Practical Guidelines
For the Management of Children with Cancer

‘SOBO’ Paediatric Oncology Ward, Queen Elizabeth Central Hospital College of Medicine, Blantyre, Malawi

December 2017 | Trijn Israels | George Chagaluka | Simon Bailey | Liz Molyneux
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Introduction

This booklet with treatment guidelines is written for the paediatric oncology ward (‘SOBO’) of the Queen Elizabeth Central Hospital (QECH) in Blantyre, Malawi.

It is meant to be a practical manual for the physicians working on the ward (and those covering the ward when on call), nurses, visiting nurses, clinical officers, physicians and students.

The information is not extensive, for more information on the different diseases please refer to a paediatric oncology textbook. The treatment strategies are the optimal treatments currently available to us in QECH.

We hope this manual will help us to further improve the treatment for children with cancer in Malawi.

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December 2017

1. General Approach to Management

Different tumours have differing presenting symptoms and sites, preferential sites for primary tumours and metastases, degrees of aggression of tumour cells and sensitivity to chemotherapy. To know what the diagnosis is and how best to treat we need to ask some simple questions:

What Is It? (The Diagnosis)

This question is usually answered by a careful and thorough history and examination followed by a Fine Needle Aspirate (FNA) or an open biopsy.

When dealing with a malignancy, or the suspicion of a malignancy, one would like to make a definitive diagnosis. In malignancies, this is most commonly done through obtaining tissue and looking at it through a microscope.

This can be done by fine needle aspirate and looking at the cells with a microscope (cytology).

At times one will need to do a tissue biopsy to be able to see the structure of the tumour tissue (histology) to make a definite diagnosis.

Where Is It? (The Extent of Disease/Staging)

After a careful history and examination this question is usually answered by X-rays, ultrasound, CSF sampling, bone marrow aspiration or some other specific investigations.

For almost all tumours it is useful to know where it is: what is the primary tumour and has it metastasized to other places. Some additional investigations (e.g. imaging, bone marrow aspirate, CSP) are aimed at assessing involvement of preferential sites for metastases. The presence of distant metastases will often worsen the prognosis of the patient and will sometimes change the management.

Is It Safe to Treat?

This question may be answered by looking for evidence of anaemia (FBC and differential) malaria (Rapid Diagnostic Test (RDT) for malaria or thick blood films), stool and urine microscopy. An HIV test is also helpful in anticipating problems and it is important to assess for malnutrition.

In general, there are three treatment modalities in paediatric oncology: chemotherapy, surgery and radiotherapy. Radiotherapy is not available yet in Malawi. Surgery of the primary tumour is often needed in solid tumours to achieve complete cure. Chemotherapy kills malignant (cancer) cells, but will also kill normal cells of the body. This especially affects all rapidly dividing cells; i.e. bone marrow, mucosa (mouth and gastrointestinal tract) and hair follicle cells.

One needs to consider the intensity of the chemotherapy, level of supportive care and tolerance of the patient (malnutrition) in deciding which treatment is safe for a particular patient.

Quality of Life

Palliative care becomes the major focus of treatment when cure is no longer feasible. Adequate pain control, control of other symptoms such as vomiting, and giving psychological, religious and spiritual support are important to improve quality of life. Often the child and parents will prefer to go home with the best available symptomatic control.
2. When is Treatment with Curative Intent (not) Feasible? – Some Considerations

Weigh the balance between toxicity of treatment, burden for the patient and parents and the chance of survival. At times deciding on treatment with palliative intent is a fair choice and in the best interest of the child and his / her family if chances of cure are not realistic.

Patients with a relatively good prognosis include: endemic Burkitt lymphoma (especially stage I – III), Wilms tumour (especially localized disease), Hodgkin’s disease (especially lower stage), retinoblastoma – intra ocular disease only, acute lymphoblastic leukaemia (especially if very chemo sensitive disease) and germ cell tumour.

Patients with a poor prognosis include those with: neuroblastoma (especially metastatic disease), rhabdomyosarcoma (especially if a large (> 5 cm) primary tumour or metastatic disease), acute myeloid leukaemia and most brain tumours.

Multidisciplinary Teams (MDTs)

Clinicians caring for children with cancer in low-income countries often do so in isolation. Cancer diagnosis and care requires the expertise of several disciplines such as pathology, surgery, radiology, oncology and palliative care. It is very helpful to have the input of all these teams in decisions about diagnosis and in planning treatment. The best way of bringing these groups together is to hold regular (e.g. every fortnight or every month) meetings together. These are called Multidisciplinary Teams Meetings (MDTs) and are routine in high income settings.

MDTs are held every month in the QECH and attended by members of SOBO, by surgeons, pathologists and ophthalmologists.

3. Routine Investigations at Admission

Fine Needle Aspirate (FNA)
The pathologist will examine the cells and attempt to make a diagnosis. Only cytology (examination of cells) can be done on a fine needle aspirate.

Remote Pathology Service
When a Fine Needle Aspirate (FNA) or Bone Marrow sample is taken on the ward, it is put on to microscope slides and stained. When viewed with a microscope this shows the type and number of cells on the slide and is helpful in diagnosing several common tumours such as Burkitt lymphoma. It is important to make a diagnosis as soon as possible and our pathology department are overwhelmed with the amount of work they have; and so the slides in the paediatric annexe are photographed with a microscope camera and immediately uploaded by computer and sent to Newcastle where an expert reviews them and gives an opinion as to what the diagnosis is likely to be. This takes about two days. This is called a remote pathology service.

Histopathology
Histopathology is when a surgical sample (i.e. biopsy) is taken and looked at in the lab. This is necessary for some diagnoses and to be able to tell between some cancer subtypes. This is done in the QECH histopathology lab and results of a biopsy have often delayed in Malawi. Recently, because of an improvement in staffing, the reports have been coming back to the ward more quickly.

Ultrasound Abdomen (USS)
An abdominal USS is important:
- In solid abdominal tumours as a scan helps to define a location of the tumour and its relation to organs. The structure of the tumour aids in diagnosis.
- To assess abdominal involvement, especially in patients with Burkitt lymphoma.
- To assess the kidneys and anticipate problems if they are involved.
- To rule out bilateral renal involvement in Wilms tumour.

