Oncology

General Principles

Staging by TNM system, although some cancers still have specific systems (e.g. Dukes)

Management decisions are largely made at MDT meetings.

Counselling on life expectancy should stress that figures are averages, and use blocks of time – days/weeks/months – rather than exact numbers.

Performance status (WHO scale – others exist)

0. Symptom free
1. Minimally symptomatic, may be limited on major exertion
2. Significant symptoms. Limited on minor exertion. <50% of day in bed
3. >50% of day in bed or resting in chair. Needs significant assistance with ADL
4. Bedbound

Evaluating treatment

- Benefit
    - Overall survival
        - Median often quoted
        - 1 or 2 year figures can give better idea of tail of curve
        - Extending the tail can be beneficial without greatly altering median
    - Progression-free survival
    - Quality of life
        - Validated questionnaires
            - Global, but can be subjective, difficult to interpret
        - Individual symptoms
- Costs
    - Financial
        - No formal cut-off, but £30 000 per QALY gained is common
    - Toxicity
        - Graded 0-4 (none/mild/moderate/severe/life threatening)

Cancer Genetics

Family history

- Ask about each generation in turn, working through relatives explicitly by name (jog memory)
    - Ask about children as well as siblings/older relatives at each stage
- Age of onset – younger than usual for that cancer suggests genetic link
- Type – but remember that patient report may not be reliable
- Ask about both sides of family
- Takes time to do well

Evaluate risk

- Number of cases of same or related type in one bloodline
    - Breast/ovary/prostate/(stomach)
    - Ovary/colon/endometrium/urothelium – Lynch syndrome
- Age of onset
    - Genetic link suggested by (rule of thumb):
        - One case under age 40
        - Two cases under age 50
        - Three cases under age 60
        - Multiple cases in one relative
- Increased risk with:
    - Rare cancer (e.g. MEN2)
    - Very young age (e.g. Li Fraumeni)
    - Other developmental disorders

Counselling needs to allow for probability that patient has gene, variable penetrance, and how risk of developing cancer will progress with age.

Genetic testing:

- Guide to decision making
    - Surgical removal best prophylaxis (e.g. breast, ovary)
- Consider options beforehand – will result change anything?
- Implications for rest of family
- Easier to test for specific mutations, harder to blindly screen
    - Try to find relative with high chance of having mutation, use to determine which mutation is carried in the family

Selection of Treatment

Information required:

- Tumour type and grade
- Location and stage
- Performance status

Treatment types:

- Radical – aim to cure
- Palliative – symptomatic relief
- ± Adjuvant – given after definitive treatment
- ± Neo-adjuvant – given before definitive treatment

Radical	**Palliative**
Intensive – acute toxicity high	Aim to minimise acute toxicity
Minimise long term toxicity (infertility, second cancers, organ failure)	Long term toxicity less important
Treat all of disease	Symptom directed
Admission acceptable	Aim to treat at home

Treatment options:

- Surgery – local, respectable tumour. May lose organ function.
- Radiotherapy – local tumour, may be non-resectable. Organ function typically preserved.
- Chemotherapy – systemic treatment, except testes and brain.

Chemotherapy

May be curative:

- Hodgkin's Disease
- Non-Hodgkin's lymphoma
- Germ cell tumours
- Wilm's tumour
- Ewings sarcoma
- Osteosarcoma
- Rhabdomyosarcoma
- Leukaemia

Adds to cure rate:

- Stage II breast cancer
- Colorectal cancer
- Ovarian cancer
- SCLC (small effect)

Remission/prolongs survival:

- SCLC
- Advanced breast cancer
- Prostate cancer
- Ovarian cancer
- Myeloma

Palliates:

- Incurable non-Hodgkin's lymphoma
- SCLC
- NSCLC

Cancer Epidemiology

1 in 3 people will get cancer in their life , 1 in 4 will die of it (worldwide). Disease of older population – rarer in developing countries where other disease tends to kill earlier.

Lung cancer has the highest incidence and mortality (after skin - many non-melanoma tumours are handled in GP, and do not appear on cancer registries). Smoking is a major risk factor – link found by Bradford-Hill and Doll. 1954 Case control study suggested link, although some studies dating to 1930s exist. Cohort study then set up – first results in 1956, 50 year follow up has been published. Smoking now 25% of men in Britain (having peaked), lower but rising in women.

