Prostatic Carcinoma

Pathology & Gleason grading

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What is seen in the lab

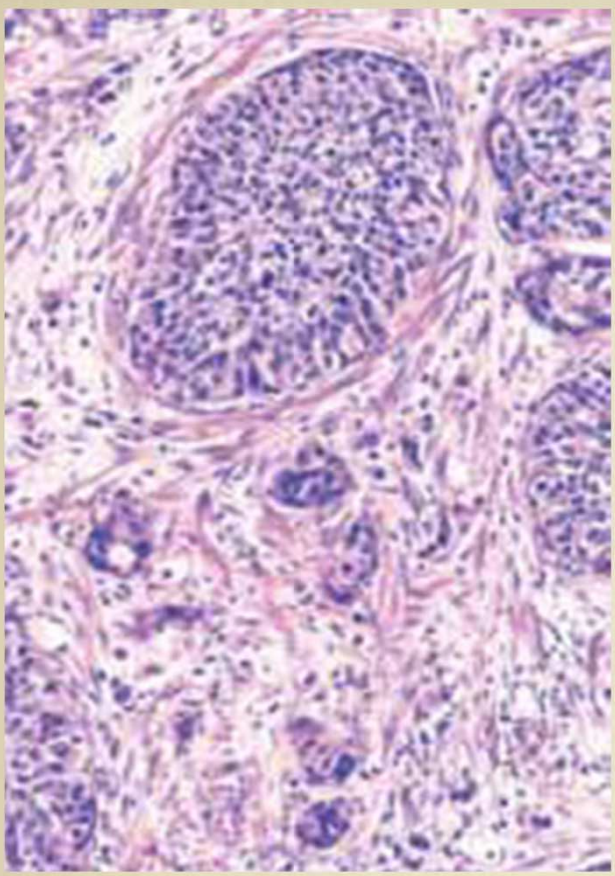
- TURP
- Core biopsy
- Sextant biopsies
- FNA
- Prostatectomy- sub total and radical
- Radical cystectomy

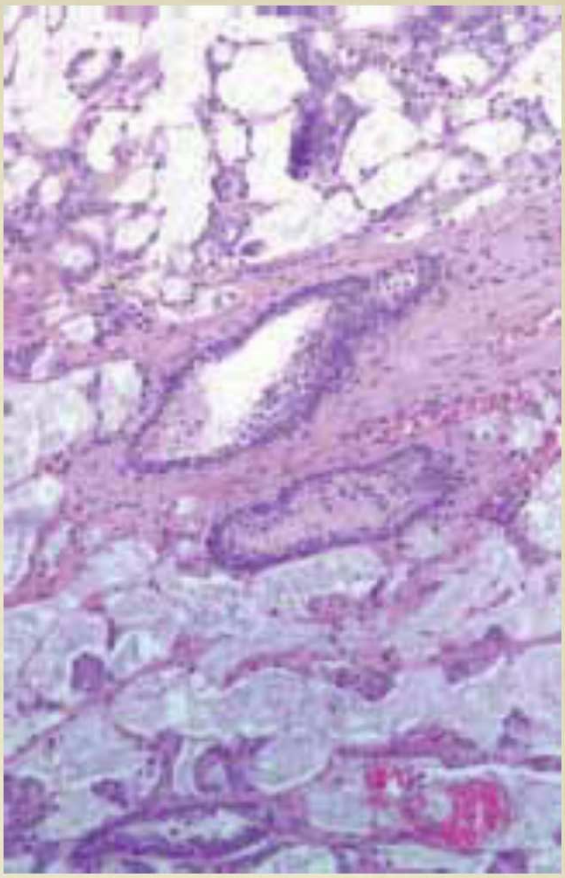
Histologic variants

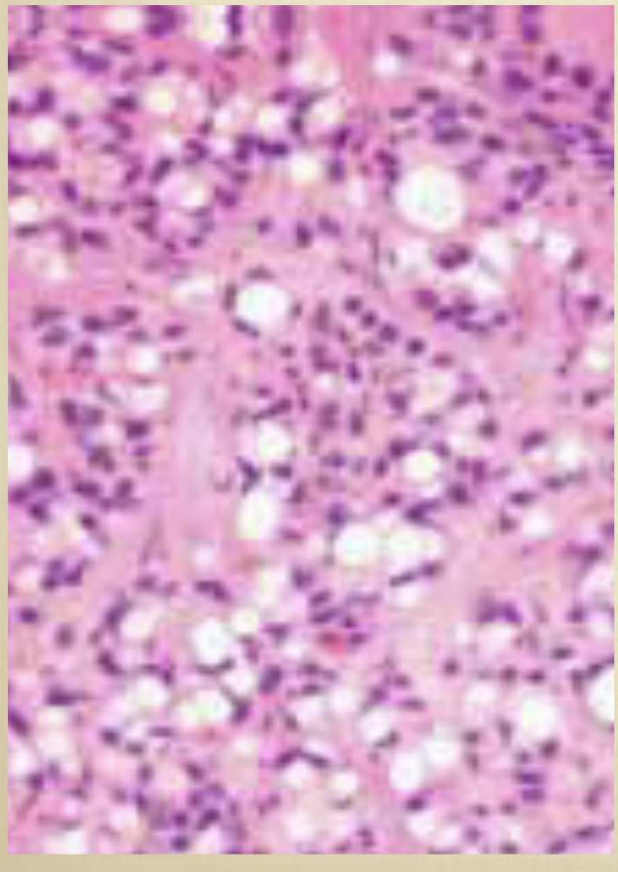
- Acinar adenocarcinoma
- Ductal adenocarcinoma
- Signet ring cell
- Mucinous
- Lymphoepithelioma-like
- Sarcomatoid
- Small cell
- Squamous cell
- Transitional cell
- Basaloid/adenoid cystic

