



## Caring for the Neuromuscular Scoliosis Patient at The Bristol Myers-Squibb Children's Hospital at RWJUH-New Brunswick

This document is for the nursing staff of BMSCH at RWJUH-New Brunswick to help guide the care of a patient undergoing correction of *Neuromuscular Scoliosis* only. This care is driven from multiple disciplines including but not limited to the Pediatric Orthopedic Surgeons and residents, pre-op, intra-op and PACU staff, anesthesia and pain management teams, PICU and the Adolescent unit staff, as well as Child Life. All of these disciplines partner with the patient and family to gain the optimal outcome of spinal deformity correction and repair while preventing complications from surgery and hospitalization.

**Neuromuscular Scoliosis** is one of the three main types of scoliosis (the others being idiopathic and congenital) and it occurs in patients with abnormalities of the myoneural pathways such as spina bifida, cerebral palsy, post traumatic paralysis and spinal muscle atrophy. Due to the abnormalities in the myoneural pathways, the muscles and nerves are unable to maintain proper spine/trunk alignment. Neuromuscular spinal curves are much more likely to progress and are often associated with kyphosis (bowing and rounding of the back) and pelvic obliquity (uneven tilt to the pelvis) which can lead to seating imbalance, hygiene challenges, and thoracic insufficiency syndrome which is the inability of the chest and thorax to support normal breathing.

**Non-operative Treatment** should be multidisciplinary and could include close monitoring of the curve, bracing (although bracing of neuromuscular curves is often ineffective at preventing curve progression), and wheelchair/seating modifications.

**Operative Treatment** is dependent on the age of the patient, the ambulatory status of the patient, and any comorbidities with the goal to be to prevent curve progression, provide optimal seating balance and reduce pain/discomfort.

**Posterior spinal instrumentation and fusion-** Most common type. Two rods and multiple hooks and bone grafts are used.

**Anterior release and instrumentation and fusion-** Fusion over a smaller area of the spine with preservation of lumbar motion.

**Anterior release with posterior instrumentation and fusion-** This procedure is used when the curve is stiff, large or kyphotic (bowing or rounding of the back), may be done in 2 stages.

### **Nursing Care of this patient begins with Preparation:**

#### **Pre-op**

- Pre-op work up including X-rays, blood work, EKG, and anesthesia consult
- Pre-operative clearance from subspecialists i.e. pulmonary, neuro, etc.
- Base line vital signs
- Height/weight
- Pre-op Education by Scoliosis Nurse Coordinator. Includes review of all post-op care provided by medical and nursing

staff. Patient and family should be included in outlining desired goals associated with the procedure.

- Tour of care areas.
- Discussion of approximate length of stay
- Consideration of any possible discharge needs to be referred to outcomes management
- Obtain consent forms

All labs and X-rays reviewed by appropriate medical staff.  
Abnormalities need to be acted on.

### **Pre-op night phone call should include**

- Time to start fasting
- Pre-op medications \*as per anesthesia, all home meds taken with sip of H2O on morning of OR is ok especially seizure medications and Baclofen
- Pre-op shower reminder
- Time to report to the hospital

### **Specific complication related to patients undergoing scoliosis correction and appropriate interventions:**

It is important for all staff taking care of this patient to recognize they are at risk of any possible complication arising from any surgery including bleeding, infection, and hemodynamic compromise.

### **Pulmonary**

Pneumonia-caused from lying flat for prolonged periods, decreased activity secondary to spinal precautions, anesthesia and opioid use. Interventions include log rolling q2 hours, Incentive Spirometry and C&DB every hour, early return to activity.

All patients will be placed on humidification (air or oxygen) for initial 24 hours post-operatively for enhanced pulmonary clearance.

Chest physical therapy will be instituted for all neuromuscular scoliosis patients and other selected patients with concerns for ineffective chest clearance.

- Chest physical therapy (CPT) will be administered every 4 hours for the first 24 hours post-operative and reassessed thereafter. Modalities to be implemented include but not limited to:
  - Manual CPT
  - Chest percussive CPT
  - Metaneb
  - Mechanical cough assist
  - Vest treatment (high frequency chest wall oscillation)

### **Neurovascular**

Paralysis/paresthesias due to spinal cord compression. Interventions include hourly neuro vascular checks for 24 hours and then q4 hours until discharge.

### **Blood Loss**

Surgery can result to moderate to severe blood loss. Interventions include monitor dressing for drainage with each log roll, reinforce dressing as needed, notifying orthopedic medical staff of bleeding, vs q hour for 24 hours and then q4 hour until discharge, monitor H&H daily, autotransfusion

### **Electrolyte Imbalance**

Due to fluid and blood loss during surgery. Check electrolytes immediately postoperatively in PICU, POD 1 and 2.

### **GI**

Secondary to disruption of nerves to the peritoneum and manipulation of GI organs during surgery, patients may have slow return to normal GI function. In addition, anesthesia and opioid use can decrease gastric activity resulting in nausea/vomiting or ileus. Interventions include monitoring for bowel sounds, gradual return to oral intake, early return to activity and use of antiemetic prn. In the event of an ileus, NGT insertion.