Elisa HIV
It is important to assess the HIV status of the patient. A newly diagnosed child with HIV will need to commence antiretroviral therapy as soon as possible.

Full Blood Count (FBC)
- The FBC helps to assess involvement of bone marrow in the disease process, to look for anaemia, the possible need for a blood transfusion and the tolerance of this patient for chemotherapy.
- To review the platelet count for likelihood of bleeding.

Urine and Stool Microbiology
Look for schistosoma eggs in urine and parasites / worms in the stool. These infections / infestations need to be treated before a child receives chemotherapy.

Malaria Parasitaemia (MPs)
Malaria is a common condition in Malawi and needs to be treated before a child receives chemotherapy.

Other
In certain circumstances it may be necessary to exclude TB (CXR, sputum if child old enough to produce some etc.)
4. Side Effects of Chemotherapeutic Drugs

**Vincristine**: Neuropathy (constipation, neuropathic pain, areflexia, foot drop), jaw pain, severe tissue necrosis with extravasation.

**Precautions to prevent extravasation**: Always place a fresh cannula, make sure it is well positioned in the vein! Flush cannula with water for injection first to see that there are no leaks, then follow the vincristine bolus injection with another flush of water for injection.

**Cyclophosphamide**: Bone marrow suppression, nausea and vomiting, haemorrhagic cystitis.

**Precaution**: Patient must be well hydrated with lots of fluids before and after the dose.

**Cisplatin**: Bone marrow suppression (especially platelets, delayed), nausea and vomiting, kidney damage, deafness.

**Actinomycin**: Nausea and vomiting, bone marrow depression, nausea and vomiting (both relatively mild when given orally), mucositis.

**Prednisolone**: Weight gain, Cushing’s syndrome, hypertension, osteoporosis, adrenal suppression (stress hormones), increased susceptibility to and severity of infections.

**Precaution**: Use short courses.

**Procarbazine**: Bone marrow depression, nausea.

**Etoposide**: Bone marrow depression, nausea and vomiting (both relatively mild when given orally), mucositis.

**Bleomycin**: Nausea and vomiting, bone marrow suppression, mucositis, pulmonary fibrosis (dependent on cumulative dose).

**Methotrexate**: Bone marrow suppression, mucositis and diarrhoea. Leucovorin (folic acid) is given after MTX infusions to prevent severe side effects.

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**Fever Protocol**

**Background**: Chemotherapy often causes bone marrow suppression. This can cause the white blood cells to drop with a lowered resistance to, especially bacterial, infections. Neutropenia is defined as a neutrophil count of less than 0.5 x 10⁹ per litre. Children who are neutropenic have an increased risk of bacterial infections which can develop very rapidly.

**Protocol**: If a child on the ward has a fever (axillary temperature above 38° Celsius):

- **Check Malaria parasites (MPs)**
- **If MPs are negative**: 
  - **Take a blood culture** (important to get information as to which bacteria are causing the infection and sensitivity / resistance to antibiotics).
  - **Start antibiotics**:
    - Benzyl penicillin (50,000 i. u. per kg/day divided over three doses IV).
    - Gentamicin (6mg per kg once daily IV).
  - If fever persist for more than 48 hours, 2nd line antibiotics need to be considered.
  - **Usual choice**: ceftriaxone (50mg per kg once daily IV)
  - If fevers still persist add amikacin (and stop gentamicin).

**Mouth Care**

- Children may develop a painful mouth (mucositis) from the chemotherapy. Adequate pain control is important to enable the child to eat and drink.
  - 1% gentian-violet paint (“GV paint”) three times a day can be used when there are oral sores and/or thrush.
  - Thrush (candida infection) can also be treated with nystatin oral drops three times daily.
  - If fungal infection is severe fluconazole needs to be added.
  - When herpetic lesions (pain, blisters) are suspected clinically, add oral acyclovir (older than 2 years: 200mg 5 times daily x 5/7; younger than 2 years: 100mg 5 times daily x 5/7)
Nutrition

Children with cancer are often malnourished.
• Malnutrition will reduce their immunity to infections, tolerance to chemotherapy and increase the risk of surgery.
• Try to encourage children to eat.
• Encourage the children to eat one sachet of chiponde every day.
• If a child cannot eat, but can drink; milk (F100) is a nutritious alternative.
• If a child cannot or will not eat or drink adequately a nasogastric tube (NGT) should be inserted and used for feeds.

Pain control: ‘Pain is what the patients says hurts.’ Do not wait for pain, anticipate it and try to prevent it.

Non-pharmacological interventions:
Distraction (e.g. for procedures), play therapy
Physical comfort (positioning or massage).

Pharmacological interventions:
WHO analgesic ladder for children.

Step 1: Non-opioid +/- adjuvant
e.g. paracetamol 10-15mg/kg every 4-6 hours oral or ibuprofen 5-10mg/kg every 6-8 hours oral.

Step 2: Strong opioid (morphine) +/- adjuvant +/- step 1
e.g. starting dose: oral morphine 0.15-0.3mg/kg every 4 hours.
Tritrate against pain and side effects (nausea, vomiting, and constipation).

Do not use codeine and morphine concurrently.

6. SIOP PODC Adapted Treatment Guidelines

The PODC (Pediatric Oncology in Developing Countries) Committee of the International Society of Pediatric Oncology (SIOP) has a working group on adapted treatment guidelines. These are guidelines adapted to the local realities in low income countries which means that they are often of reduced intensity to avoid undue treatment-related toxicity and mortality.

Some of these guidelines (e.g. Wilms tumour and KS) are very similar to the treatment guidelines currently used in Malawi. Others are different, but may still provide useful further reading with reference to the principles and considerations taken into account.

So far SIOP PODC has published guidelines on acute lymphoblastic leukaemia (ALL), endemic Burkitt lymphoma (eBL), Wilms tumour, supportive care, retinoblastoma, Kaposi sarcoma (KS), neuroblastoma and medulloblastoma. All guidelines are published in Pediatric Blood & Cancer.