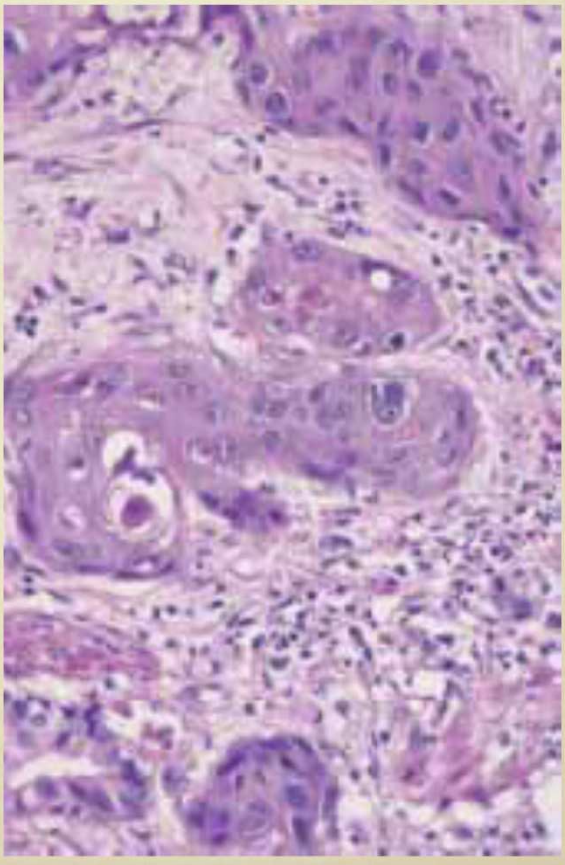
Growth/cytologic variants

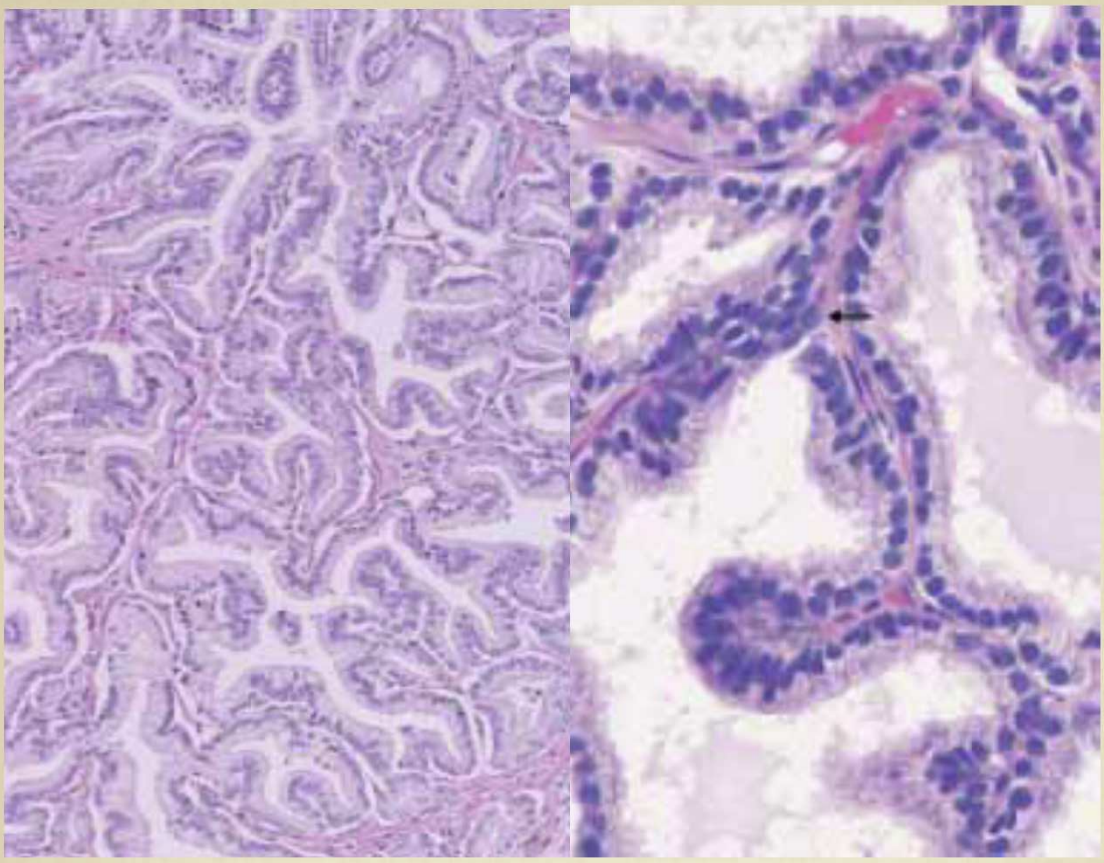
- Hypernephroid pattern
- Atrophic
- Pseudohyperplastic
- Foamy gland
- With Paneth like cells
- With oncocytic cells

