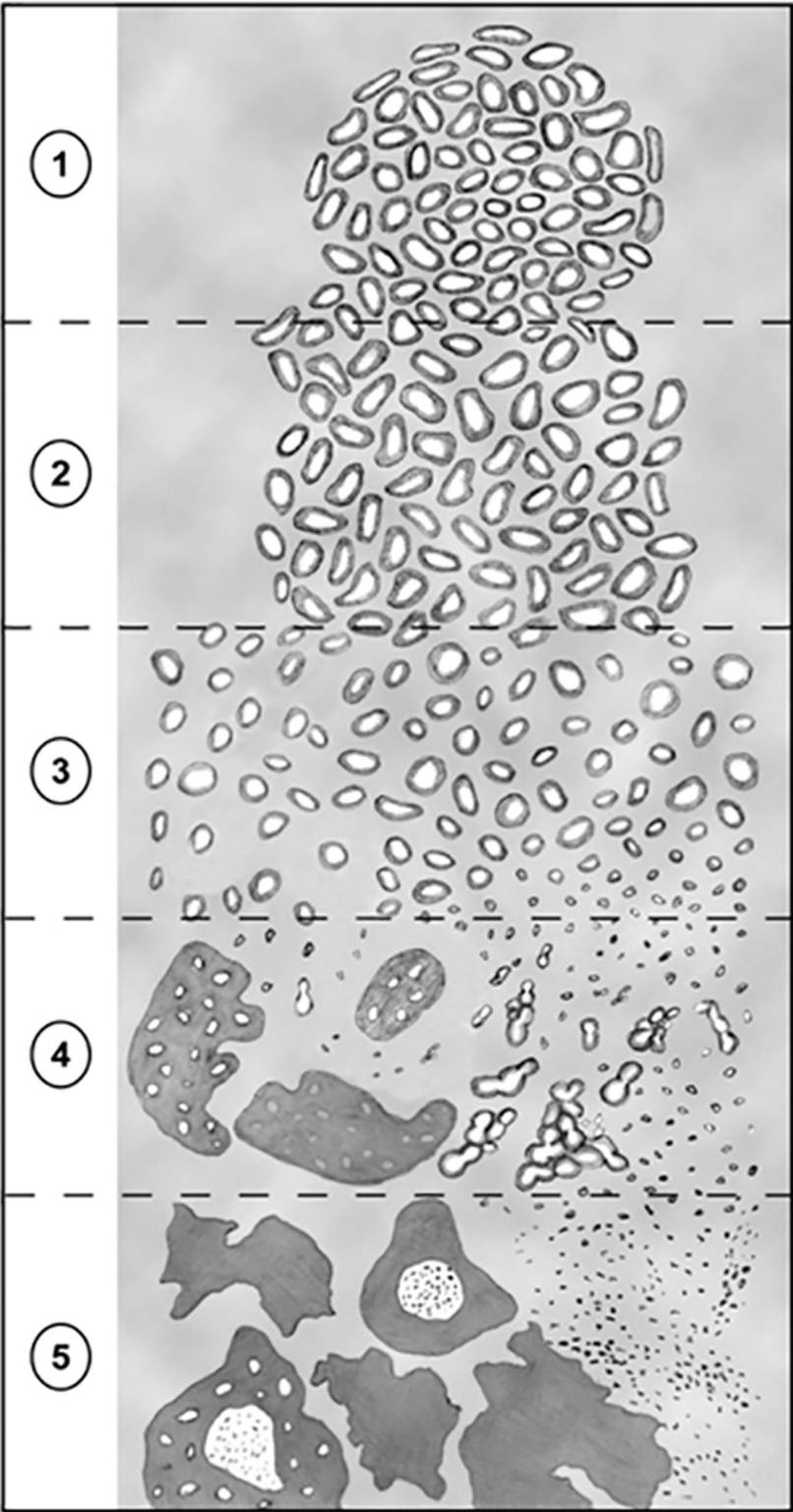
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Fig. 1. Gleason grading diagram: 2010 modification of ISUP 2005 modified scheme. (From Epstein JI. An update of the Gleason grading system. *J Urol* 2010;183: 433–40; with permission.) Note that a new ISUP modification of this diagram will be published (Epstein JI, Egevad L, Amin MB, et al. The 2014 international society of urological pathology [ISUP] Consensus Conference on Gleason grading of prostatic carcinoma: Definition of grading patterns and proposal for a new grading system. *Am J Surg Pathol* 2015, in press).

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