Oncological Emergencies

Spinal Cord compression

- Usually due to bony mets (breast/prostate/lung)
- PC often pain, followed by neurological signs
- Prompt diagnosis and treatment necessary to preserve function
    - MRI
    - Alert neurosurgeon/RT
    - High dose steroid (Dexamethasone 8mg bd)
    - Surgery for single lesion in fit patient with reasonable prognosis, else RT

SVC Obstruction

- Swelling of upper limbs, face, neck and distended veins in SVC distribution
- Breathless
    - Sit up, oxygen, analgesia
    - CT (lung cancer ~80% cases – 97% malignancy, 15% lymphoma)
    - Biopsy
    - High dose steroids
    - Treat cause
        - RT/chemo for tumour
        - Radiological stenting for some others

Brain Metastases

- Increased ICP, fits, focal neurology
- High dose steroids
- CT ± contrast
- Full work up if no underlying diagnosis (breast XR, CXR, PR)
- Median survival 2-3/12
    - Breast primary, good performance status patients do best
- RT whole brain
    - Single lesion and good status – may resect/stereotactic RT

Febrile neutropaenia

- Chemotherapy is myelosuppressive
    - Risk of septicaemia, usually from commensals
- Treat if NØ <0.5, or <1 and likely to drop, along with T>38.5 or >38.0 for >1hr
    - NB steroids and paracetamol can mask pyrexia
- Septic screen – blood cultures, MSU, throat swab, other likely sources
- Inspect perianal region, but NO PR
- Renal function, FBC promptly, CXR next day
- Prompt treatment
    - Antibiotics per protocol – Cef/Gent/Vanc at Addies
    - Resuscitate, IV fluids, maintain fluid balance
    - 72 hours of AB minimum, add Amphotericin if no response after 2/3 days

Hypercalcaemia

- Check corrected calcium
- Usually dehydrated – IV fluids
- Bisphosphonate (when passing urine)
- Treat cause, stop aggravating factors, monitor in community

Extravasation

- Pain and inflammation at cannula site
- Prompt treatment to prevent tissue damage
- Stop infusion, assess patient, elevate limb
- Look up drug and treatment
    - Vesicant – inject hyalironidase in 1cm grid over affected area, then saline wash out
    - Non-vesicant – cold compress
- Plastics assessment same day

Gastric Cancer

Incidence is decreasing, especially in women. Cancers of oesophagus and gastric cardia appear to be rising at roughly same rate. Risk factors include H pylori infection, increasing age, male gender, diet low in fruit/veg, high in salt/smoked food/preserved food.

Staging:

- Upper GI endoscopy
- CT thorax and abdomen
- Endoscopic U/S
- Laparascopy

Treatment involves surgery and chemotherapy – the latter increases both survival and quality of life, with relatively low toxicity.

Colorectal Cancer

2nd commonest malignancy, 28000 new cases and 18000 deaths annually. 80% are operable, with a 50% survival rate.

Stage at presentation	Proportion	5 year survival
Dukes A	15%	90%
Dukes B	35%	66%
Dukes C	50%	40%

Total mesorectal excision is normal operation. Local recurrence as low as 5% with good circumferential margin.

Radiotherapy only indicated for rectal carcinoma, reduces local recurrence but survival benefit unproven. Pre-op has some benefits, but doesn't permit selectivity. Post-op permits selection (pathology available), but greater risks and less proven benefits. Pre-op MRI – Good (T1/2 Dukes A), Bad (between), Ugly (Anticipating positive resection margin). Surgery alone for good, short course pre-op RT for bad, long course chemoradiation for ugly. RT alone if unfit for surgery/refuses, or advanced tumour. Some radical results, but more effective for palliation.

Side effects of RT:

- Acute
    - Lethargy
    - Nausea
    - Diarrhoea
    - Wound healing
- Late
    - Chronic diarrhoea, stricture
    - Sphincter function (incontinence)
    - Hip fractures

Chemotherapy – 5FU/Capecitabine, Oxaliplatin, Irinotecan, Antibodies, Anti-inflammatories used. Adjuvant 5FU based therapy improves survival 7-10% in Dukes C. Palliative chemo improves median survival from 6/12 to 18/12. Some therapies under research appear promising.

Lung Cancer

Types:

- Small cell
- Non-small cell
    - Adenocarcinoma
        - Broncheoalveolar (BAC) Subgroup of adenocarcinoma
    - Squamous cell (most common in Britain)
    - Undifferentiated

Cell samples by bronchoscopy and biopsy/brushing/washing if proximal, CT guided biopsy if distal. Sputum cytology and pleural tap are possible, but less successful.