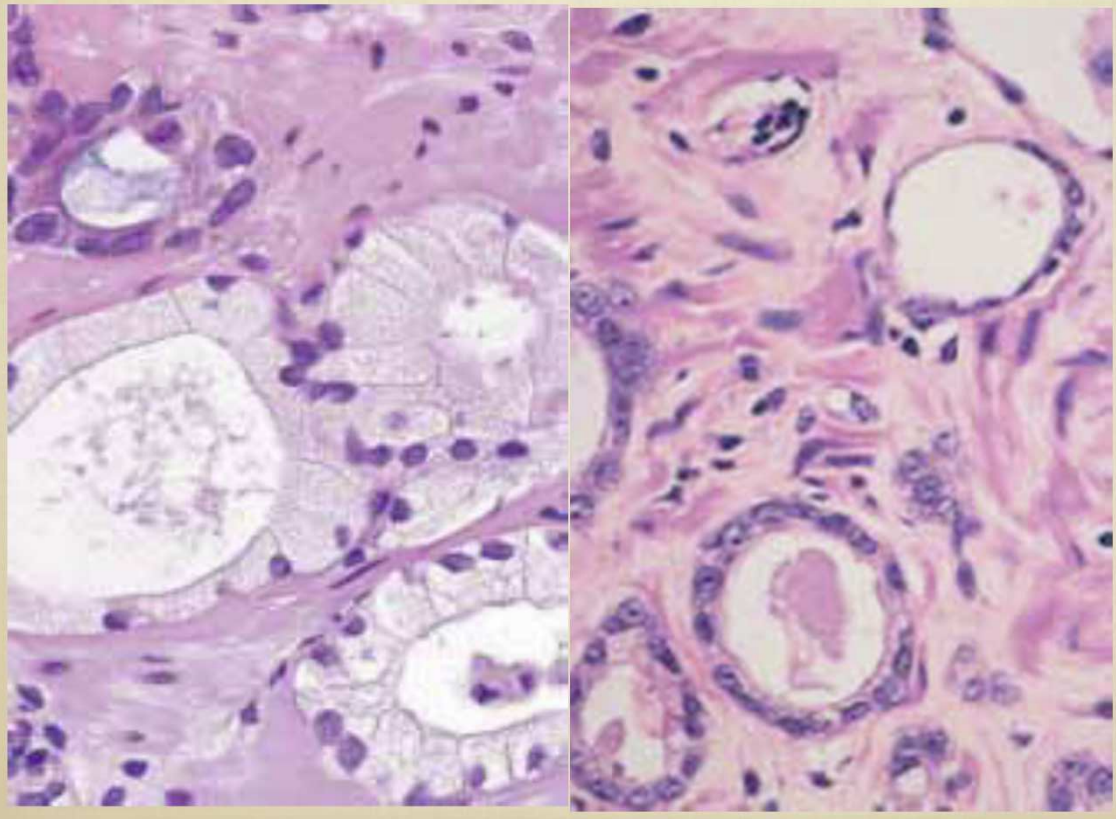












PIN
Prostatic Intra-epithelial Neoplasia

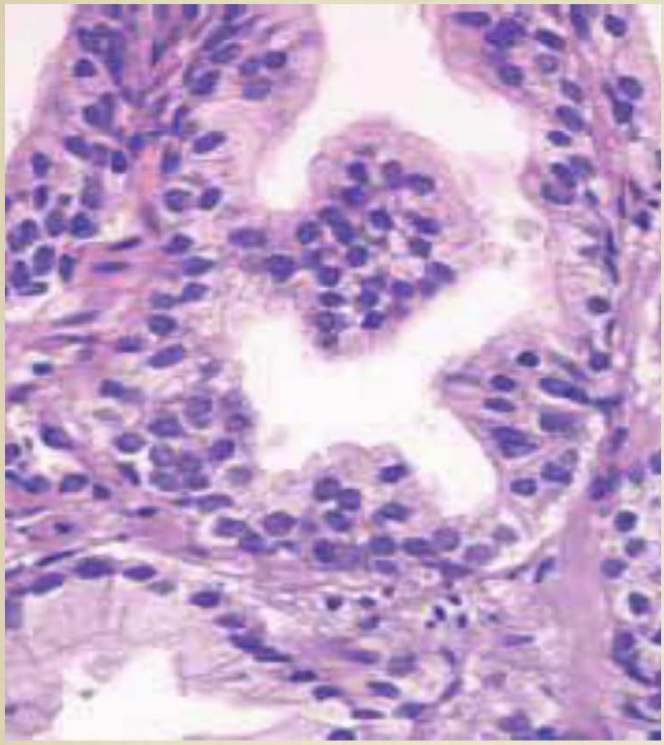
High and low grade

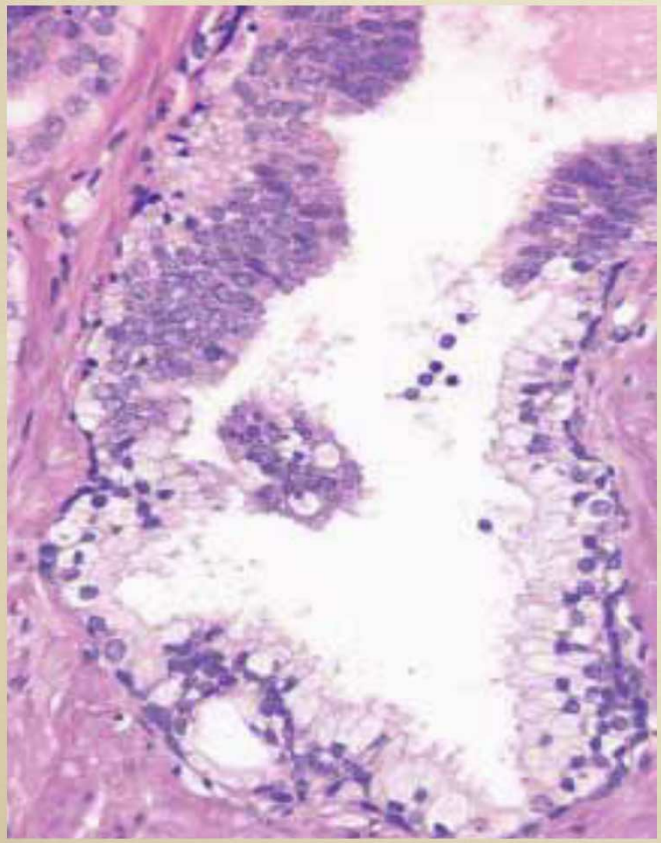
- Patterns - solid , comedo, papillary and cribriform
- Relationship with carcinoma

    - molecular features

    - age

    - multifocality





Mimics of Carcinoma

- Adenosis (atypical adenomatous hyperplasia)
- Post atrophic lobular hyerplasia
- 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?

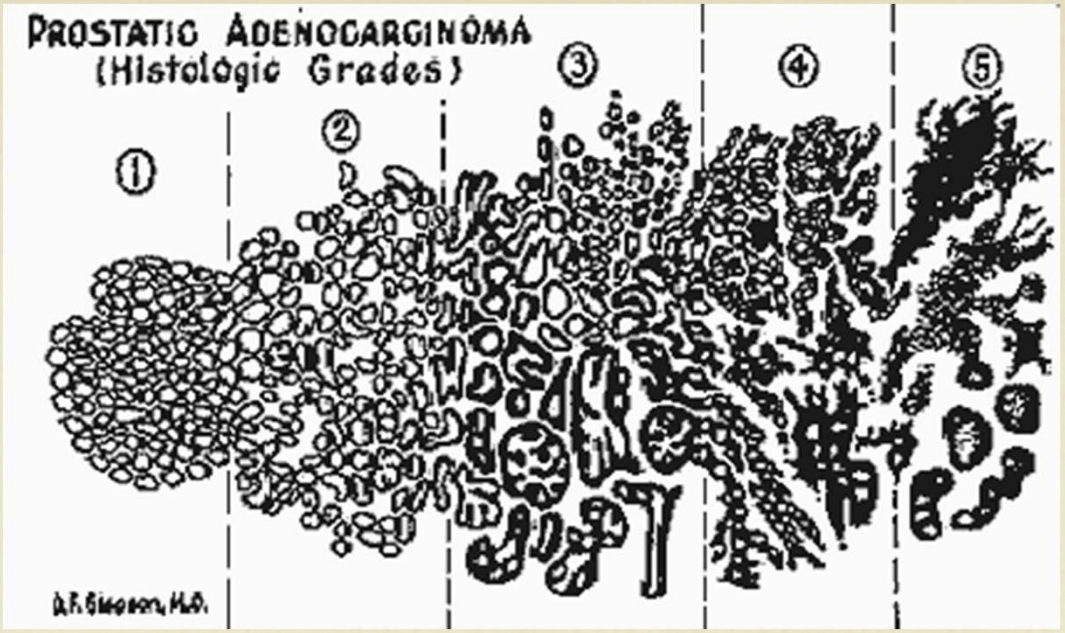
