

# Pediatric Palliative Care

## An Inpatient Oncology Perspective

HPC Palliative Spring Education Event

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# Objectives

- Present palliative pediatric oncology cases that illustrate symptoms such as
  - pain
  - cytopenias
  - bleeding
  - nausea/vomiting
  - constipation
  - dyspnea
  - secretions

# Objectives

- Review medications and tools used for pediatric symptom management
- Highlight challenges to provision of care in children
- Provide some “practical pearls” to enhance provision of palliative care to pediatric patients

# GOAL

**To demonstrate that strategies for palliative symptom management in pediatric patients are not that different than those used for adult palliative patients.**

# Introduction

- **Symptom management for children with end-stage cancer presents a challenge to health care providers**
- **Interdisciplinary family-centered care is an integral part of the symptom management for these children**

# Pediatric symptoms during last week of life

Pain 84 %

Fatigue 63 %

Nausea/Vomiting 58 %

Dyspnea 55 %

Constipation 47 %

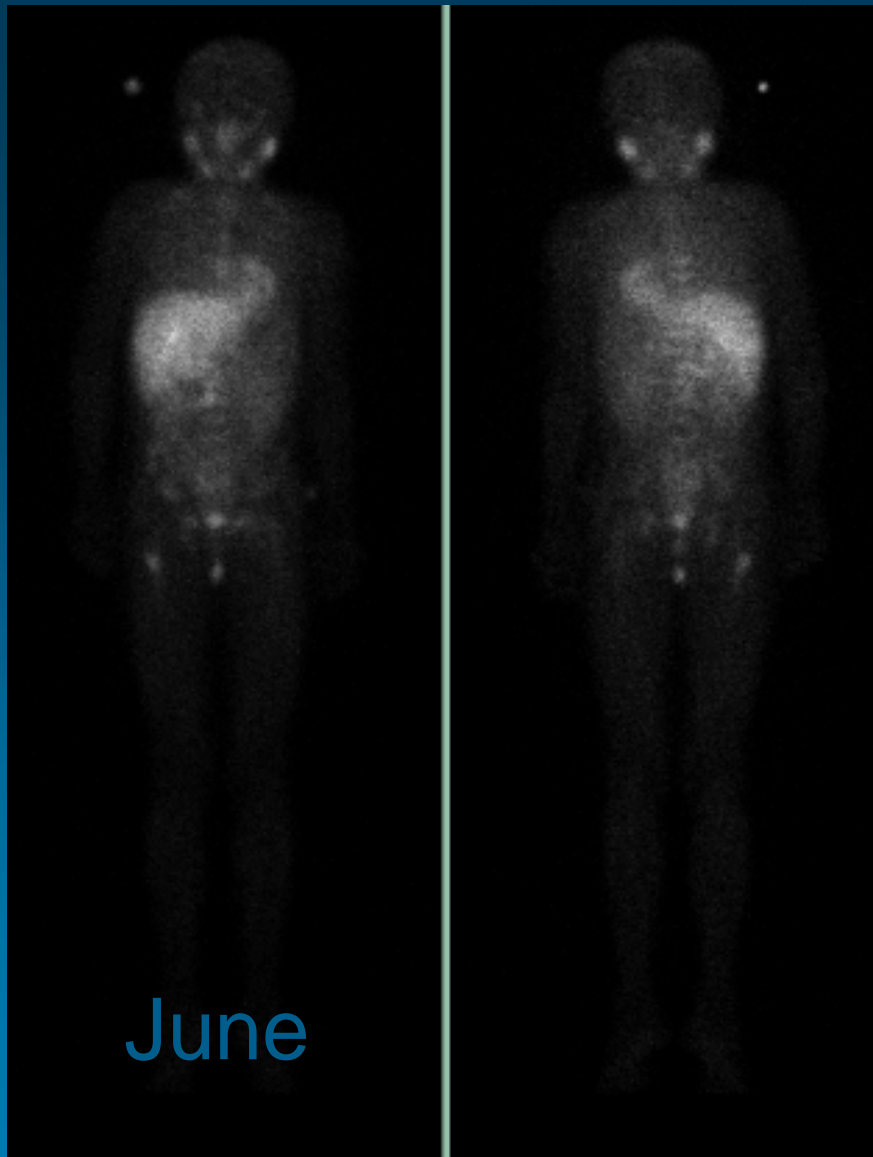
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T. Dangel (Poland)  
R. Drake (Australia)  
A. Goldman (UK)  
T. Hongo (Japan)  
J. Wolfe (USA)



# CASE: 12 yr ♀ metastatic NBL

- Long-standing recurrent/refractory NBL
  - Extensive progression of bony disease
  - Large cranial lesion with intracranial extensions
  - No possibility of cure
- Severe pain in legs, back, head, etc.
- **Overarching goal of care:**
  - ❖ Go home as much as possible for as long as possible!!!!