Use of Adjuvants

1. For raised intracranial pressure:
Dexamethasone 10mg/m2 per day orally
Usually in daily practice we would give 5mg once daily. (For a maximum of 3 days to limit side effects.)

2. For neuropathic pain (burning, stinging in extremities):
Amitriptyline (0.2 – 0.5mg/kg) orally
Age 1 – 5 years: 6.25mg.
Age 6 – 12 years: 12.5mg.

Anti-Emetics

• Anti-emetics are given to reduce chemotherapy associated vomiting.
• Give oral metoclopramide (10 mg or 100 – 400 µg/kg) 30 minutes before chemotherapy.
• If needed add oral (0.15mg/kg, max 8 mg) or IV (0.01mg/kg, max 4 mg) ondansetron 8 hourly. If needed add dexamethasone IV (5mg/m2 – max 4 mg stat 30 minutes before chemotherapy, followed by 5mg/m2 divided in two to three doses).

Reference for Further Reading


References for Further Reading


7. Burkitt Lymphoma

Clinical Presentation
- Rapidly growing tumour, peak age 4 – 7 years, boys more often affected than girls.
- Site of presentation: Jaw, retro-orbital, abdomen (including kidneys), paraspinal (can cause paraplegia, urinary/stool incontinence) and in CNS. Relatively common childhood cancer in Malawi (~40% of patients).
- Treatment is needed urgently when children present with neurological symptoms or orbital disease to try to prevent irreversible damage.

Differential Diagnosis
- Other lymphoma.
- Face/jaw: Abscess, dental cyst.
- Eye: Retinoblastoma, rhabdomyosarcoma.
- Kidney: Wilms tumour.
- Extremity (arm/leg): Osteosarcoma, osteomyelitis.

Investigations at Admission
- For routine investigations please see chapter 13.
- For final diagnosis: Fine needle aspirate (FNA).
- For staging: Bone marrow aspiration (BMA), cerebrospinal fluid (CSF), ultrasound abdomen (USS).
- (Treatment is currently no different for different stages of disease, but a higher stage of disease does affect outcome; stage IV (with bone marrow and/or CSF involvement) has a poorer prognosis).

Supportive Care
Tumour Lysis Syndrome:
The rapid destruction of tumour cells (breakdown products) may cause a tumour lysis syndrome, characterized by renal failure (‘blockage of kidney’) and laboratory abnormalities (especially potassium ▲, phosphate ▲, calcium ▼).

To prevent/manage tumour lysis syndrome:
- Allopurinol 5mg/kg tds orally x 5/7: starting the day before chemotherapy.
- Hydration according to age / weight.
- Watch for decreased urine output and/or fluid overload as signs of tumour lysis syndrome.
- Close monitoring (sometimes daily) of the electrolytes in important and can be measured quickly on the blood gas analyser in the paediatric annexe. Samples for analysis by the blood gas machine need to be taken in a heparinised syringe that is available in the annexe lab.

Nausea and vomiting:
- Prevent with metoclopramide (maxolon) 10mg po; half an hour before and ~ 5 hours after chemotherapy. If remain nauseated and vomiting or develops despite metoclopramide, add ondansetron 4mg IV or PO stat (<5 years – 2 mg).

Neutropenia: do weekly full blood counts (FBC). If neutrophils are lower than 1.0 x 10^9/L it is necessary to delay chemotherapy until recovery of the neutrophil count (above 1.0 x 10^9/L).

Treatment
- Chemotherapy.
- See flow sheets: eBL localized stage I, eBL and NHL all other stages, eBL and NHL relapse.

Reference for Further Reading:
8. Non-Hodgkin Lymphoma Other Than BL

Burkitt lymphoma is one of the non-Hodgkin lymphomas. Others include lymphoblastic lymphoma, large B-cell lymphoma and anaplastic large cell lymphoma.

Lymphoblastic leukaemia is best treated on the leukaemia protocol.

Clinical Presentation
- Clinical presentation is varied and depends on primary site, histological subtype and extent of disease. Non-Hodgkin lymphomas often present in the abdomen, mediastinum and head and neck, less commonly in superficial lymph nodes and bone.

Differential Diagnosis
- Other causes of lymph node swelling (e.g. tuberculosis, HIV, Kaposi Sarcoma, Burkitt lymphoma, Hodgkin’s disease).

Investigations at Admission:
- Routine investigations (Chapter 13).
- Mantoux if possible, CXR and FNA for AFBs when TB is a possible diagnosis.
- For final diagnosis: Fine needle aspirate (FNA) if this fails to provide a diagnosis a biopsy will be needed.

Treatment
- Chemotherapy.
- See flow sheets: eBL localized stage I, eBL and NHL all other stages, eBL and NHL relapse.

Clinical Presentation
- Slow growing painless mass in the flank. Usually clinically relatively well. Peak age 3 years. Relatively common tumour.
- Patients often found to have hypertension and (microscopic) haematuria.
- Metastasizes to lungs (Chest X-ray), less frequently to the liver (USS).

Differential Diagnosis
- Burkitt lymphoma (more rapidly growing, more weight loss), Neuroblastoma (adrenal mass, patients usually more severely ill and in more pain and often anaemic).

Investigations at Admission
- Routine investigations (chapter 13).
- Ultrasound abdomen (renal tissue visible? cystic tumour? IVC involved? local spread to lymph node or liver? other kidney normal?).
- Blood pressure, urine dipstick for blood.
- For cytology: Fine needle aspirate.
- For staging / metastases: Chest X-ray (lungs), Ultrasound abdomen (liver).

9. Wilms Tumour

Clinical Presentation
- Chemotherapy and surgery.
- See flow sheets:
  - Preoperative chemotherapy – 2 different protocols*
  - Postoperative chemotherapy – 3 different protocols**

* Preoperative chemotherapy depends on the absence / presence of distant metastatic disease i.e. chest X-ray (metastases lungs) and USS (metastases liver).
** Postoperative chemotherapy depends on stage and risk group of the tumour at surgery (pathologist’s report) – or, if no pathology report is available on surgical staging and difficulty of the surgery.

