NOTES
MALE GENITOURINARY CANCERS

GENERALLY, WHAT ARE THEY?

PATHOLOGY & CAUSES

- Male reproductive, urinary system cancers

CAUSES

- Depends on cancer type

RISK FACTORS

- Depends on cancer type
  - Tobacco smoking, increased age, positive family history

COMPLICATIONS

- Metastasis, affected part function loss

SIGNS & SYMPTOMS

- Depends on cancer type
  - Dysuria, painful ejaculation, back pain, hematuria/hematospermia, pelvic pain, weight loss, lower back/abdominal pain

DIAGNOSIS

DIAGNOSTIC IMAGING

- CT scan/MRI/ultrasound
- Identify lesions

LAB RESULTS

- Serum tumor markers

OTHER DIAGNOSTICS

- History/physical exam

Biopsy

- Grading
  - *GX*: grade cannot be assessed (undetermined grade)
  - *G1*: well differentiated (low grade)
  - *G2*: moderately differentiated (intermediate grade)
  - *G3*: poorly differentiated (high grade)
  - *G4*: undifferentiated (high grade)

Staging

- Tumor, nodes, metastasis (TNM) system; scored 0–4
  - *T*: size, sites invaded (e.g. only testis/extratesticular invasion)
  - *N*: degree of spread to regional lymph nodes
  - *M*: distant metastasis presence
  - *V*: Vascular invasion

TREATMENT

MEDICATIONS

- Chemotherapy

SURGERY

- See individual cancers

OTHER INTERVENTIONS

- Radiotherapy

PENILE CANCER

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PATHOLOGY & CAUSES

- Malignant penis tumor
- Rare in high-income countries
- Initial lesions found on prepuce, glans
- Can invade corpora, shaft of penis → penile autoamputation

TYPES

Squamous cell carcinoma (SCC)

- Most predominant; melanoma, small-cell carcinoma, Kaposi sarcoma, Meckel cell carcinoma, basal cell carcinoma, etc.
- Bowenoid papulosis
  - SCC form *in situ* of penis
- Erythroplasia of Queyrat
  - SCC of penis glans, presents as erythroplakia (red patch)

Histologic subtypes of SCC

- Usual type
  - Most predominant
  - Involves corpus spongiosum
  - Invades perineural, regional lympho-vascular system
- Papillary carcinoma
  - Involves superficial erectile tissues
  - Not associated with human papillomavirus (HPV)
  - *Histology:* papillomatosis, hyperkeratosis
- Warty tumors
  - Associated with HPV infection
  - *Histology:* irregular stroma with papillary fibrovascular core
- Basaloid carcinoma
  - Associated with HPV
  - *Histology:* necrosis, erectile tissue invasion
- Verrucous carcinoma
  - Not aggressive (low metastatic ability)
  - *Histology:* straight papillae, surface, interpapillary hyperkeratosis
- Sarcomatoid carcinoma
  - Very rare
  - Highly aggressive
  - *Histology:* SCC, spindle cell carcinoma components

RISK FACTORS

- Infection
  - HPV 16/18 infection, HIV, urinary tract infections (UTIs)
- Genital warts, poor hygiene, phimosis/paraphimosis, tobacco smoking, smegma accumulation, increased age

COMPLICATIONS

- Metastasis
  - Inguinal/femoral lymph nodes; liver, lung, bone, brain (rare)
- Penile autoamputation

SIGNS & SYMPTOMS

- Painless mass
- Ulcer/rash
- Penile pain/foul-smelling discharge/bleeding
- Inguinal lymphadenopathy
- Penile skin color change (redness)

DIAGNOSIS

DIAGNOSTIC IMAGING

CT scan/MRI/ultrasound

- Regional lymph, distant metastasis assessment

OTHER DIAGNOSTICS

- Obvious suspicious penile lesions
- Biopsy
  - Diagnosis, tumor grading
- Staging
  - TNM

TREATMENT

MEDICATIONS

- Chemotherapy

SURGERY

- Local excision in early stage
- Partial/total penectomy if glans/shaft invaded

OTHER INTERVENTIONS

- Radiotherapy

Figure 127.1 The clinical appearance of a fungating penile tumor, likely a squamous-cell carcinoma. There is visible lymphadenopathy of the left superficial inguinal chain which almost certainly represents metastatic disease.