# CASE: 12 yr ♀ metastatic NBL

- Initial goal at disease progression:  
**optimize pain control as outpatient as long as possible**
- initially requested no central IV access but agreed to oral medications and radiation
- Chemotherapy (irinotecan + temozolomide) stopped after 2 cycles due to prolonged neutropenia, thrombocytopenia and diarrhea

# CASE: 12 yr ♀ metastatic NBL

- So... what to do about her pain?
  - ❖ oral hydromorphone PRN initially  
(≠ morphine, acetaminophen, NSAIDs)
    1. Radiate skull, R hip and back lesions
    2. REGULAR hydromorph contin + bolus:  
9mg PO q12h + 2mg q2h PRN
  - ❖ When pain worsened, increased to 12mg PO q12h + 3mg breakthrough q2h PRN

# Challenges

- Tolerance vs rapid disease progression
- Morphine allergy
- Lorazepam intolerance (agitation)
- Thrombocytopenia ( $\neq$  NSAIDs)
- No fentanyl infusions outside PICU
- No authorized methadone prescriber in community

# Myths Related to Pain and Pain Management in Children

- Risk of respiratory depression
- Addiction
- Child that is sleeping or playing does not have pain
- Presence of pain indicates worsening of disease or approaching death

# WHO Guidelines on the pharmacological treatment of persisting pain in children (2012)

- Dosing at regular intervals:
  - **Around the Clock**
- Adapting treatment to the individual child:
  - **With the Child**
- Using the appropriate route of administration:
  - **By the appropriate route**
- Using a two-step strategy:
  - **By the Analgesic Ladder**

# Assessment

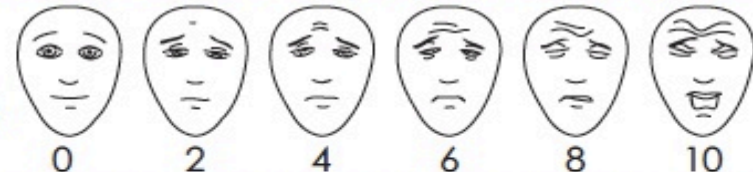
## Infant FLACC Scale

Category	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distracted	Difficult to console or comfort

Each of the five categories (F) Face, (L) Legs, (A) Activity, (C) Cry, (C) Consolability, is scored from zero to two, which results in a total score between zero and 10.

**Faces Pain Scale – Revised For ages > 4 yrs**  
[www.painsourcebook.ca](http://www.painsourcebook.ca)

Say to the child, "Point to the face that shows how much you hurt (right now)."



**Numeric Scale** – Use zero (no pain) to 10 (worst pain you can imagine) scale for children older than 7 years of age.

# Using the appropriate route of administration (i.e. Least traumatic)

- Use **oral/enteral route**, when possible
- Alternative routes:
  - Sublingual/buccal
  - Intranasal
  - Transdermal (contraindicated in acute pain)
  - Rectal
  - Intravenous (or subcutaneous)
  - ~~● Intramuscular = obsolete~~

# Using a two-step strategy

WHO Step 1  
Mild Pain

**Ibuprofen**  
and/or  
**Acetaminophen**

Other NSAIDs?  
Cox-2 Inhibitor?

WHO Step 2  
Moderate to  
Severe Pain

**Morphine**

or

**Fentanyl,**  
**Hydromorphone,**  
**Methadone**



# OTC Analgesics

## ■ Acetaminophen

- may mask fever and infection in neutropenia
- 10-15 mg/kg/dose; repeat every 4-6 hrs
- Oral, rectal

## ■ NSAIDs

- Anti-inflammatory; good for bone pain
- Caution: with thrombocytopenia, renal dysfxn
- Ibuprofen 5-10 mg/kg PO every 6-8 hrs
- Ketorolac 0.5 mg/kg IV every 6-8 hrs
- Naproxen 5-10 mg/kg PO/PR q8-12h (max 20 mg/kg/d)