References for Further Reading:

10. Hodgkin's Disease

Clinical Presentation
- Usually adolescents, more common in boys; painless enlarged lymph nodes in the neck (80%), often with a widened mediastinum on chest X ray.
- Can also involve other lymph nodes, lymphatic structures (abdomen, LN in the groin or axilla, spleen).
- B symptoms (systemic disease): fever, night sweats, pruritus (itch), weight loss – especially with advanced disease.

Differential Diagnosis
- Other causes of lymph node swelling (e.g. tuberculosis), Burkitt lymphoma (usually younger children), Kaposi’s sarcoma (usually HIV positive) and other non-Hodgkin’s lymphoma.

Investigations at Admission
- Routine investigations (Chapter 13).
- Mantoux skin test if possible or FNA for AFB (acid fast bacilli) when TB is a possible diagnosis. GenExpert on body fluid sample.
- For final diagnosis: Fine needle aspirate (FNA) – histology with a tissue diagnosis is much preferred in Hodgkin’s disease.
- For staging: Chest X-ray, USS abdomen.

Treatment
- See flow sheets for ABVD, OEPPA or COPP (last p = procarbazine) depending on availability of drugs.

11. Acute Lymphoblastic Leukaemia (ALL)

Clinical Presentation
- Acute leukaemia can be classified as acute myeloid and acute lymphoblastic leukaemia. Acute lymphoblastic leukaemia is the most common.

Differential Diagnosis
- Malaria, acute viral infection such as EBV, aplastic anaemia.

Investigations at Admission
- Routine investigations (Chapter 13).
- Blood film for morphology (send to haematology).
- Bone marrow aspirate if platelets are adequate.

References for Further Reading:
12. Neuroblastoma

Clinical Presentation
- Solid tumour, clinical manifestations vary, at times with hypertension, peak age 0-4 years. Patients often ill at presentation, especially with metastatic disease. Pain and anaemia are common.
- Site of presentation: Abdomen (adrenal), sympathetic chain, 25% primaries are in neck or thorax, 70% abdomen, 5% pelvis.
- Metastases: Bone, lymph nodes, bone marrow, (skin), often present with metastatic lumps on the head, or racoon eyes.
- Prognosis is usually poor if metastatic disease is present.
- Patients who are below one year often have less aggressive disease and a better prognosis.

Differential Diagnosis
- Burkitt lymphoma (in widespread disease).
- Other solid tumours (abdomen).

Investigations at Admission
- Routine investigations (Chapter 13).
- Ultrasound abdomen (? adrenal tumour). Plain X-ray may identify calcification.
- MRI if there is doubt about the origin of the mass.
- For final diagnosis: Fine needle aspirate (FNA) and Bone Marrow Aspirate.
- Urine for tumour markers if available.
- Tumour markers: Metabolites of catecholamines in urine (VMA and HVA).

Treatment
- Chemotherapy and surgery.
- See flow sheet VAC (good empirical treatment to start with, if neuroblastoma confirmed, consider carboplatin instead of cyclophosphamide).
- Surgery of primary tumour with curative intent if no residual metastases post chemotherapy.

13. Rhabdomyosarcoma

Rhabdomyosarcoma is the most common soft tissue sarcoma in childhood.

Clinical Presentation
- Solid tumour. Most common primary sites: Head and neck, orbit of eye, nose and throat (40 %), bladder, vagina (20 %), extremities (20 %).
- Prognosis is very poor in metastatic disease.
- Prognosis is better in small primary tumours (smaller than 5 cm).

Investigations at Admission
- Routine investigations (please see chapter 13).
- Measure the tumour (important for prognosis in localized tumours).

Treatment
- Chemotherapy and surgery.
- See flow sheet VAC, with A = Actinomycin.
- Surgery of primary tumour if completely resectable and no metastases.
14. Retinoblastoma

Clinical Presentation
- Early: Leukocoria (white pupil reflex in the eye), strabismus (squint).
- Late: Proptosis (eye pushed forward), orbital mass, and often destruction of the eye ball.
- Can be inherited (then more often bilateral disease).
- Average age at diagnosis 2 years (unilateral disease), 1 year (bilateral disease), but often older in Malawi.
- Metastases: Intracerebral, bone, peri-auricular (around the ear).

Differential Diagnosis
- When advanced disease: Burkitt lymphoma (BL usually develops more rapidly + ask about white pupil reflex in eye to differentiate), orbital rhabdomyosarcoma, metastatic neuroblastoma, other lymphoma.

Investigations at Admission
- Routine investigations (Chapter 13).
- Bone marrow and CSF examination to assess tumour spread.
- Usually referred from ophthalmologist. Need both eyes examined by ophthalmologist.

Treatment
- Chemotherapy with JOE.
- Amount of treatment depends on the stage of disease.
  - If intraocular only: 2 courses of JOE then surgery (enucleation of the eye).
  - If extra ocular disease: 2 - 4 courses of JOE and then exenteration.
  - If distant metastases: (palliative) chemotherapy.

Post op needs further chemotherapy to complete 6 courses in total.

15. Brain Tumours

Clinical Presentation
- Often signs and symptoms of raised intracranial pressure: Headache, vomiting, disturbed vision.
- Differential diagnosis
- Important to exclude curable conditions
- Burkitt lymphoma, Infectious causes

Investigations at Admission
- Routine investigations (Chapter 13)
- MRI head

Treatment
- As radiotherapy is not available treatment is mainly symptomatic.
- Dexamethasone for raised ICP; VP shunt for hydrocephalus.

Some low grade gliomas can be managed with surgery and/or chemotherapy and depending on the site of the tumour.

Reference for Further Reading:

Palliative Chemotherapy:
- 1st choice: cyclophosphamide orally 40mg/kg, once weekly (tablets are 50mg).
- Alternative: cisplatin IV or oral etoposide 100mg/ m2 weekly.

Inform the guardian about the risk of another child in the family having retinoblastoma (especially if the patient is below 1 year or bilateral disease) and early signs (white pupil). If possible, refer mother with any further children to ophthalmologist for early screening.

Reference for Further Reading:
16. Hepatocellular Carcinoma

Clinical Presentation
- Abdominal pain, enlarged hard, lumpy, not tender liver (and spleen), weight loss.
- Occasionally: Fever, jaundice.
- More common with endemic hepatitis B infection (as in Malawi before Hep B vaccination was introduced). Usually children older than 5 years; boys more than girls. A relatively rare tumour.