- Different prostatic tissue samples
- Minimal carcinoma
- Fine needle aspirates of prostate
- Histological variants
- Metastatic deposits
- After radiation and hormonal therapy

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

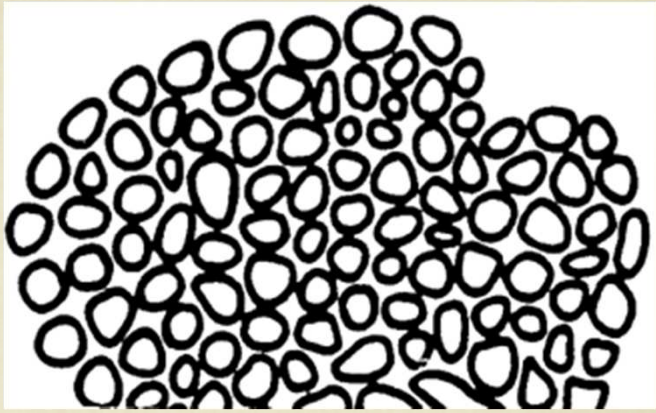
How?

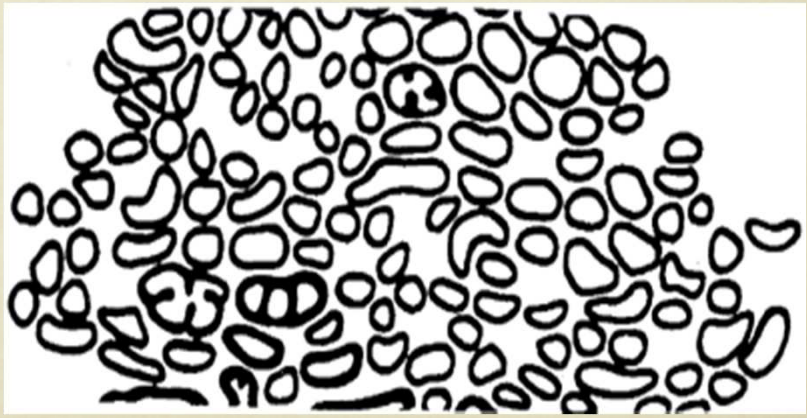


Adapted from Gleason DF. The Veteran's Administration Cooperative Urologic Research Group: histologic grading and clinical staging of prostatic carcinoma. In Tannenbaum M (ed.) Urologic Pathology: The Prostate. Lea and Febiger, Philadelphia, 1977; 171-198.