PROSTATE CANCER

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PATHOLOGY & CAUSES

- Very common male cancer
  - Arises in prostate gland
- Second leading cancer death cause in biologically-male individuals
- Usually associated with *BRCA1*/*BRCA2* gene mutations
- Early cancer cells require androgens to survive
- Can later become androgen-independent
- Usually arise in prostate's peripheral zone

TYPES

Adenocarcinomas

- Most common
- Arise from glandular tissues; from luminal/basal cells

Transitional cell cancer

- Arises from prostatic urethra transitional epithelium cells

Small cell prostate cancer

- Arise from neuroendocrine cells

RISK FACTORS

- > 40 years old
- Black people of African descent ↑ risk
- Positive family history
- Smoking
- Obesity
- Animal-fat rich diet

COMPLICATIONS

- Bone osteolysis → hypercalcemia (rare)
- Metastasis
  - Lymph nodes → more metastasis to distant organs (e.g. lungs)

- Bones (thoracic/lumbar spine, pelvis) → lower back pain, pathologic fractures → spinal cord compression (if spine involved) → neurological deficits (e.g. lower limb pain/weakness, bowel/urinary bladder control loss, etc.)
- Nearby structure compression/invasion
  - Urinary bladder/prostatic urethra (later stages) → difficulty urinating; bleeding; urination, ejaculation pain

SIGNS & SYMPTOMS

- Urinary frequency/hesitancy/incontinence
- Dysuria
- Painful ejaculation
- Lower-back/bone pain
- Hematuria/hematospermia (rare)
- Neurological deficits (e.g. weakness/lack of lower limb sensation)

DIAGNOSIS

Gleason score

- 2–4: low grade
- 5–7: moderate grade
- 8–10: high grade

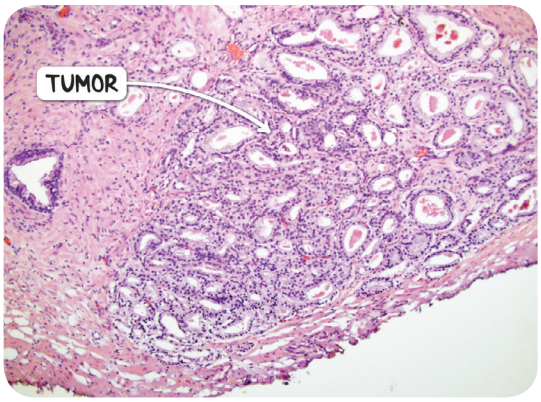

Figure 127.3 The histological appearance of prostate adenocarcinoma, Gleason grade 3. The tumor is composed of small, compressed glands with only a tiny amount of intervening stroma.

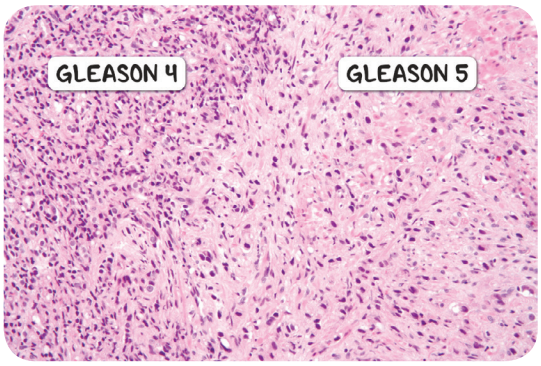

Figure 127.2 The histological appearance of prostate adenocarcinoma. On the left the tumor forms vague gland like structures (Gleason 4) and on the right is composed of infiltrating single cells (Gleason 5).