Differential Diagnosis
- In young children (usually < 2 years) hepatoblastoma.
- Hepatitis (usually shorter history, often low grade fever, liver smoothly enlarged, more painful).

Investigations
- Routine investigations (chapter 13).
- Serum alpha feto protein (AFP), CXR.
- For final diagnosis: FNA.

Treatment
- Chemotherapy and surgery.
- Curative only if resection is possible (this depends on the site and extent of the liver infiltrates).
- Chemotherapy is used in an attempt to shrink the tumour and reduce pain.
- Please see flow sheet cisplatin / doxorubicin.

Boy (12) with hepatocellular carcinoma

17. Osteosarcoma

Clinical Presentation
- Painful swelling arising from affected bone. More common in teenagers.
- Common sites: distal femur (upper leg) = 30 %, proximal tibia (lower leg) = 15 %, proximal humerus (upper arm) = 10 %.
- Metastases: lungs, always check for regional lymphadenopathy.
- Extent of the disease at presentation is the most important prognostic factor.

Differential Diagnosis
- Burkitt lymphoma has to be excluded before treatment.
- Ewing sarcoma: Usually affects the diaphysis (mid bone) and flat bones.

Investigations at Admission
- X-ray of the affected bone may show bone destruction, periosteal elevation and new bone formation.
- For final diagnosis: Fine needle aspiration.
- For metastases: chest X-ray; check groin and lower abdomen for LNs.

Treatment
- Chemotherapy and surgery.
- First choice: Please see flow sheet cisplatin / doxorubicin.
- (Alternative is VAC (A = Adriamycin)).
- Surgical treatment may improve quality of life in metastatic disease.

Osteosarcoma

Patient with Burkitt lymphoma. Essential to differentiate from osteosarcoma.
18. Germ Cell Tumour

Often in children below 3 years or above 12 years. Most common germ cell tumours: teratoma (often sacrococcygeal) and yolk sac tumour.

Yolk sac tumour

Clinical Presentation
- Usually a painless mass.
- In infancy usually sacrococcygeal region. In older children usually testes or ovaries affected.
- Tumour markers: serum α-fetoprotein and serum β–HCG are often raised.

Investigations at Admission
- Routine investigations: please see chapter 13.
- Ultrasound abdomen.
- Tumour markers can be done in the college lab
- For final diagnosis: Fine needle aspirate, but can often go straight for surgery.

Treatment
- Complete resection is often curative.
- Preoperative chemotherapy may be needed to shrink the tumour and make surgery possible. Please see flow sheet cisplatin, etoposide and bleomycin.

19. Kaposi’s Sarcoma

Clinical Presentation
- Usually in HIV infected patients but can also occur in HIV negative patients.
- Varied clinical presentation.
- Enlarged, often generalized, hard, lymph nodes.
- Dark raised patches and nodules in the skin and subcutaneous tissue of feet, legs, face and genitalia.
- Often painful brawny, lymphoedema especially of legs (difficulty to walk).
- Oral cavity, dark, pigmented lesions on hard palate.
- Gastrointestinal disease is common and associated with bloody rectal discharge, abdominal pain and sometimes obstruction.
- Pulmonary disease with bloody pleural effusion is often life threatening (differential diagnosis TB).

Differential Diagnosis
- TB, lymphoma if LNs involved.

Investigations at Admission
- Routine investigations please see chapter 13.
- Consider TB when appropriate, beware of false negative Mantoux result in HIV infected children.
- Fine needle aspirate only if diagnosis in doubt. (Aspirate often bloody).

Treatment
- Complete resection is often curative.
- Preoperative chemotherapy may be needed to shrink the tumour and make surgery possible.

Thalidomide is often helpful in palliative care. Thalidomide 3 mg/kg nocle for 2 months can be used but it is expensive.

Be sure to warn the guardian never to give thalidomide to anyone else as it is teratogenic (can goes congenital abnormalities if taken in early pregnancy).

References for Further Reading

Oste Skin lesions foot (painful) osarcoma

A 1 year old patient on oxygen (pulmonary disease) and with axillary lymphadenopathy.
eBL 1st Presentation – Stage I – Localized Tumours Only

Patient Name: Maxolon (metoclopramide) 10 mg before and after (afternoon) chemotherapy to reduce vomiting.

Allopurinol 5 mg/kg tds for 5 days to prevent tumor lysis syndrome.

At Admission:
- Cyclophosphamide day 1: ------- mg (40 mg/kg, max 1.6 gr)
- Cyclophosphamide day 8, 18, 28: ----- mg (60 mg/kg, max 2.4 gr)
- Intrathecal Methotrexate (MTX) 12.5 mg / Hydrocortisone (HC) 12.5 mg

Maclaxon (metoclopramide) 10 mg before and after (afternoon) chemotherapy to reduce vomiting.

Appendix:
Treatment Flow Sheets

Practical Guidelines for the Management of Children with Cancer

Cyclophosphamide
IT MTX/HC

DAYS
1 8 18 28
Date Given: 

Size Tumour:
(Presumed) Diagnosis:
Presenting Complaints:
USS:

FNA Date: FNA Result:
### eBL and Other NHL Protocol 1st Presentation – All Other Stages

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>Age:</th>
<th>Date of Admission:</th>
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<tbody>
<tr>
<td><strong>At Admission:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td>Cyclophosphamide day 1, 15, 28: 40 mg/kg (max 1.6 gr)</td>
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<tr>
<td>Height</td>
<td></td>
<td>Cyclophosphamide day 8: 60 mg/kg (max 2.4 gr)</td>
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<tr>
<td>Body Surface Area</td>
<td></td>
<td>Doxorubicin day 15: 60 mg/m² over 4 hours</td>
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<td></td>
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<td>Prednisolone day 1-5: 60 mg/m² per day in 2 divided doses</td>
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<td></td>
<td></td>
<td>Vincristine day 1, 8, 15, 28, 42: 1.5 mg/m² (max 2 mg)</td>
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<td>Intrathecal Methotrexate: 12.5 mg / Hydrocortisone 12.5 mg if &gt;3 yrs</td>
</tr>
<tr>
<td><strong>Methotrexate</strong></td>
<td></td>
<td>↓ ↓ ↓</td>
</tr>
<tr>
<td><strong>Doxorubicin</strong></td>
<td></td>
<td>↓ ↓</td>
</tr>
<tr>
<td><strong>Prednisolone</strong></td>
<td></td>
<td>↓ ↓ ↓ ↓ ↓</td>
</tr>
<tr>
<td><strong>Vincristine</strong></td>
<td></td>
<td>↓ ↓</td>
</tr>
<tr>
<td><strong>MTX/HC</strong></td>
<td></td>
<td>↓ ↓ ↓ ↓</td>
</tr>
</tbody>
</table>