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





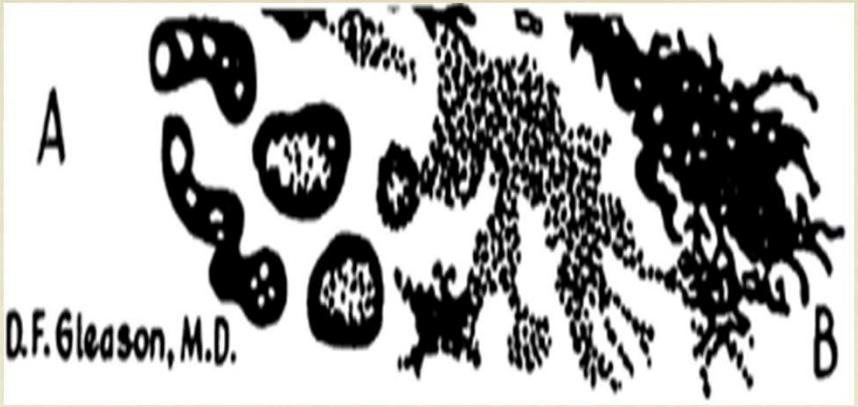
Gleason Pattern/Grade 3

- 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

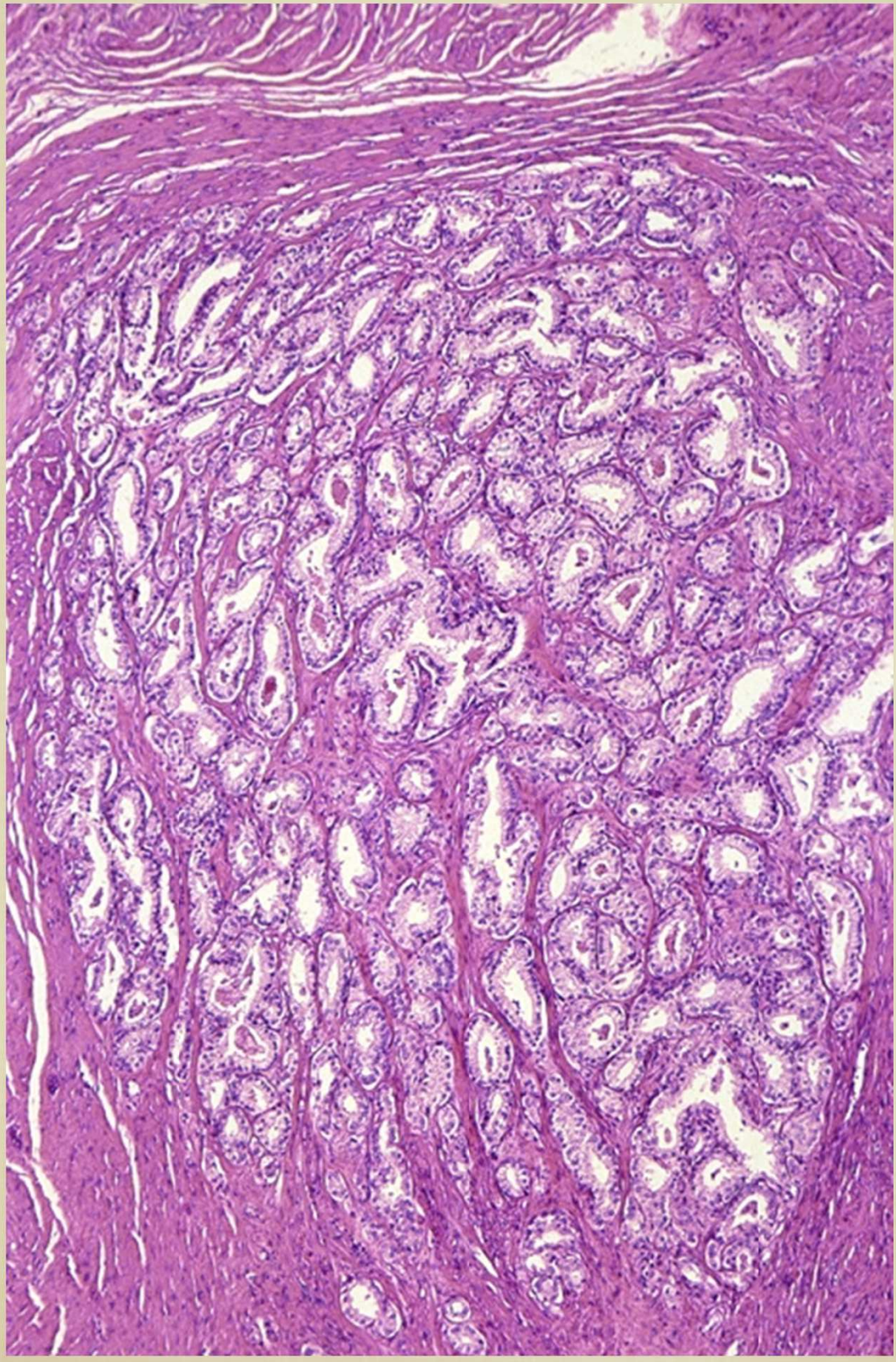
