PROTOCOL FOR INITIAL MANAGEMENT OF NEWBORNS WITH MYELOMENINGOCELE IN NEONATAL INTENSIVE CARE UNIT

PRE-OPERATIVE CARE

Prior to delivery

1. **Notify teams with delivery date/time**
    - Notify the attending neurosurgeon once ob/gyn has determined delivery date/time via phone:
        - 608-263-9585 or 608-263-6420, option 3.
    - Notify AFCH NICU team of delivery date/time via email to:
        - lkonkol@uwhealth.org
        - jjlimjoco@pediatrics.wisc.edu
2. **Mother's admission/delivery of infant**
    - On day of admission and once infant is delivered, the neurosurgery attending who performed prenatal visit should be notified

Immediately after birth

1. **Strict latex precautions**
2. **Cover the back defect**
    - Keep the myelomeningocele (MMC) defect clean and moist
    - Immediately after birth, cover defect with sterile Telfa (non-adherent) and then layer with wet 4x4 gauzes
    - Telfa should be left in place until surgery but wet sterile gauzes can be changed as needed to keep area moist
    - Telfa can be kept in place by covering with a steri-drape or loosely wrapping Kerlix around abdomen
3. **Prevent contamination**
    - Prevent fecal contamination or exposure of MMC area
    - Protect from soiling with a plastic flap (steri-drape)
4. **Record head circumference**
    - Perform initial measurement of head circumference
5. **Initiate antibiotics**
    - Prophylactic antibiotic coverage should be started with broad spectrum coverage (Ampicillin and Gentamycin)
    - Antibiotic coverage (Ampicillin and Gentamycin) should be continued for 48 hours post-op
6. **Position infant**
    - Infant must be kept prone to prevent injury to the exposed neural tissue
    - Prone position to be maintained even with feeding/nursing
7. **Consult Pediatric Urology**

- If infant has not voided within first 4 hours of birth, catheterization must be performed

8. **Careful skin monitoring**
    - Infant may be insensate in lower extremities

Procedures

1. **Quick Brain MRI**
    - First Quick Brain MRI should be obtained prior to surgery or within 24 hours of life at the latest
    - During MRI, care must be taken to place infant in supine position for scan while elevating the areas cephalad and caudal to defect to relieve any pressure from the myelomeningocele area (can use towels or gel donut to relieve pressure off area)
2. **Plain spine x-ray**
    - Obtain plain 2-view x-rays (AP and lateral) of the entire spine to evaluate for tandem lesion (spina bifida occulta) and vertebral anomalies
3. **Echocardiogram.**
    - If a detailed fetal echo was performed and the infant is clinically stable, there is no need for postnatal echocardiogram
    - Otherwise, post-natal echocardiogram prior to myelomeningocele repair

POST OPERATIVE CARE

Surgery will be performed within 48 hours of birth, usually on the first day

1. **Continue latex precautions**
2. **Antibiotics**
    - Pediatric Neurosurgery: Continue Ampicillin and Gentamycin for 48 hours post closure
    - Pediatric Urology: After 48 hours, start Amoxicillin prophylaxis (10 mg/kg once per day) if:
        - Unilateral moderate to severe hydronephrosis on RBUS or
        - Bilateral moderate to severe hydronephrosis on RBUS or
        - Vesicoureteral reflux on VCUG
3. **Monitor for hydrocephalus**
    - Daily monitoring of head circumference and fontanelle size by bedside NICU RN
    - Will obtain head ultrasound as needed
4. **Infant positioning**
    - Keep infant prone or lateral decubitus as much as possible, even with nursing/feeding
    - May lie supine intermittently for cares, including CIC
    - Maintain prone position for 5 days post-closure followed by side-lying for 5 days
    - Will liberalize on post-operative day 11 as wound healing allows
5. **Wound care**

- Dressing to be changed by neurosurgery as needed
- Please call neurosurgery right away for drainage from the wound
- Additional care instructions documented in providers' daily progress notes
- Assess and document drainage and dressing integrity every shift
- MMC defects often closed with Steri-strips
    - Steri-strips should NOT be removed but may be covered
- Sterile drape in place to maintain incision

6. **Bladder care – Neurogenic bladder**
    - Renal bladder ultrasound (RBUS) after closure and once neonate is stable
    - Obtain voiding cystourethrogram (VCUG) if RBUS shows:
        - Unilateral moderate to severe hydronephrosis
        - Bilateral moderate to severe hydronephrosis
    - Start Amoxicillin prophylaxis (10 mg/kg once per day) per urology, if:
        - Unilateral moderate to severe hydronephrosis on RBUS or
        - Bilateral moderate to severe hydronephrosis on RBUS or
        - Vesicoureteral reflux on VCUG
    - Maintain Foley catheter for 48 hours post-op
    - After Foley catheter is removed:
        - May turn baby supine for catheterizations but otherwise prone positioning through post-operative day 5
        - Clean intermittent catheterizations (CIC) every 4 hours for 24 hours
        - Strict recording wet diaper/spontaneous voiding occurrences
        - Instruct parents on CIC and neurogenic bladder care
        - CIC protocol
            - If volume is greater than 10mL 75% of the time, then continue CIC every 4-6 hours
            - If volume is less than 5-9 mL 75% of the time, then CIC 1-2 times per day
            - Record CIC volumes for at least 7-10 days prior to urology appointment
7. **Continue careful skin monitoring**
    - Please monitor skin closely given risk of impaired sensation to lower extremities
8. **Orthopedics**
    - Feet
        - Clubfeet will be casted after discharged
        - All foot deformities may be stretched by PT to prevent progression of contracture
    - Knees – if congenital knee dislocations, use wraps/bolsters to hold legs in position of allowable hip extension and knee flexion to allow joints to progressively relax and improve position

- Hips – if prolonged hospitalization, obtain hip ultrasound when 4-6 weeks old to evaluate for dislocation

9. **Other consults prior to discharge**
    - Rehabilitation Medicine
    - PT
    - OT
    - Speech
    - Nutrition

CONDITIONS TO BE MET PRIOR TO DISCHARGE

1. **Ventricles**
    - Absent/stable ventriculomegaly
    - No clear need for shunt/ETV
2. **Wound**
    - No evidence of breakdown, CSF leak, or infection
3. **Feeding properly/adequate weight gain**
4. **Family/caregiver education**
    - Family understands
        - Wound care
        - Signs and symptoms of hydrocephalus
        - Straight catheterization technique
        - Need for ongoing/lifelong follow up with neurosurgery & urology

POST DISCHARGE

1. **Neurosurgery Clinic**
    - Within 1 week of discharge.
    - Please contact pediatric neurosurgery NP with discharge date to ensure follow up is scheduled
2. **Multi-disciplinary Spina Bifida Clinic**
    - First appointment around 3 months of age
3. **Orthopedics Clinic**
    - For casting of clubfeet with Dr. Bellaire or Dr. Noonan when >3-weeks old
    - For follow-up of congenital knee dislocations 1-2 weeks after discharge
    - Otherwise, will be seen in Spina Bifida Clinic by Dr. Nemeth when 3-months old

Additional questions

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