**Methotrexate**<br>Day 8: 1g/m² – see protocol for more detailed directions and folic acid rescue.<br>Doxorubicin day 1, 8, 22 (60 mg/kg, max 2.4 gr)<br>Prednisolone day 8 (60 mg/m² over 4 hours)<br>Vincristine day 1, 8, 18, 28 (1.5 mg/m² (max 2 mg))

**Etoposide**<br>Day 22 and 23 150/mg/m² dose – daily x 2 days

**Rituximab** (if available) D1, 22 – (375mg/m²) – don’t give if infected.

**Intrathecal Methotrexate**: 12.5 mg / Hydrocortisone 12.5 mg

---

### eBL and NHL Relapse Protocol

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>Age:</th>
<th>Date of Admission:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>At Admission:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td>Methotrexate day 8 1g/m² – see protocol for more detailed directions and folic acid rescue.</td>
</tr>
<tr>
<td>Height</td>
<td></td>
<td>Cyclophosphamide day 1, 8, 22 (60 mg/kg, max 2.4 gr)</td>
</tr>
<tr>
<td>Body Surface Area</td>
<td></td>
<td>Doxorubicin day 8 (60 mg/m² over 4 hours)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prednisolone day 1-5 (60 mg/m² per day in 2 divided doses)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vincristine day 1, 8, 18, 28 (1.5 mg/m² (max 2 mg))</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Etoposide day 22 and 23 150/mg/m² dose – daily x 2 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rektumab (if available) D1, 22 – (375mg/m²) – don’t give if infected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intrathecal Methotrexate: 12.5 mg / Hydrocortisone 12.5 mg</td>
</tr>
<tr>
<td><strong>DAYS</strong></td>
<td></td>
<td>1 8 15 22</td>
</tr>
<tr>
<td><strong>Date Given:</strong></td>
<td></td>
<td>↓ ↓ ↓ ↓</td>
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<tr>
<td><strong>Size Tumour:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>USS:</strong></td>
<td></td>
<td>FNA Date:</td>
</tr>
<tr>
<td><strong>Presenting Complaints:</strong></td>
<td></td>
<td>(Presumed) Diagnosis:</td>
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</table>

**Methotrexate**<br>Day 8: 1g/m² – see protocol for more detailed directions and folic acid rescue.<br>Doxorubicin day 1, 8, 22 (60 mg/kg, max 2.4 gr)
### Wilms Tumour

#### 1A – Preoperative Chemotherapy for Localized Disease

<table>
<thead>
<tr>
<th>Name of Patient:</th>
<th>Date of Birth:</th>
<th>Date of Admission:</th>
</tr>
</thead>
</table>

At admission:

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Dose Vincristine (1.5mg/m² (max 2 mg))</th>
<th>Dose Actinomycin (45μg/kg (max 2 mg))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (cm)</td>
<td>Body weight &lt;12kg? (if 'yes' reduce dose of both drugs to 2/3)</td>
<td></td>
</tr>
<tr>
<td>Body surface area (m²):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Both drugs are given i.v. push.

**Before Chemo:**
- USS (+ tumour size)
- FBC
- Chest X-Ray
- Blood pressure
- Urine dipstick (blood, prot)
- FNA
- MPs / Elisa
- Size tumour (tape measure)
- MUAC

Before Surgery:
- Tumour response
- Size tumour (tape measure)
- Repeat USS
- Clinician’s assessment

#### 1B – Preoperative Chemotherapy for Metastatic Disease

<table>
<thead>
<tr>
<th>Name of Patient:</th>
<th>Date of Birth:</th>
<th>Date of Admission:</th>
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At admission:

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Dose Vincristine (1.5mg/m² (max 2 mg))</th>
<th>Dose Actinomycin (45μg/kg (max 2 mg))</th>
<th>Dose Doxorubicin (30mg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (cm)</td>
<td>Body weight &lt;12kg? (if ‘yes’ reduce dose of both drugs to 2/3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body surface area (m²):</td>
<td></td>
<td></td>
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</table>

Vincristine and actinomycin are given i.v. push.

Doxorubicin is given in a 6 hour infusion.

**Before Chemo:**
- USS (+ tumour size)
- Investigations**
- Size tumour (tape measure)
- MUAC

** Investigations: FBC, BP, Chest X-ray, RNA, dipstick urine (prot/blood), Elisa, MP’s

**® Chest X-ray and / or ultrasound abdomen to determine regression and resectability of metastases.**

**®® Chest X-ray and / or ultrasound abdomen to determine regression and resectability of metastases.**

### Wilms Tumour

**Before Surgery:**
- Tumour response
- Size tumour (tape measure)
- Repeat USS
- Clinician’s assessment
Wilms Tumour

Optional – Prolonged and Intensified Preoperative Chemotherapy
for Localized Disease to Improve Resectability

<table>
<thead>
<tr>
<th>Name of Patient:</th>
<th>Date of Birth:</th>
<th>Date of Admission:</th>
</tr>
</thead>
</table>

At admission:
- Weight (kg):  
- Height (cm):  
- Body surface area (m²):  
- Date Vincristine (1.5mg/m² (max 2 mg)):  
- Date Actinomycin (45μg/kg (max 2 mg)):  
- Body weight <12kg? (If ‘yes’ reduce dose of both drugs to 2/3)

Vincristine and actinomycin are given i.v. push. Doxorubicin is given in a 6 hour infusion.

