Newborn Critical Care Center (NCCC) Clinical Guidelines

Management of Gastroschisis

OBJECTIVE
To develop an evidence-based standard of care for the medical and surgical management of gastroschisis.

Exclusions: *This guideline does not apply to patients with complex gastroschisis (including volvulus, atresia, necrotic bowel, or bowel perforation).*

PRE-OPERATIVE MANAGEMENT

Delivery Room

- Avoid bag/mask ventilation when possible; determine the need for intubation and mechanical ventilation based on clinical status. Place warm, pre-soaked gauze roll over bowel during resuscitation if needed.
- Examine the bowel to determine if there is any torsion, ischemia, atresia, perforation, or visceral organ involvement.
- Weigh infant prior to wrapping bowel.
- Place patient in right side-lying position to prevent kinking of the bowel. Reposition as appropriate to prevent torsion/kinking of bowel.
- Wrap exposed bowel and viscera with gauze roll pre-soaked in warm saline.
- Use latex-free products.
- Place wrapped bowel and lower body up to the axillae into "bowel bag" and secure bag opening loosely across upper chest.
- Minimize handling of bowel and monitor color and perfusion of bowel continuously.
- Insert 10Fr Replogle (sump tube) to low, continuous suction for decompression.
- Ask for check type and screen to be sent on cord blood.

Upon Admission

- Use the Neonatal Abdominal Wall Defect Admission Order Set.
- Closely monitor blood pressure, perfusion (peripheral and bowel), and temperature (avoid hypothermia).
- Maintain NPO status with Replogle to low, continuous suction.
- Notify Pediatric Surgery for evaluation and closure planning.
- Keep gauze dressing moist and bowel bag in place until surgical intervention.
- Place peripheral IV for parenteral fluids and antibiotics. There is no contraindication to placing an umbilical venous catheter (UVC) if needed.
- Obtain the following labs:
    1. POCT blood glucose
    2. CBC with differential
    3. Blood culture
    4. Arterial blood gas with lactate
    5. Type and screen (also ensure check type and screen was sent from cord blood)

- The following studies should be done if there is respiratory distress or need for supplemental oxygen:
    1. Arterial (or capillary) blood gas
    2. Chest radiograph
- Initiate IV fluids with D10W @ 80mL/kg/day.
- Obtain initial electrolyte panel 6-8 hours following admission.
- Obtain serial electrolytes every 8 hours, following sodium levels closely.
- Closely monitor intake, output, and clinical signs of hypovolemia during the first 24 - 48 hours after birth (e.g., tachycardia, widened pulse pressure, prolonged capillary refill time, acidosis).
    - Some patients may experience high fluid losses and require volume expansion and replacement fluids. Take care to avoid volume overload.
- For hypovolemia, provide volume expansion with 10 mL/kg of normal saline.
- Replace Replogle output >1 mL/kg/hr 1:1 with 1/2 NS. Consider using NS based on clinical status and sodium levels.
- Adjust fluid volume, sodium additives, and protein additives as needed based on clinical status and laboratory results.
- Inotropic agents should be used with caution.
- Initiate ampicillin and gentamicin.
    - If prolonged time to closure (>7 days), consider discontinuing antibiotics in conjunction with Pediatric Surgery Team.
- If antibiotics were discontinued prior to surgery, restart perioperative antibiotics and discuss length of post-operative antibiotic therapy with Pediatric Surgery Team.

SURGICAL MANAGEMENT

Choice of procedure is dependent on the size of the defect and bowel edema.

Staged Closure with Silo (most defects)

- Place peripheral arterial line (PAL) prior to procedure with initial infusion of isotonic amino acids.
    - Consider removing PAL once respiratory, cardiovascular, fluid/electrolyte and pain status is stable.
    - If removed, consider replacing PAL at the time of final surgical closure.
- For sedation with silo placement provide an initial dose of fentanyl 2 mcg/kg IV. Provide fentanyl bolus PRN for patient needs (e.g., silo reductions).
- Gradual manual reduction of the silo contents will be performed by the Pediatric Surgery team once or twice daily over 5-10 days.
- Closely monitor bowel perfusion during reduction.