**\*\* Rectal administration is contraindicated in neutropenic and thrombocytopenic patients**

# Opioid drug options

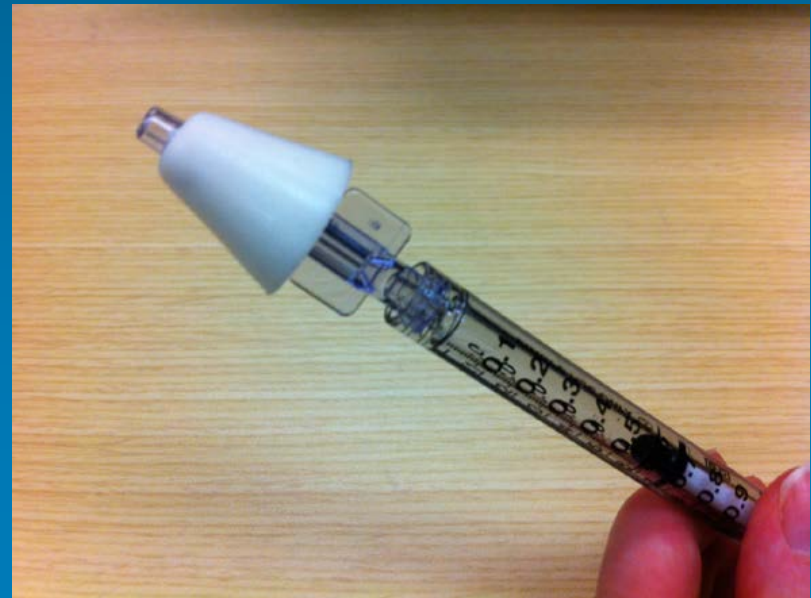
- Phenanthrene derivatives
  - **Morphine: Gold Standard**
  - **Hydromorphone**
  - Oxycodone (not recommended)
  - Codeine (not recommended)
- Phenylpiperidine derivatives
  - **Fentanyl**
- Diphenylheptane derivatives
  - **Methadone**

# Intranasal Fentanyl

- Rapid and effective minimization of pain
- **Indicated** for Moderate to Severe Acute Pain when IV access not available or necessary
- **Contraindicated** if allergy to fentanyl or other opiates, altered conscious state, occluded nasal passages, intubated pts, URTI with nasal secretions, epistaxis

# Intranasal Fentanyl

- **Dose:** 1.5 mcg/kg/dose
  - Repeat q5mins, PRN
  - Onset: 2-5 minutes
  - Duration: ~ 30 minutes to 2 hours
  - Administration via **Mucosal Atomization Device (MAD):**
- Tool kits at [www.caphc.org](http://www.caphc.org)



# Intranasal Fentanyl

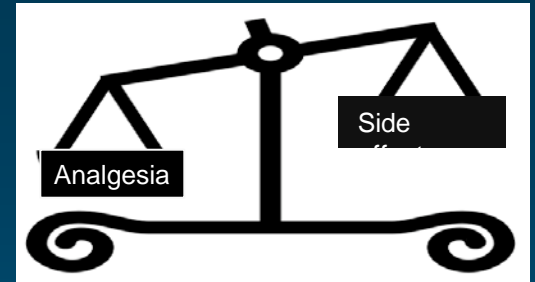
## ■ Adverse Effects

- Bitter taste
- Nasal irritation
- Respiratory depression
- Dyspnea/cough
- Hypotension
- Excessive sedation
- Pruritus
- Chest wall rigidity (with large doses)
- ❖ **Monitoring same as with IV opioids**

# HHSC Opioid Equivalencies

Drug	Parenteral (mg)	PO (mg)
FentaNYL	0.1	N/A
HYDROmorphone	2	4-6
Morphine	<b>10</b>	20-30
OxyCODONE	N/A	10-15
Methadone	N/A	2.5-10

# Opioid Rotation



- Morphine is gold standard first line
  - BUT, it is not always *best* for *every* child
- $\geq 10\%$  of children have inadequate pain control with intolerable side effects
  - May respond to opioid rotation!
  - If in renal failure consider: fentanyl,  
methadone
  - Premature infants: fentanyl
  - **Equianalgesic** dosing

# What about neuropathic pain?

## ■ Multiple causes of neuropathic pain in childhood cancer:

Tumor infiltration (nerve compression)

