Prostatic Carcinoma
Pathology & Gleason grading

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What is seen in the lab

- TURP
- Core biopsy
- Sextant biopsies
- FNA
- Prostatectomy- sub total and radical
- Radical cystectomy
Histologic variants

- Acinar adenocarcinoma
- Ductal adenocarcinoma
- Signet ring cell
- Mucinuous
- Lymphoepithelioma-like
- Sarcomatoid
- Small cell
- Squamous cell
- Transitional cell
- Basaloid/adenoid cystic
Growth/cytologic variants

- Hypernephroid pattern
- Atrophic
- Pseudohyperplastic
- Foamy gland
- With Paneth like cells
- With oncocyctic cells
PIN
Prostatic Intra-epithelial Neoplasia

High and low grade

- Patterns - solid, comedo, papillary and cribriform

- Relationship with carcinoma
  - molecular features
  - age
  - multifocality
Mimics of Carcinoma

- Adenosis (atypical adenomatous hyperplasia)
- Post atrophic lobular hyperplasia
- Seminal vesicle
- Glands of verumontanum
- Nephrogenic adenoma / metaplasia
- Sclerosing adenosis
Role of IHC

- PSA
- PAP
- HMWK (CK 903)
- p63
- AMACR (P504S)
- Androgen receptor
Who?

Dr. Donald Gleason
What?

Gleason grade or pattern

- Primary grade - most predominant pattern
- Secondary grade - next most predominant pattern
What?

Gleason Score (GS)

Two numbers representing:

a) the predominant pattern and

b) the next most predominant pattern

eg. 3+4=7

5+3=8
What?

Gleason differential (GD)

The percentage makeup of the GS when there is any GG4 or GG5

This is shown as the GS followed by the GD, e.g. (4+3)[75/25]
Why?

- Histopathologic endpoints: tumor size, LVI, positive surgical margins and pathologic stage including extraprostatic extension and metastasis

- Clinical outcomes: stage, response to therapies, PSA failure/progression to metastatic disease, survival

- Treatment strategies and clinical trials
Nomogram

- Graphical calculating device

- Gleason grade, serum PSA level, clinical stage

- Partin tables

- Treatment decisions
When?

- Different prostatic tissue samples
- Minimal carcinoma
- Fine needle aspirates of prostate
- Histological variants
- Metastatic deposits
- After radiation and hormonal therapy

Histologic grade should be reported for untreated adenocarcinoma in every prostatic tissue sample
How?

- Based entirely on histologic pattern of arrangement of carcinoma cells in H&E stained prostatic tissue sections at relatively low magnification by the extent of glandular differentiation and pattern of growth of the tumor in the prostatic stroma
How?

Gleason Patterns/Grades 1 and 2

- Closely resemble normal prostate

- The least important

- Composed by mass: in grade 2 the medium sized glands are more loosely aggregated, and some wander into the surrounding stroma
Gleason Pattern/Grade 3

- Most common
- Has a normal "gland unit" like that of a normal prostate
- Infiltration of glands into the stroma is very prominent
- Single/ papillary with variation in size and shape
- 3 A,B,C
Gleason Pattern/Grade 4

- Most important
- Disruption and loss of the normal gland unit
- Raggedly infiltrative
- Fused/ cribriform
- Varying sizes
- 4 A,B
Gleason Pattern/Grade 5

- An important grade
- Less common than grade 4
- Usually no evidence of any attempt to form gland units, sometimes cribriform with comedonecrosis - often called undifferentiated
- Expansile/ diffusely permeative
- 5 A,B
4+3 or 3+4

Does it matter?
4+3 or 3+4

GS 4+3

- More advanced clinical and pathological stages
- Larger tumor volumes
- Higher preoperative PSA levels
- Older age
- Higher proportion were African-American
Tertiary pattern
Does it matter?

Yes, if it is 4 or 5
Minimum dataset

- Type of tumor
- Gleason score
- Amount of tumor present on each core (percent of core involvement and length)
- Location involved
- Perineural invasion
- Seminal vesicle and lymph node involvement
- Intravascular involvement and extraprostatic extension
- Surgical margins
- Any other pathology
Concerns

- Undercall a lesion/score
- Reproducibility (interobserver and intraobserver)
- Training dependent
- Technical issues
- Failure to identify other factors - intravascular, extraprostatic, or perineural tumor involvement
Experimental approaches

- DNA ploidy
- Nuclear morphometry
- Biomarkers – p53, BCL-2, p21
- Microvessel density counts
- Ki-67 index
- Chromogranin, p27, Her-2, e cadherin, CD 44
- Gene expression profiling
Prognostic factors for prostate cancer
CAP and WHO recommendations

**Category I: Recommended for routine reporting**
- TNM stage
- Histological grade (Gleason)
- Surgical margin status
- Perioperative serum PSA

**Category II: Factors with promise or recommended despite incomplete data**
- DNA ploidy
- Histologic type
- Tumor amount in needle biopsy tissue
- Tumor amount in radical prostatectomy specimens

**Category III: Not currently recommended due to insufficient evidence**
- Genetic markers
- Neuroendocrine markers
- Proliferation markers, apoptosis
- Perineural invasion
- Vascular/lymphatic invasion
- Microvessel density
- Nuclear morphometry
- Androgen receptors

Agreed upon by both CAP and WHO
From: Botswick and Foster