

## Prostate cancer mimics

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## Mimics of prostatic adenocarcinoma

- Atrophy
- Seminal vesicle/ejaculatory duct (nuclear atypia; intracytoplasmic pigment present)
- Central zone glands (normally more crowded with some architectural complexity, Roman bridges but lack nuclear/nucleolar changes of neoplasia)
- Cowper's gland
- Paraganglia
- Atypical adenomatous hyperplasia ('adenosis')
- Verumontanum mucosal gland hyperplasia
- Sclerosing adenosis
- Urothelial carcinoma
- Nephrogenic 'adenoma' (metaplasia)
- Mesonephric remnants +/- hyperplasia
- Treatment effects (hormone/radiotherapy)
- High grade PIN (rare cases)



## Atrophy

- Simple (lobular)
- Sclerotic
- Cystic
- Linear (streaming)
- Partial atrophy
- Post-atrophic hyperplasia
- Atrophy following androgen deprivation therapy



## Partial atrophy

- Commonest mimic of adenocarcinoma in some contemporary series
- Up to 25% of cases may lack expression of basal cell makers and show expression of racemase (AMACR)
- Affected glands do not show an infiltrative pattern
- Pale/clear cytoplasm
- Lack of prominent nucleoli



## Anatomical structures which could be confused with prostatic neoplasia

- Central zone glands of the prostate
- Seminal vesicle/ejaculatory duct
- Cowper's gland (bulbourethral gland)
- Paraganglia
- Verumontanum mucosal glands (hyperplasia)
- Mesonephric gland remnants (hyperplasia)



## Verumontanum mucosal gland hyperplasia

- Crowded gland in region of verumontanum
- Benign cytoarchitectural features
- Corpora amylacea often present



### Urothelial carcinoma (Uca) in prostatic ducts versus ductal carcinoma of prostate

<u>Prostatic ductal carcinoma</u>	<u>UCa in prostatic ducts</u>
▪ PSA +/-	▪ PSA –
▪ PSAP +/-	▪ PSAP –
▪ CK7 -/+	▪ CK7 +/-
▪ CK20 -	▪ CK20 +/-
▪ 34BβE12 -	▪ 34BβE12 +/-
▪ CK5/6 –	▪ CK5/6 +/-
▪ Thrombomodulin –	▪ Thrombomodulin +/-
▪ Uroplakin III –	▪ Uroplakin III -/+
▪ NKX3.1 +/-	▪ NKX3.1 -



### Metaplasia

- Mucinous metaplasia
- Nephrogenic adenoma



### Mesonephric remnant hyperplasia

- Extremely rare
- Lobular arrangement of tubules
- May have an infiltrative appearing growth pattern
- Single layer of bland cuboidal, flattened or low columnar cells
- Often contains dense eosinophilic secretions “colloid-like” resembling thyroid follicles
- May have ‘infiltrative’ cords that lack colloid with nucleoli than can mimic adenocarcinoma
- PSA and PSAP –ve
- Most are positive for high molecular weight cytokeratins



### Treatment effects (androgen deprivation therapy)

- Acinar atrophy
- Decreased ratio acini:stroma
- Basal cell hyperplasia benign glands
- Stromal oedema and/or fibrosis
- Squamous metaplasia
- Decrease in extent of PIN
- Prominent clear cell change
- Nuclear/nucleolar shrinkage
- Nuclear hyperchromasia



### Treatment effects (radiotherapy)

- Nuclear hyperchromasia
- Nuclear pleomorphism
- High N:C ratios
- Variable nucleolar enlargement
- Vascular myointimal proliferation
- Basal cell hyperplasia/squamous metaplasia
- Decrease in ratio acini:stroma



### Small gland flat pattern high grade PIN

- Can be a very close mimic of invasive adenocarcinoma of prostate



## Mimics of high grade PIN

- Basal cell hyperplasia
- Clear cell cribriform hyperplasia
- Inflammatory changes
- Urothelial carcinoma in situ (more often can resemble intraductal adenocarcinoma)
- Intraductal adenocarcinoma of prostate
- Treatment effects (hormone/radiotherapy)



## Immunohistochemistry can assist us in difficult cases that mimic neoplasia in the prostate

- Markers for basal cells, including high molecular weight cytokeratins (34 $\beta$ E12 and CK5/6) and p63 (stain basal cells in PIN and benign glands; absent in most cases of prostatic adenocarcinoma, except very rare cases of p63+ve adenocarcinoma)
- Racemase (alpha methyl co-A racemase or AMACR): positive in PIN and many cases of adenocarcinoma. Negative in most benign lesions with some exceptions e.g. atypical adenomatous hyperplasia, partial atrophy



## Inflammation

- Usual type +/- with reactive atypia in acini
- Granulomatous prostatitis, non-specific
- Xanthogranulomatous prostatitis
- Malakoplakia
- Signet ring-like change in lymphocytes (and/or stromal cells)