Phantom limb pain

Spinal cord compression

↑ intracranial pressure

Neuropathy (e.g. from chemotherapy)

*\*Currently no validated neuropathic pain scales for children < 18 years of age.*



# What about neuropathic pain?

- Start with opioids
- Consider addition of adjuvant agents
  - Tricyclic antidepressants\*
    - Amitriptyline, Nortriptyline
    - Side effects: sedation, anticholinergic effects, prolonged QTc. Wean over 1 week
  - Gabapentinoids\*
    - Gabapentin, pregabalin
    - Mechanism: calcium-channel blocker, decrease release of pain transmitters
    - Side effects: nystagmus, thought disorder, hallucinations, headache, and myalgia. Wean 1-2 wks

# Pediatric doses of adjuvant agents

## ■ Amitriptyline (or Nortriptyline)

### ■ Dose same for both

- Starting dose: 0.1 mg/kg po qhs
- Slowly titrate up to 1 mg/kg/day  
(usually 5-10 mg to start, then max 50-75 mg/day)

## ■ Gabapentin

- Starting dose: 5-10 mg/kg/dose (max 100 mg/dose); start QHS, then BID, then TID-QID
- Titrate by 5 mg/kg/day every 3-4 days based on response (max 50 mg/kg/day OR 3600 mg/day)
- May titrate more rapidly for severe pain

# Adjuvant agents

- NMDA receptor channel blockers:
  - Ketamine (low-dose infusion)
    - Dissociative anesthetic, analgesic at low doses
    - Side effects: intracranial hypertension, tachycardia, psychomimetic phenomena (give lorazepam)
    - 1-2 mcg/kg/min IV continuous infusion
  - Methadone
    - Mu-opioid receptor agonist and NMDA receptor antagonist
    - Also serotonin and norepinephrine reuptake inhibitor

# CASE: 12 yr ♀ metastatic NBL

- Her pain worsens – PO not fast enough:
  1. Switch to hydromorphone IV (CADD):
    - 8mcg/kg/hr plus boluses 4mcg/kg
    - Titrate increases: by 50% of dose
    - Her max reached: 620mcg/kg/hr!!!! (gradual increase over months; good efficacy; manageable side effects)
  2. Amitriptyline added: 10mg PO qhs
  3. Ketorolac added: 10mg q6h IV
  4. Methadone added:
    - Started 0.5mg PO BID → 2mg PO TID

# CASE: 12 yr ♀ metastatic NBL

## ■ Other symptoms:

Cytopenias; bleeding risk

Anxiety/ OCD-like behaviour

Anorexia/Cachexia/Dehydration

Nausea/Vomiting

Constipation

# Cytopenias

## ■ Caused by:

- Decreased production (chemo, radiation, bone marrow infiltration of malignant cells)
- Destruction, Sequestration

## Management: (symptom focused!)

- \* Reduce risks (i.e. no rectal meds, ↓ invasive procedures)
- Anemia – fatigue, respiratory compromise - **PRBCs**
- Neutropenia – infection risk – antibiotics/ G-CSF
- Thrombocytopenia – transfuse; no NSAIDs

# Bleeding and hemorrhage

## ■ Caused by:

- Thrombocytopenia (e.g. nosebleeds)
- Liver dysfunction (e.g. altered clotting mechanism)
- Tumour invasion (e.g. lungs – hemoptysis, GI)

## ■ Management:

Small Bleed (localized)	Platelet transfusions, pressure/packing, hemostatic dressing (thrombin, gelfoam), gauze + tranexamic acid, cauterization
Heavy Bleed (systemic)	Tranexamic acid IV (10 mg/kg q8h), vitamin K, pantoprazole, octreotide, PRBCs, platelet transfusions, FFP, IV fluids if hypotensive
Acute Catastrophic Bleed	Sedation (e.g. IV/SC or intranasal midazolam, sublingual lorazepam)

**Dark-colored towels and bed linens readily available**

# Anxiety

- **Child life involvement**
  - **Emotional-expressive play therapy**
  - **Benzodiazepines:**
    - Treatment of choice in children
    - Antiemetic properties
    - Sleep initiation – caution oversedation
    - Short-acting: **lorazepam** 0.02-0.05 mg/kg q6-8h  
PO/SL/IV/Subcut
    - Longer acting: **clonazepam** BID or TID dosing;  
better anticonvulsant
- BUT: paradoxical agitation (40% children)**