Doxorubicin
- See previous preop chemo 1A

Actinomycin D

Vincristine

Weeks

Date Given:
- Before Chemo:
  - USS (+ size tumour)
  - RBC
  - Chest X-Ray
  - Blood pressure
  - Urine dipstick (blood, prot)
  - FNA, MPN, ELISA, Size tumour (tape measure)
  - MUAC

- Before Prolongation:
  - Tumour response
  - Size tumour (tape measure)
  - Repeat USS
  - Clinician’s assessment

- Before Surgery:
  - Tumour response
  - Size tumour (tape measure)
  - Repeat USS
  - Clinician’s assessment

Wilms Tumour

Post-operative Chemotherapy – AV4 – Localized Disease at Diagnosis
Pathology: Stage I, Intermediate Risk (IR) – Not for Surgical Staging Only

<table>
<thead>
<tr>
<th>Name of Patient:</th>
<th>Date of Birth:</th>
<th>Date of Admission:</th>
</tr>
</thead>
</table>

At admission:
- Weight (kg):  
- Height (cm):  
- Body surface area (m²):  
- Date Vincristine (1.5mg/m² (max 2 mg)):  
- Date Actinomycin (45μg/kg (max 2 mg)):  
- Body weight <12kg? (If ‘yes’ reduce dose of both drugs to 2/3)

Both drugs are given i.v. push.

Actinomycin D

Vincristine

Weeks

Date Given:
### Wilms Tumour

#### Post-operative Chemotherapy – AV14 Localized Disease at Diagnosis

**Pathology:** Stage I, High Risk (HR) and Stage II, IR and Stage II, III LR

or Surgical Stage I or II / Easy Surgery

<table>
<thead>
<tr>
<th>Name of Patient:</th>
<th>Date of Birth:</th>
<th>Date of Admission:</th>
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</table>

**At admission:**

<table>
<thead>
<tr>
<th>Weight (kg):</th>
<th>Height (cm):</th>
<th>Body surface area (m²):</th>
</tr>
</thead>
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</tbody>
</table>

Dose Vincristine (2.0 mg/m² (max 2 mg))

Dose Actinomycin (45 µg/kg (max 2 mg))

Dose Doxorubicin (30 mg/m²)

Body weight <12kg?

(If ‘yes’ reduce dose of both drugs to 2/3)

Vincristine and actinomycin are given i.v. push.

<table>
<thead>
<tr>
<th>Actinomycin D</th>
<th>Vincristine</th>
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**WEEKS**

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</table>

Give 1st dose Vincristine when peristalsis is re-established and no obvious surgical problems.

### Wilms Tumour

#### Post-operative Chemotherapy – AVD 14 – Metastatic Disease at Diagnosis

**Localized Disease at Diagnosis – Pathology:** Stage II High Risk, Stage III IR and HR

or Surgical Stage III / Difficult Surgery

<table>
<thead>
<tr>
<th>Name of Patient:</th>
<th>Date of Birth:</th>
<th>Date of Admission:</th>
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<tbody>
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</table>

**At admission:**

<table>
<thead>
<tr>
<th>Weight (kg):</th>
<th>Height (cm):</th>
<th>Body surface area (m²):</th>
</tr>
</thead>
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</tbody>
</table>

Dose Vincristine (2.0 mg/m² (max 2 mg))

Dose Actinomycin (45 µg/kg (max 2 mg))

Dose Doxorubicin (30 mg/m²)

Body weight <12kg?

(If ‘yes’ reduce dose of both drugs to 2/3)

Vincristine and actinomycin are given i.v. push. Doxorubicin is given in 2–6 hours.

<table>
<thead>
<tr>
<th>Doxorubicin</th>
<th>Actinomycin D</th>
<th>Vincristine</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

**WEEKS**

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</tbody>
</table>

Give 1st dose Vincristine when peristalsis is re-established and no obvious surgical problems.
Hodgkin's Disease

Name of Patient: 
Date of Birth: 
Date of Admission: 

At admission:

- Weight (kg): 
- Height (cm): 
- Body surface area (m²): 

Maxolon (metoclopramide) 10 mg before and after (afternoon) chemotherapy to reduce vomiting.
Allopurinol 5 mg/kg tds for 5 days to prevent tumor lysis syndrome.

- Doxorubicin: 
- Vincristine IV day 1 --- (1.5mg/m² max dose 2mg)
- Etoposide IV days 1, 2, 3 --- (100mg/m²)
- Prednisolone days 1-5 --- (40mg/m²)
- Procarbazine days 1-14 --- (100mg/m²)
- Doxorubicin day 1 --- (50mg/m²)

Flow Sheet: Prednisolone Pre-Phase ALL

Name of Patient: 
Date of Birth: 
Hospital Number: 

- Weight: 
- Surface Area: 

Full Blood Count:
- Haemoglobin: 
- White Blood Count: 
- Neutrophils: 
- Platelets: 

Prednisolone dose given:

- Bone Marrow: 
  - 1-2 Years Old - 8mg
  - 2-3 Years Old - 10mg
  - 3+ Years Old - 12mg
- Intrathecal: 
- Methotrexate: 
- Prednisolone: 40mg/m²/day in 2 divided doses. Prednisolone - 40mg/m² /x7days

Dosing may be started gradually for high presenting WBC mediastinal disease and if very unwell.