Presentation:

- Local
    - Pain (pleural/rib/arm – brachial plexus)
    - SOB (pleural effusion/airway obstruction)
    - Hoarse voice
    - Horners (stellate ganglion)
    - Persistent cough/infection
    - Haemoptysis
    - Stridor
    - SVCO
- Systemic
    - Weight loss
    - Anaemia
    - Anorexia
    - Lethargy

- Paraneoplastic syndromes
    - SIADH
    - PTH-like (↑osteoclast activity → hypercalcaemia)
    - Most paraneoplastic (except PTH-like) from small cell tumour
- Metastatic
    - Brain
    - Bone
    - Liver
    - Adrenals
    - Same/other lung

Treatment for early stage disease of NSCLC is surgical resection if fit, radical RT if not. Adjuvant chemotherapy is being investigated.

SCLC with mets – palliative chemo. 1 year survival is 30-40% with chemo, 2 year is 5-10%. Median 10 months. Limited stage SCLC can be cured in ~20% of cases with chemo, RT, and prophylactic cranial RT.

Bone Tumours

Main types:

- Primary (Both most common in adolescence)
    - Osteosarcoma – typically proximal humerus, distal femur, proximal tibia
    - Ewings Sarcoma – typically pelvis, mid-shaft femur
- Metastasis
    - Breast, Lung, Prostate, Thyroid, Kidney
- Multiple Myeloma

Bone scan

- Tc-99 used
- Detect sclerotic but not lytic lesions
    - Latter sometimes visible on XR
- Most mets are mixed pattern
    - Breast/prostate often predominantly sclerotic
    - Renal can be entirely lytic
- Myeloma is entirely lytic (e.g. pepper pot skull)

Germ Cell Tumours

Testicular cancer – commonest cancer in young men. Usually curable if caught early, but <3% of men regularly check – often present with mets. Incidence is ~5/100 000. On examination, a tumour is within the testis, not separate to it.

Main types:

- Teratoma 31%
- Seminoma 40%
- Combined 15%
- Lymphoma

Common presentations:

- TSE (Testicular Self Examination)
- Backache
    - Particularly with teratoma or lymphoma
    - Severe pain, night pain, erythema ab igne – warning signs
        - Examine testes and lymph nodes
- Metastases

Investigations:

- (U/S testes – adds little to clinical exam)
- Palpate abdomen
- CXR
- U+E
- A-fetoprotein, β-HCG

Referral

- Unwell, reduced renal function, lung mets – directly to oncology
- Else inguinal orchidectomy, send histology, and refer
    - Inguinal approach reduces chance of metastasis via lymph drainage
        - Drainage: → renal hilum, also → iliac → para-aortic
    - Spermatic cord clamped before manipulating testis

Staging

- Anatomical
    - I – testes, II – para-aortic nodes, III – mediastinum/neck, IV – beyond lymphatics
- Biological (multivariate regression for risk factors)
- Molecular (cancer markers – nothing useful yet for seminoma)

Stage I seminoma strategies

- A : Surveillance – 80-85% don't need radiotherapy. Rarely used
- B : Adjuvant radiotherapy to nodal regions
    - 1.5x increase in second cancer rate after 15-20 years
- C : Adjuvant chemotherapy (single dose cisplatin)
    - Second cancer rate lower, as effective as B – but less follow-up data

Stage I teratoma strategies:

- Low risk (no lymph or vascular invasion)
    - 20% relapse rate
    - Surveillance – watch markers and CT
- High risk (lymphovascular invasion)
    - 40% relapse within 2 years
    - Adjuvant chemotherapy reduces rate to 1%, but has risks
        - Currently – BEP (Bleomycin, Etoposide, Platinum (cis-platin))
        - 85% complete remission rate
- PET scan – look for mets

Prognostic factors – Primary site, mets, cancer markers

Surgery
- Should be performed on all residual masses
- Can cure patient with active disease
    - Findings – 35% differentiated (risk for future), 50% necrotic, 15% currently viable
- RPLND – Retro-Peritoneal Lymph Node Dissection
    - Rare, complex, specialised surgery
- May be essential to clear residual masses

Sperm preservation
- 70% of those treated remain fertile
- Cryostorage offered to all
- Collection can be after treatment commenced if severely unwell

Thyroid Tumours

Most neck lumps are not cancerous. Investigation by TSH levels (most thyroid cancers non-functioning), and FNA/core biopsy.

Types
- Differentiated
    - Follicular
    - Papillary
    - Generally seen in young women
- Undifferentiated
    - Anaplastic
        - Commonest in the elderly
    - Medullary
        - MEN2 syndrome

Treatment – Surgery (lobectomy/thyroidectomy) ± radioiodine ± TSH suppression

Follow-up – diagnostic scan 4-6/12 post-ablation, with measurement of thyroglobulin. If normal, continue TSH suppression, if high risk repeat I^{131} treatment.

Recurrence risk highest in men, age over 45, increased stage disease, poorly differentiated tumours.