# OCD-like Behaviours

## ■ Second-generation neuroleptics

- e.g. Risperidone, Olanzapine
- First line in children and adolescents
- ↓ EPS, dystonia, tardive dyskinesia
- Start low dose; titrate up slowly
  - Risperidone: start 0.25-0.5 mg qhs; ↑ bid or tid
  - Olanzapine: (Zydis) start 2.5 – 5 mg qhs
- Quick dissolve dosage forms
- \*\* weight gain, ↑ appetite
- ↓ seizure threshold

# Anorexia-Cachexia

- **Anorexia:** loss of appetite, decreased food intake
  - Loss of taste, pain, constipation, N/V, anxiety, depression
- **Cachexia:** involuntary weight loss, lack of nutrition
  - Limited ability to eat, chew or swallow, metabolic abnormalities

<b>A</b>	Aches and pains
<b>N</b>	Nausea
<b>O</b>	Oral candidiasis
<b>R</b>	Reactive (or organic) depression
<b>E</b>	Evacuation problems (constipation, retention)
<b>X</b>	Xerostomia (dry mouth)
<b>I</b>	Iatrogenic (radiation or chemotherapy)
<b>A</b>	Acid-related gastritis or peptic ulcers

# Anorexia-Cachexia

❖ **Goal of Care:** ↑ appetite → promote wt gain

**\*\* slow rate of weight loss \*\***

- favourite high-calorie foods, soft foods
- Nutritional supplementation – enteral vs parenteral
- Appetite stimulants (e.g. Cyproheptadine, steroids)
- Treat underlying causes of ↓ appetite:
  - constipation
  - N/V
  - pain
  - anxiety
  - thrush

# Dehydration

- excessive loss of water
  - limited ability to consume sufficient fluids
  - increased losses
- Hydration intervention – controversial; individualized
  - Goal: ↓ thirst for comfort  
help maintain renal function
  - Caution: peripheral edema
  - ≠ evidence that hydration ↑ terminal secretions

# Goals of Nutrition and Fluid Management in the Dying Child

- Alleviate any hunger and thirst
- Reduce anxiety about intake
- Preserve the social aspects of mealtimes

# Constipation

## ■ Causes:

- Disease-related (e.g. obstruction, neurologic, hypercalcemia, inactivity)
- Treatment-related (e.g. opioids, vincristine)
- Change in diet

## ■ Management:

- Diet (high fiber) and fluids
- Activity
- Toileting
- Medications

# Medications to treat Constipation

- **Osmotic** – PEG 3350, lactulose, Citromag
- **Bulk forming (fibre)** - Metamucil
- **Stimulants** – senna, bisacodyl, PicoSalax
- **Stool softeners** - docusate
- **Lubricants** - mineral oil, glycerine
- **Opioid reversal** - methylnaltrexone
- **Motility agents** – domperidone, metoclopramide
  
- ❖ **Caution:** thrombocytopenia, neutropenia, obstruction

# Nausea and Vomiting

## ■ Causes

- GI – infection, obstruction, ileus, constipation
- Metabolic – hypoglycemia, electrolyte imbalance
- CNS - ↑ ICP, anxiety; brain tumour location
- Treatment – opioids, chemo, radiation

## ■ Management

- Distraction
- Dietary
- Small meals + slow feeding
- Medications



# Antiemetics

Drug Class	Dosing	SEs
5-HT <sub>3</sub> Antagonists	Ondansetron 0.15 mg/kg tid IV/PO/SL/SC  Granisetron 20-40 mcg/kg bid IV/PO	Constipation, HAs, prolongation of QT interval
H <sub>1</sub> Antagonists	Dimenhydrinate 0.5-1 mg/kg q4-6h IV/PO/PR	Drowsiness, dry mouth
Dopamine Antagonists	Prochlorperazine 0.1 mg/kg q6h PO  Chlorpromazine 0.5 mg/kg q6h IV/PO/PR	Limited use in pediatrics due to EPS; sedation, hypotension <i>*with diphenhydramine</i>
Prokinetics	Domperidone 0.3-0.6 mg/kg tid or qid PO only  Metoclopramide 0.1-0.2 mg/kg IV/PO q6h	Max 30 mg/day due to QT prolongation (Health Canada warning) Contraindicated < 1 y.o. <i>*with diphenhydramine</i>