Day 1 2 3 4 5 6 7
Week

PREDNISOLONE PRE-PHASE All ALL 3 Sheet 1
Flow Sheet: Induction ALL

Name of Patient: ____________________________
Date of Birth: ____________________________
Hospital Number: ____________________________

Full Blood Count:
- Haemoglobin: ____________________________
- White Blood Count: ____________________________
- Neutrophils: ____________________________
- Platelets: ____________________________

Treatment given:

Bone Marrow:

Intrathecal Methotrexate:

1-2 Years Old - 8mg
2-3 Years Old - 10mg
3+ Years Old - 12mg

Asparaginase:

6000 IU/m² per dose (intramuscular)
Day 4 - 1st dose

Vincristine:

1.5mg/m² per dose

Prednisolone:

40mg/m²/day in 2 divided doses then wean over 5 days

Weight: ____________________________
Surface Area: ____________________________

Flow Sheet: Continuation ALL

Name of Patient: ____________________________
Date of Birth: ____________________________
Hospital Number: ____________________________

Full Blood Count:
- Haemoglobin: ____________________________
- White Blood Count: ____________________________
- Neutrophils: ____________________________
- Platelets: ____________________________

Treatment given:

Bone Marrow:

Intrathecal Methotrexate:

1-2 Years Old - 8mg
2-3 Years Old - 10mg
3+ Years Old - 12mg

6 Mercaptopurine:

60mg/m²/day - in the evening

Vincristine:

1.5mg/m² per dose

Prednisolone:

40mg/m²/day in 2 divided doses then wean over 5 days

Weight: ____________________________
Surface Area: ____________________________
**Flow Sheet: Intensification ALL**

Name of Patient: ____________________________  
Date of Birth: ____________________________  
Hospital Number: ____________________________

Full Blood Count:  
- Hemoglobin: [ ]  
- White Blood Count: [ ]  
- Neutrophils: [ ]  
- Platelets: [ ]

Treatment given:  
- Intrathecal: [ ]  
- Methotrexate: [ ]  
- Doxorubicin: [ ]  
- Etoposide: [ ]  
- Cytarabine: [ ]  
- 6 Mercaptopurine: [ ]  
- Vincristine: [ ]  
- Prednisolone: [ ]

- 1-2 Years Old - 8mg  
- 2-3 Years Old - 10mg  
- 3+ Years Old - 12mg  
- 45mg/m² per dose  
- 100mg/m² per dose  
- 100mg/m² per dose  
- 60mg/m² in the evening  
- 1.5mg/m² per dose  
- 40mg/m² /day in 2 divided doses for 5 days

Doxorubicin / Cisplatin  
Osteosarcoma, Hepatocellular Carcinoma (Neuroblastoma)

**Patient Name:** ____________________________  
**Age:** ____________________________  
**Date of Admission:** ____________________________

At Admission:  
- Weight: [ ]  
- Height: [ ]  
- Body Surface Area: [ ]

Doxorubicin: [ ]  
Cisplatin: [ ]  
(50mg/m², max 70mg)

**WEKNRS**  
1  
2  
3  
4  
5  
6  
7

**Date Given:**  
1  
2  
3  
4  
5  
6  
7

**Size Tumour:**  
1  
2  
3  
4  
5  
6  
7

**USG:**  
Chest X-Ray: [ ]

**FNA Date:**  
FNA Result: [ ]

**Presenting Complaints:**  
(Resumed) Diagnosis: [ ]
### Etoposide / Cisplatin / Bleomycin

**Germ Cell Protocol**

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>Age:</th>
<th>Date of Admission:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Etoposide day 1-3 IV; OR 1-5 po (100mg/m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cisplatin, day 1+2 (50mg/m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bleomycin day 1 (15 IU/m²)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight</th>
<th>Height</th>
<th>Body Surface Area</th>
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</table>

#### Cisplatin

#### Bleomycin

#### Etoposide

<table>
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<tr>
<th>WEEKS</th>
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<td>Chest X-Ray:</td>
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<td>FNA Date:</td>
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<td>Presenting Complaints:</td>
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<td>(Presumed) Diagnosis:</td>
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</table>

### Kaposi Sarcoma Vincristine, Bleomycin and Etoposide

**HIV pos Y/N**

**CD4 count...**

**On ARTs Y/N**

**If 'Yes' since when?**

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>Age:</th>
<th>Date of Admission:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Etoposide 1-3 IV 1 hr infusion, or 1-5 days po (100 mg/m²)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vincristine day 1, IV bolus (1.5mg/m², max 2 mg)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bleomycin day 1 IV 15 min infusion 15 IU/m²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight</th>
<th>Height</th>
<th>Body Surface Area</th>
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</thead>
</table>

#### Etoposide

#### Vincristine

#### Bleomycin

<table>
<thead>
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<th>3</th>
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<tr>
<td>Size Sentinel Node:</td>
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<td>Chest X-Ray:</td>
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</tr>
</tbody>
</table>
Low Grade Glioma – Vincristine and Carboplatin

Frequency:
The initial phase consists of weekly chemotherapy for 10 weeks with Vincristine and 3 weekly with Carboplatin. The next phase lasts for 10 courses of Vincristine and Carboplatin at approximately 28 day intervals, when the neutrophils are >1x 10^9/l and platelets > 100 x 10^9/l.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vincristine</td>
<td>1.5 mg/m² for children &gt;10 kg (max total dose 2mg)</td>
</tr>
<tr>
<td>Carboplatin</td>
<td>600 mg/m² for children &gt;10 kg</td>
</tr>
</tbody>
</table>

Both:
Recommendations for children under 10 kg in weight:
- Less than 6 months of age: 50% of calculated dose by body surface area
- 6 months to 1 year of age: 75% of calculated dose by body surface area
- Over 1 year of age: 100% of calculated dose by body surface area

Retinoblastoma – Chemotherapy – JOE

<table>
<thead>
<tr>
<th>Eye examination</th>
<th>Date Chemotherapy Given</th>
<th>Course number</th>
<th>MPS/PCV</th>
<th>Serum creatinine</th>
<th>HB</th>
<th>WBC/Neut</th>
<th>Pts</th>
<th>Any toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PRE 1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Carboplatin Dose</th>
<th>600 mg/m² for children &gt;10 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendations for children under 10 kg in weight:</td>
<td></td>
</tr>
</tbody>
</table>
- Less than 6 months of age: 50% of calculated dose by BSA
- 6 months to 1 year of age: 75% of calculated dose by BSA
- Over 1 year of age: 100% of calculated dose by BSA

<table>
<thead>
<tr>
<th>Etoposide Dose</th>
<th>300 mg/m² for children &gt;10 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendations for children under 10 kg in weight:</td>
<td></td>
</tr>
</tbody>
</table>
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- Over 1 year of age: 100% of calculated dose by BSA

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<tr>
<th>Vincristine Dose</th>
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</tr>
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<tr>
<td>Recommendations for children under 10 kg in weight:</td>
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