DIAGNOSTIC IMAGING

Ultrasound

- Hypoechoic areas in prostate → suggestive of cancer

X-ray/CT scan/MRI

- Lesions in prostate, pelvic lymph nodes, bones
  - *Staging:* TNM
- Bone scan
  - Bone metastases presence

LAB RESULTS

- ↑ prostate specific antigen (PSA) serum levels
- ↑ alkaline phosphatase serum levels
  - Suggestive of bone metastasis
- Biopsy used for Gleason scoring

OTHER DIAGNOSTICS

- Digital rectal exam (DRE)
  - Asymmetric prostate enlargement

TREATMENT

MEDICATIONS

- Anti-androgen therapy
  - ↓ testosterone levels → ↓ cancer cell growth

SURGERY

- Prostatectomy
- Cryosurgery
- Orchidectomy
  - ↓ testosterone levels → ↓ cancer cell growth

OTHER INTERVENTIONS

- Active surveillance (early stage)
  - Regular biopsy, PSA monitoring
- Radiotherapy

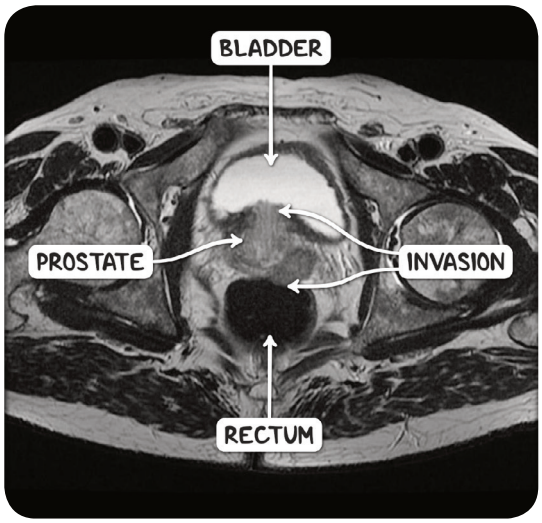

Figure 127.4 An MRI scan of the pelvis in the axial plane demonstrating prostate adenocarcinoma invading the bladder and the rectum.

TESTICULAR CANCER

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PATHOLOGY & CAUSES

- Cancer develops in testicular cells
  - Unilateral/bilateral
  - Common in biologically-male individuals (15–35 years old)
- High cure rate (very high five year survival rate)

TYPES

Germ cell tumors (GCT)

- Most common
- Seminomas
  - Very poor prognosis
  - Syncytiotrophoblastic/spermatocytic seminoma
  - *Histology:* "fried egg"-like cells (clear cytoplasm, central nucleus)
- Non-seminomas germ cell tumors (NSGCT)
  - Produce beta human chorionic gonadotropin (β-hCG)
  - Yolk sac tumor (AKA endodermal sinus tumor)
  - *Histology:* Schiller–Duval bodies (germ cells encircle blood vessel, resemble glomerulus)
- Embryonal carcinoma
  - *Histology:* prominent nucleoli; necrotic areas; clear, empty-appearing nuclei
- Choriocarcinoma
  - *Histology:* cytotrophoblasts, syncytiotrophoblasts, hemorrhagic areas
- Teratoma
  - *Histology:* contains many tissue types (hair, teeth, neurons, etc.)

Sex cord/gonadal stromal tumors

- Sertoli cells tumor
  - *Histology:* dense fibrous stroma, abundant eosinophilic cytoplasm, cells have tubular arrangement
- Leydig cells tumors
  - *Histology:* Reinke crystals (eosinophilic cytoplasmic inclusion bodies)

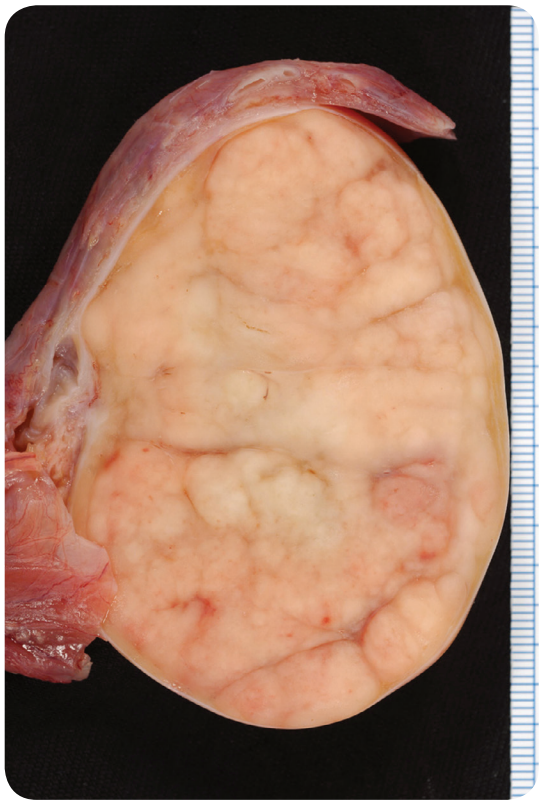

Figure 127.5 The gross pathological appearance of a testicular seminoma. The tumor has entirely replaced the normal testicular parenchyma.