# Antiemetics

Drug Class	Dosing	Ses
Cannabinoids	Nabilone 0.5-2 mg bid to tid PO (for pts > 18 kg)	Drowsiness, hallucinations, dysphoria, dry mouth, tachycardia
Corticosteroids	Dexamethasone 0.1-0.25 mg/kg bid-qid IV/PO/SC (maximum 8 mg /dose)	Mood/behaviour changes, increased appetite, edema, give with antacid
Benzodiazepines	Lorazepam 0.025-0.1 mg/kg bid-qid IV/PO/SL (maximum 2 mg/ dose)	* For anticipatory N/V Sedation
Antipsychotics	Haloperidol 0.01-0.1 mg/kg bid-tid PO/IV  Olanzapine 2.5-5 mg PO once daily (regular and ODT available)	*limited due to EPS ; reserved for refractory cases  Limited evidence pediatric antiemetic dosing; reserved for refractory cases

# Case: 16 yr ♂ – High-grade brain stem glioma

## ■ Diagnosed with **DIPG**

- High grade brain stem glioma
- 10-20% of childhood brain tumours
- Very aggressive, poor prognosis
- No surgical removal; no chemotherapy
- Radiation = temporary response (~ 6-9 months)
- Post radiation inflammation = **Radiation Necrosis**
- Dexamethasone for symptom control

# Case: 16 yr ♂ – High-grade brain stem glioma

- Palliative care initiated in community
- episode of coughing, difficulty swallowing → Panic Attack → Admit
  - Unable to stand, walk or speak
  - Extreme hunger (dexamethasone) but coughing with liquids, secretions
  - Tongue numbness
  - Dyspnea

# Case: 16 yr ♂ – High-grade brain stem glioma

## ■ Overarching goal of care:

- Comfort, surrounded by loved ones
- End-of-life in hospital

## • Issues:

- Hunger : NG tube + feeds for satiety
- Communication: IPAD + eye movements
- Restlessness: lorazepam sublingually
- Secretions: scopolamine (Intima – SC)
- Dyspnea: O<sub>2</sub> by nasal prongs
- Legacy-building: organ donation

# Secretions

- ↓ ability to swallow and clear oral secretions

- **Contributing factors:**

- Pulmonary malignancy
- Pulmonary edema
- Dysphagia
- Generalized weakness
- Altered consciousness

- **Interventions:**

- Humidified air
- Suctioning (may ↑ secretions)
- Medications

# Management of Terminal Secretions

Drug	Dose	Comments
Scopolamine ( <i>Hyoscine hydrobromide</i> )	0.4-0.6 mg OR 5-10 mcg/kg IV/SC q4-8h  (maximum dose 0.6 mg)	<ul style="list-style-type: none"> <li>• Sedating</li> <li>• May cause delirium</li> <li>• Dry mouth</li> </ul>
Transderm-V Patch (Scopolamine) – 1.5 mg	2-3 yrs: ¼ patch  3-9 yrs: ½ patch  10+ yrs: 1 patch	<ul style="list-style-type: none"> <li>• Q72hrs</li> <li>• Sedating, delirium</li> <li>• Place behind ear</li> </ul>
Glycopyrrolate	PO: 40-100mcg/kg q6-8h  IV/SC: 4-10 mcg/kg q3-4h (maximum 200 mcg/dose)	<ul style="list-style-type: none"> <li>• Less sedating and less effective than scopolamine</li> </ul>

# Dyspnea = distressing SOB; breathlessness

## ■ Causes in cancer patients:

### ❖ Respiratory

- Metastatic lung disease - obstruction
- Pleural effusion, pulmonary edema, ascites
- Pulmonary embolism
- Pneumonia