Primary Closure – at the bedside (typically for small defects)

- Intubate for bedside procedure.
- Provide sedation with initial dose of fentanyl 2 mcg/kg IV, and consider initiating a fentanyl infusion at 1-2 mcg/kg/hr (titrate for patient needs).
- Surgeon may desire paralytic (vecuronium 0.1 mg/kg IV) for the procedure. Discontinue paralytic after completion of repair.

- At the discretion of the surgeon, the defect may be repaired with a “suture less” closure using an umbilical cord flap followed by placement of an occlusive dressing such as Tegaderm (Diyaolu, Wood & Bruzoni, 2021). Dressing changes per surgical team.
- Place PAL, although may not be needed for small defects.

Primary Closure – in the operating room

- Coordinate with anesthesia and surgical team for timing of procedure.
- If time allows, consider placing a PAL prior to the procedure.
- If the intubation is elective prior to the procedure, coordinate timing of intubation with anesthesia.
- Discuss placement of central line in the OR if needed.

POSTOPERATIVE MANAGEMENT

- Post abdominal closure, monitor for signs of abdominal compartment syndrome: decreased cardiac output, respiratory compromise, and/or compromise of perfusion to kidneys, intestines, and/or lower extremities.
- A PICC or surgically placed central line will be needed to provide adequate parental nutrition due to prolonged ileus following surgery.
- Provide sedation/pain management with a fentanyl infusion and gradually titrate based on infant’s clinical status.
- Mechanical ventilation may be needed based on the presence of contributing respiratory disease process, level of sedation / pain management required, and abdominal compliance.
- Broad spectrum antibiotic therapy will continue for ~48 hours following surgery. Final length of treatment to be decided in conjunction with Pediatric Surgery Team.
- Continue close monitoring of intake and output.
- Fluid shifts often occur following final closure. Adjust fluid volume based on clinical status and laboratory information.
- Maintain Replogle to low, continuous suction. Consider replacing output as needed.
- Enteral feeds may be started (in agreement with Pediatric Surgery team) with demonstrated return of bowel function (tolerating Replogle to straight drain with clear output, passing flatus and/or stool, presence of bowel sounds).
- Monitor closely for signs of necrotizing enterocolitis given increased risk.
- Consider imaging (Upper GI with small bowel follow-through) to evaluate for stricture, atresia, or poor motility if feeding intolerance persists.

References:

Christison-Lagay, E., Kelleher, C., & Langer, J. (2011). Neonatal abdominal wall defects. *Seminars in Fetal and Neonatal Medicine,* 16: 164-172.

Diyaolu M, Wood LS, Bruzoni M. Suture less closure for the management of gastroschisis. Transl Gastroenterol Hepatol. 2021;6(0):31. doi:10.21037/tgh-20-185

Gamba P, Midrio P. (2014). Abdominal wall defects: prenatal diagnosis, newborn management, and long-term outcomes. *Seminars in Pediatric Surgery*, 23: 283-90. DOI: http://dx.doi.org/10.1053/j.sempedsurg.2014.09.009.

Lund, C., Bauer, K. & Berrios, M. (2007). Gastroschisis: Incidence, complications and clinical management in the neonatal intensive care unit. *The Journal of Perinatal and Neonatal Nursing,* 21: 63-8.

Seattle Children's Hospital, Research, and Foundation. (2011, March). Gastroschisis project summary.

Petrosyan M. Closure methods in gastroschisis (2018). *Seminars in pediatric surgery*. 10/2018;27(5):304-308. doi: 10.1053/j.sempedsurg.2018.08.009.

Skarsgard ED. Management of gastroschisis (2016). *Current opinion in pediatrics*. 06/2016;28(3):363-369. doi: 10.1097/MOP.0000000000000336.