- Granulosa cell tumor
  - *Histology:* Call–Exner bodies (fluid-filled eosinophilic spaces granulosa cells)

CAUSES

- Unknown; chromosome 12p gene mutations usually present

RISK FACTORS

- Cryptorchidism (undescended testis)
- Previous testicular malignancy
- Family history
- White individuals
- Congenital abnormality (hypospadias, inguinal hernias)
- Infection (mumps virus → orchitis)

COMPLICATIONS

- Infertility
- Lungs, liver, bones, brain metastases

SIGNS & SYMPTOMS

- Painless/painful testis mass
- Lower abdominal pain, heaviness
- Previously atrophied testis → ↑ size
- Gynecomastia
- Metastasis evidence (e.g. dyspnea, hemoptysis, palpable lymph nodes, bone pain)

DIAGNOSIS

DIAGNOSTIC IMAGING

- Tumor identification, TNM staging
- Orchidectomy
  - *Biopsy:* diagnosis, tumor grading

Chest X-ray

- Evaluate pulmonary metastasis

CT scan

- Asses abdominal, pelvic metastasis

MRI

- If brain involvement is suspected

Ultrasound

- *Seminoma:* smooth echogenic mass
- *NSGCT:* no defined borders, calcified cystic masses

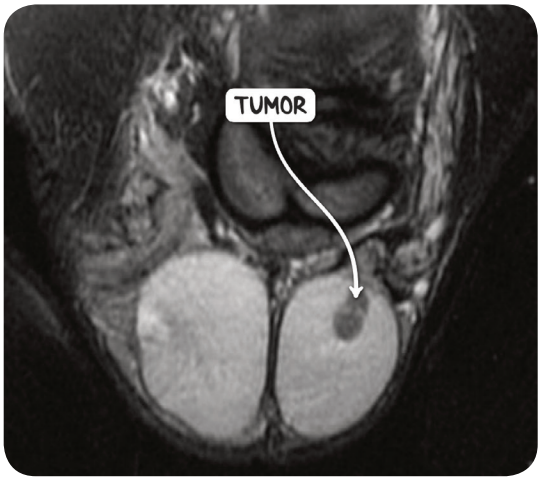

Figure 127.6 A scrotal MRI scan in the coronal plane demonstrating a tumor of the left testicle.

LAB RESULTS

- Serum tumor markers
  - ↑ *alpha fetoprotein (AFP)*: NSGCT
  - *Normal AFP*: pure seminoma, choriocarcinoma
  - *β-hCG*: NSGCT
  - ↑ *lactate dehydrogenase (LDH)*: GCT

TREATMENT

MEDICATIONS

- Chemotherapy
- High-dose chemotherapy + stem cell transplantation

SURGERY

- Surgery
  - Orchidectomy, affected lymph node removal

OTHER INTERVENTIONS

- Follow up/surveillance
  - Regular AFP/β-hCG serum-level monitoring
- Radiotherapy for seminomas

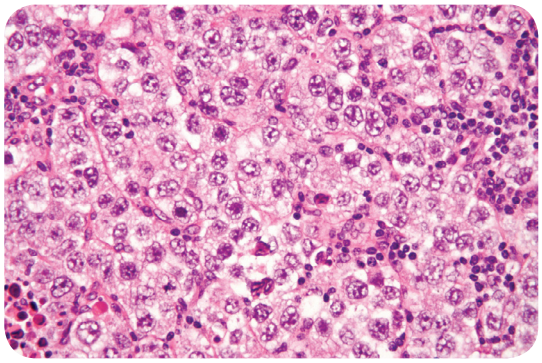

Figure 127.7 The histological appearance of a testicular seminoma, the most common form of testicular cancer. The cells have a fried egg appearance with clear cytoplasm, well-defined nuclei with open chromatin and a well-defined cell border.