Nasogastric tube insertion for patients who are remaining intubated  
Enteral feeding tube insertion pre-extubation if requested

## **GU**

UTI secondary to indwelling Foley Catheter. Interventions include the hospital's Foley care policy, and intermittent straight cath policy.  
Remove Foley AM of POD #2.

## **Skin Integrity**

Potential for breakdown secondary to prolonged bed rest.  
Interventions include using soft supports at all pressure areas, log roll q2 hours while in bed, rolls under heels, and early return to activity

# **Intraoperative**

- Total Intravenous Anesthesia maintenance: low dose Remifentanyl, Propofol, and Ketamine.
- Intrathecal Morphine 0.25-5mcg/kg/dose
- Goal directed fluid therapy; Colloids > Crystalloids
- Acetaminophen IV 15 mg/kg (max 1 gm over fifteen minutes during closure)
- Cefazolin 30 mg/kg, up to 2 gm. Redose every 4 hours.
- Gentamicin 2.5 mg/kg and redose every 4 hours

# **Post-op Nursing Care**

## **Post op day 0**

- Transfer directly from OR to PICU
- If patient is cognizant and able to comply with PCA pain management (PCA only, no continuous) with Morphine (0.01-0.015 mg/kg/bolus) or Hydromorphone (0.002-0.004 mg/kg/bolus) with 8 minute lock out.
- If unable to comply with PCA, Morphine 0.05-0.2 mg/kg/dose q 3-4 hrs
- Hourly vital signs including pain assessment
- Hourly I&O

- D5 NS at maintenance
- Hourly Neurovascular checks
- CR monitor, IVF, SCDS, ankle rolls,
- Pulse ox
- O2 prn to maintain SpO2 greater than 94%, C&DB
- I/S instruction and use hourly if able
- Humidification (air or oxygen) for initial 24 hours post-operatively for enhanced pulmonary clearance.
- Chest physical therapy will be instituted for all neuromuscular scoliosis patients and other selected patients with concerns for ineffective chest clearance.
- Chest physical therapy (CPT) will be administered every 4 hours for the first 24 hours post-operative and reassessed thereafter.
  - Modalities to be implemented include but not limited to:
    - Manual CPT
    - Chest percussive CPT
    - Metaneb
    - Mechanical cough assist
    - Vest treatment (high frequency chest wall oscillation)
- Chest tube for anterior approach
- Maintain incisional vac to continuous suction and monitor output
- Log roll q 2hours
- Hourly leg exercises, ankle circles, knee bends, foot pumps if able
- May elevate HOB as tolerated and may use pillow

**Scheduled meds:**

- IV Acetaminophen (15mg/kg unless  $\geq 50$  kg, then 1 gm) q 6 hours (change to po once tolerating regular diet)
- Ketorolac (0.5mg/kg with max of 30 mg) IV q 6 hours x 8 doses. (stagger Acetaminophen and Ketorolac so that patient receives one of these meds every 3 hours).

- Ondansetron 4mg IVPB q 6 hours until tolerating po then switch to prn
- Docusate 100 mg po BID
- Bisacodyl 10 mg po QD
- Famotidine 20 mg IVP q 12 hrs
- Cefazolin 30 mg/kg IVPB q 8 hours x 6 doses
- Gentamycin 2.5mg/kg/dose q 8 hrs x 3 doses
- PRN Meds:
  - Diphenhydramine 25-50 mg IV or po q 6 hrs prn
  - Diazepam 2.5-5 mg IV or po q 6 hrs prn for skeletal muscle spasms
  - Metoclopramide 0.25 mg/kg IV q 6 hrs prn nausea/vomiting
  - Nubain 0.05-0.1 mg/kg IV q 3 hr prn for pruritus
  - Nalaxone drip 0.25 mcg/kg/hr continuous drip if pruritus not relieved with Nubain. May titrate up to 1 mcg/kg/hr if needed.

### **Post-op day 1**

- Vital signs as per PICU
- Turn and position q 2 hrs. If extubated and stable, OOB to chair with assist
- If respiratory status is stable and not on any respiratory support can resume feeds slowly (oral or enteral). Consult registered dietician for recommendations/nutrition assessment
- I&O q 8 hours
- Consult PT/OT

### **Post-op day 2**

- OOB to chair at least TID if extubated and stable.
- Maintain incisional vac
- Decrease IVF to KVO if tolerating diet (continue at maintenance if not)
- If tolerating po/g-tube feeds transition to enteral pain management

### **Post-op day 3**

- If stable transfer out of PICU

- OOB to chair or, if ambulatory, encourage ambulation
- Discharge criteria: able to tolerate OOB to chair for an hour at least 3 times daily or longer as tolerated, able to tolerate home diet either orally or by g-tube, and comfortable on enteral pain management