Gleason Pattern/Grade 4

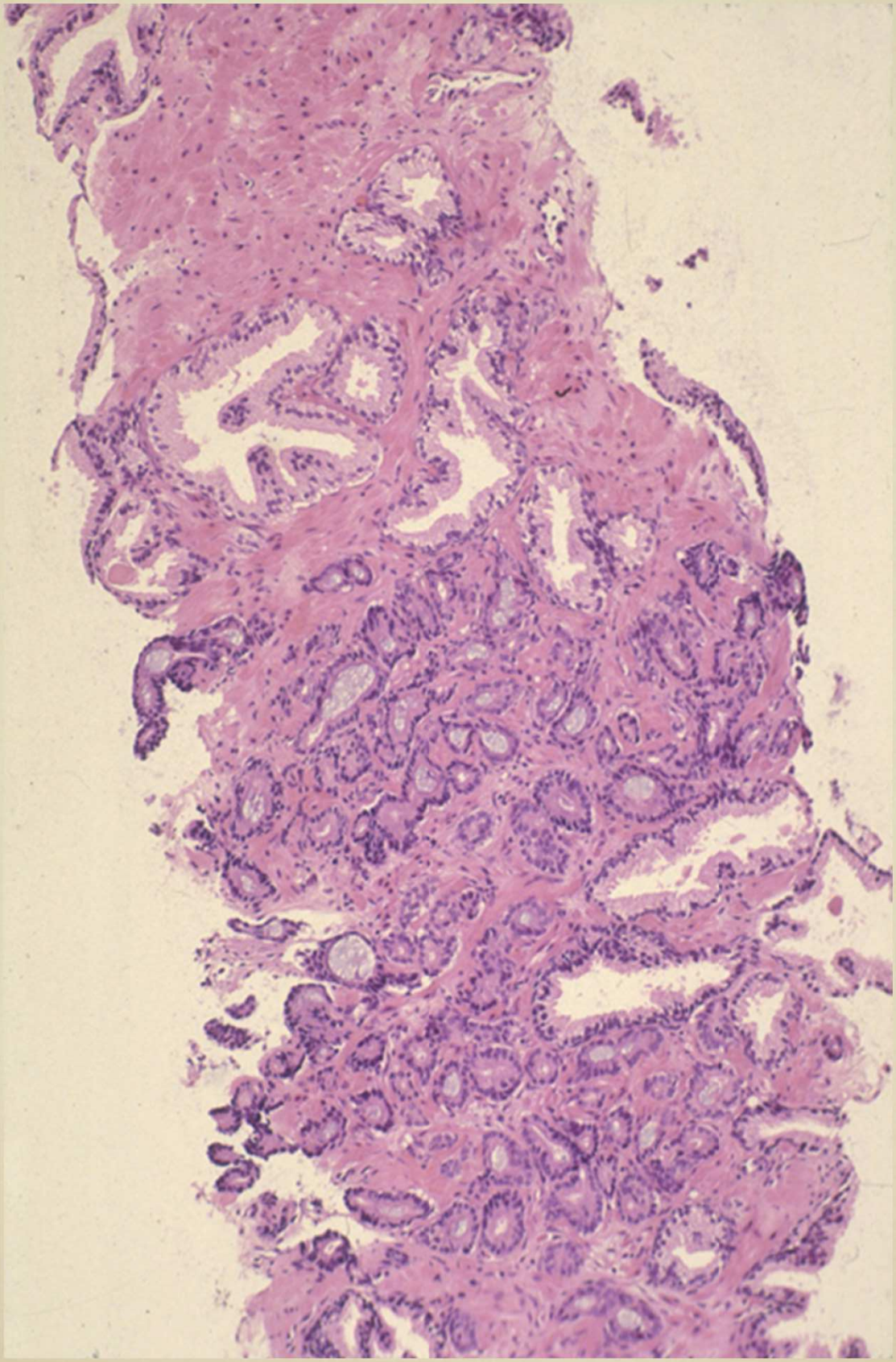
- Most important
- Disruption and loss of the normal gland unit
- Raggedly infiltrative
- Fused/ cribriform
- Varying sizes
- 4 A,B