### ❖ Cardiac

- CHF, superior vena cava obstruction, anemia

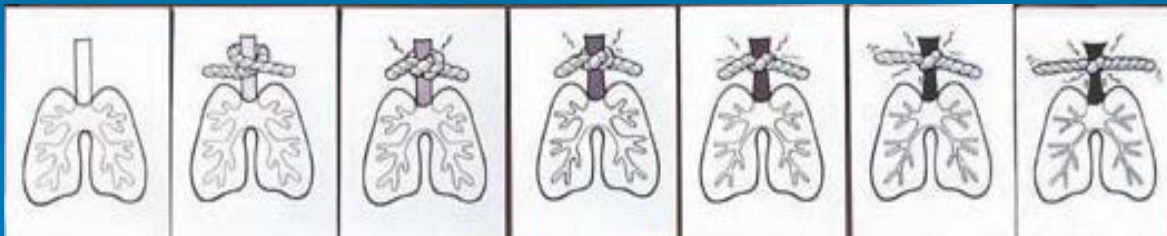
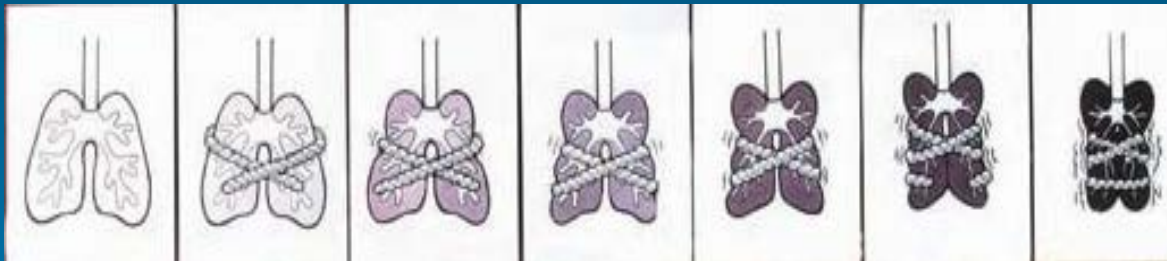
### ❖ Treatment related

- Radiation pneumonitis, chemotherapy induced cardiomyopathy or pulmonary fibrosis



# Assessment of Dyspnea

## Dyspnea Scales



# Treatment of Dyspnea

## ■ Non-pharmacological:

- Oxygen
- Fan, open window
- Sit upright
- Calm reassurance
- Relaxation and distraction
- Cool temperature
- Humidifier
- Pursed-lip breathing exercises

# Treatment of Dyspnea

## ■ Pharmacological:

- **\*Opioids\* – treatment of choice!**
  - Low dose morphine (30-50% pain dose)
  - Already on opioid – titrate dose up to effect
- **Benzodiazepines - adjunct**
  - Lorazepam – for anxiety/panic with dyspnea
    - 0.05-1 mg/kg/dose q6-24h
  - Midazolam – infusion for acute resp distress
    - 1-5 mcg/kg/min – titrate to effect
    - Children require higher doses

# Disease-specific Medications for Dyspnea

- **Diuretics (e.g. furosemide)** – CHF, ascites
- **Corticosteroids** – obstruction, pneumonitis
- **Antibiotics** – pneumonia
- **Anticoagulants** - pulmonary embolism
- **Transfusion** – anemia
- **Chemotherapy/radiation** – metastases

Treat underlying cause!

# Pediatric Pearls

- **Multidisciplinary – “it takes a village”**
- **Define overall goals of care – patient & family**
- **Adapt treatment to individual child**
- **Child that is sleeping, playing or quiet can still have pain**
- **Rotate opioids if ineffective or intolerable SEs**
- **Use consistent pain assessment scales**
- **Children with cancer can require extremely high doses of opioids at end of life (e.g. solid tumours, NBL)**

# Pediatric Pearls

- Alternative routes of administration are safe and effective (e.g. intranasal, subcutaneous, SL) – insuflons, Intima devices, MAD, CADD pumps
- Opioids = drugs of choice for pain, dyspnea but  $\emptyset$  codeine or meperidine in children
- Topical tranexamic acid  $\downarrow$  localized bleeding
- Caution with chlorpromazine, haloperidol, metoclopramide and prochlorperazine in children due to  $\uparrow$  risk of EPS, dystonias, tardive dyskinesia (give with IV diphenhydramine if benefits  $>$  risk)

# Inpatient End-of-Life Care

## ■ Advantages:

- Access to multidisciplinary team & specialists
- Quick access to IV blood products, IV medications, cardioresp monitors
- Emotional support from staff, other parents
- Medical personnel close for emergencies (ICU)

## ■ Disadvantages:

- Not home-like environment
- Limited room for family and friends
- Medical, sterile
- Lack of quiet and privacy
- Medical learners on weekends/evenings – inexperienced
- Difficult to transition from “active treatment” to “comfort care”

# Goals for the Future

**Continue to develop a collaborative relationship between McMaster Children's Hospital and our colleagues in the community so that we can create more opportunities for our pediatric oncology patients to receive end-of-life care in their home communities.**



Thank you!

Questions?  
Comments?