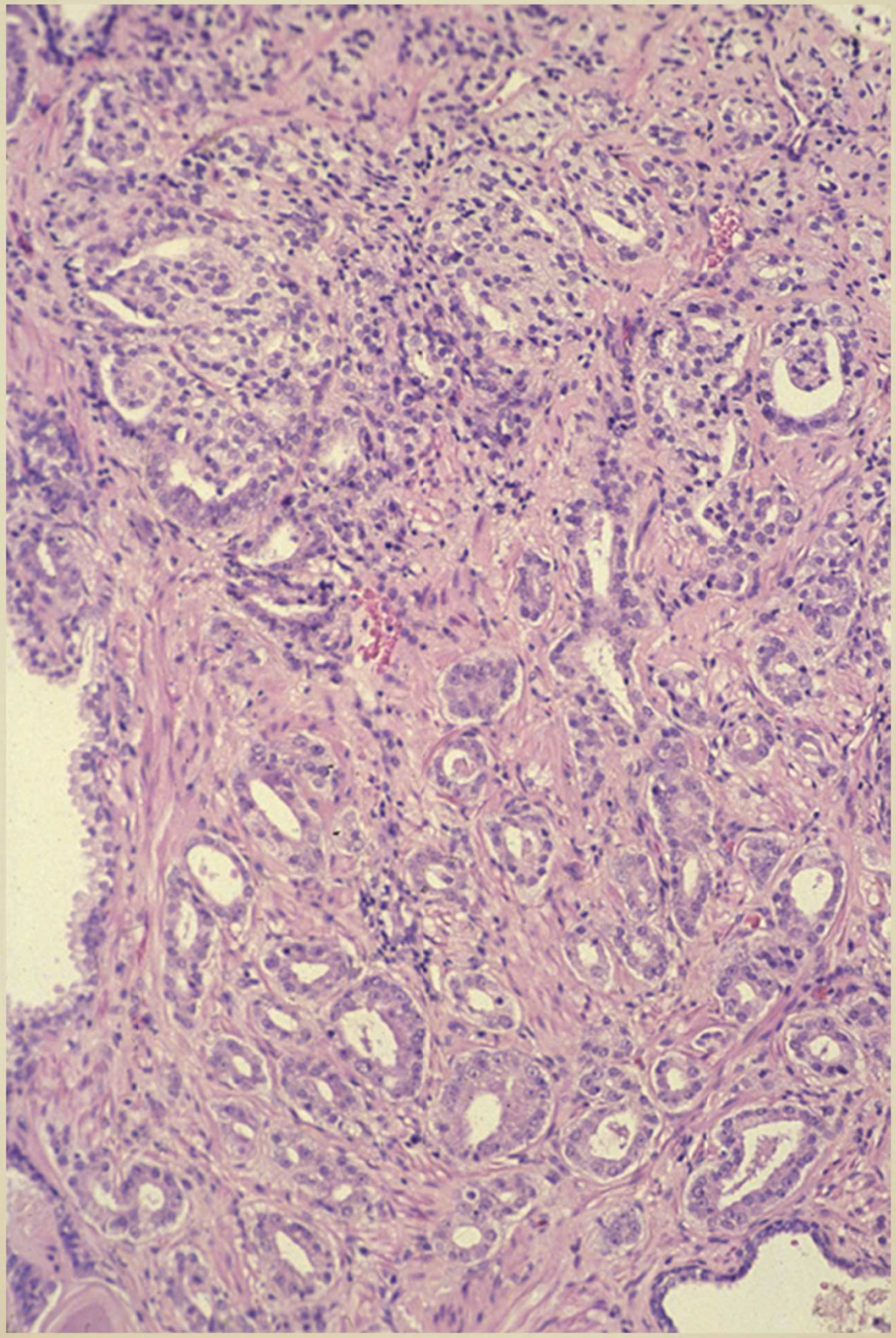
Gleason Pattern/Grade 5

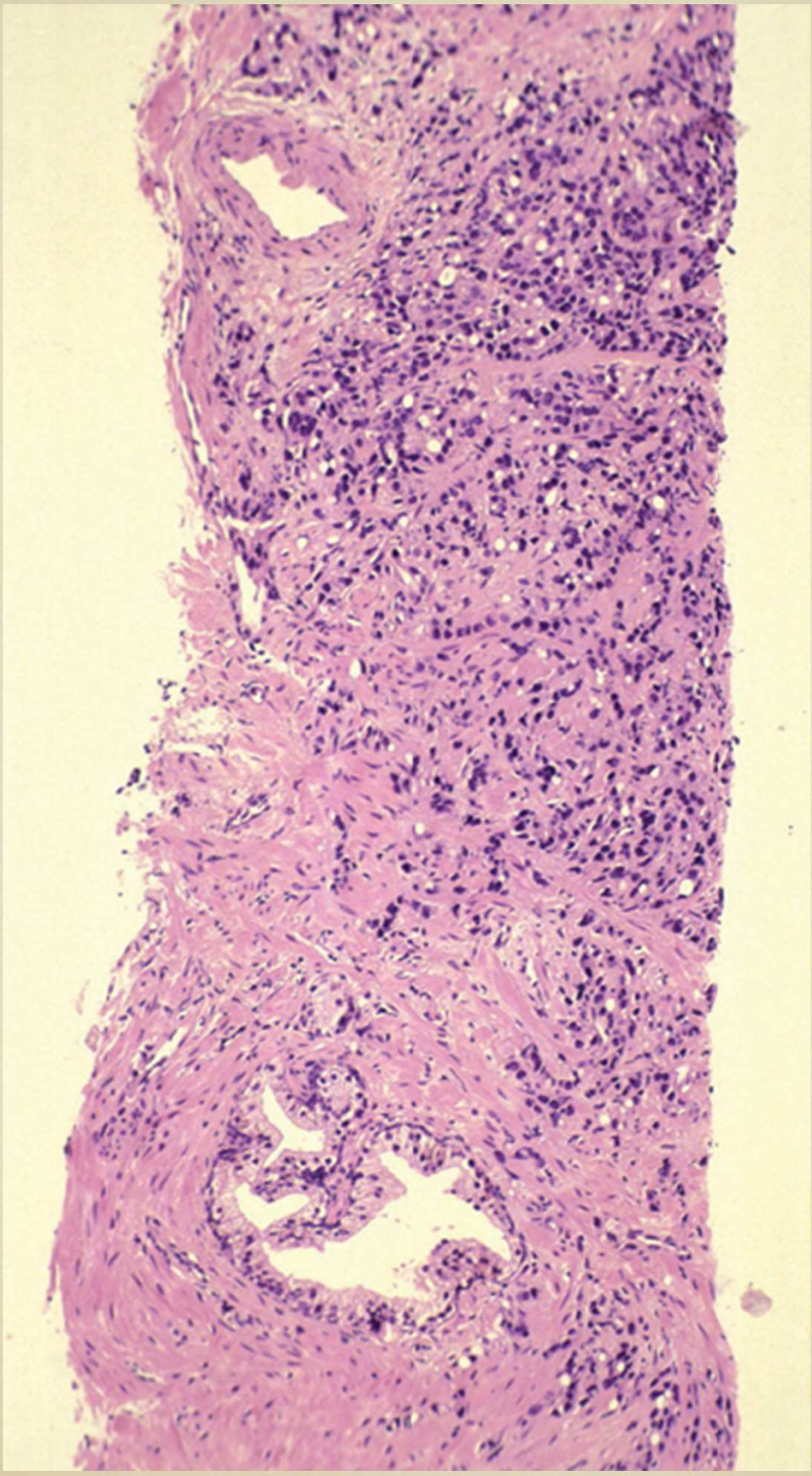


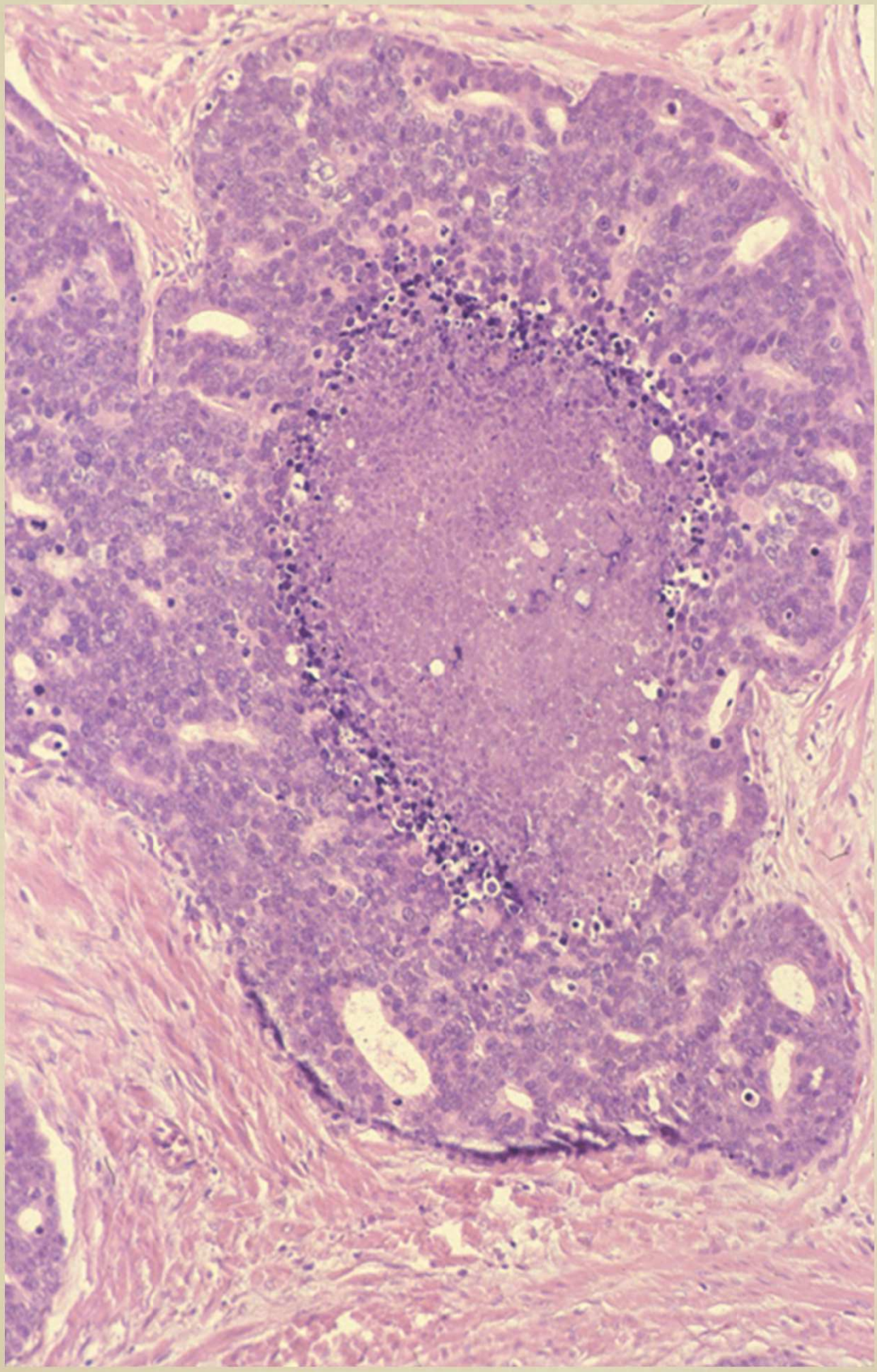
- An important grade
- Less common than grade 4
- Usually no evidence of any attempt to form gland units, sometimes cribriform with comedonecrosis -often called undifferentiated
- Expansile/ diffusely permeative
- 5 A,B











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