CLINICAL PATHWAY:
Fever in a Patient with Intestinal Failure and Central Venous Catheter (CVC)

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.

Inclusion Criteria:

Patients with intestinal failure (surgically resected bowels or with medical conditions resulting in inadequate intestinal function, such as intestinal pseudo-obstruction; often primarily dependent on TPN as a source of nutrition)
AND an indwelling Central Venous Catheter (CVC) such as Broviac, PICC or port who present with:

- temperature (obtained in any way) of ≥38°C or ≥100.4°F **or**
- signs and symptoms suggestive of Central Line Associated Blood Stream Infection (CLABSI) such as hypothermia, fatigue, changes in stool/ostomy output, vomiting, abdominal pain, feeding intolerance, general feeling of ill-being or parental concerns

Exclusion Criteria:

Hematology/oncology patients (see Oncology Patient with Fever Clinical Pathway), bone marrow transplant patients, patients on dialysis, hemodialysis catheters, concern for Multi-System Inflammatory Children in Children (MIS-C) (see MIS-C Clinical Pathway)

Initial ED Management:

ED Triage: Triage ESI level 2

ED RN:

- Make NPO and hold TPN; do not reconnect home TPN after accessing CVL
- Access central venous access device
- Place PIV and start IV fluids

Labs: *obtain cultures prior to antibiotics*

- Obtain aerobic and anaerobic blood cultures from all lumens of CVL **and** aerobic and anaerobic peripheral blood cx
  - If peripheral blood cx delays antibiotics, defer
- CBC w diff, CRP, chem 10, LFTs, Coags, UA/Ucx

Medications:

- Do NOT give NSAIDs
- Hold on giving acetaminophen

ED Provider:

- STAT: Order labs, anaerobic and aerobic blood cultures, and antibiotics[1] (see dosing below) prior to assessing patient
- Obtain H&P
  - Onset of fever, recent antibiotic treatment, hx of infection/bacteremia/sepsis; cause of intestinal failure, hx of organ transplantation, medication hx (immunosuppressive agents), prior PICU admissions due to CLABSI
- Consider further work up as indicated:
  - Type and screen (if patient appears anemic or low H/H documented from clinic)
  - Cortisol (if long term corticosteroids or shock; if abnormal, discuss with Endocrinology)
  - CXR, COVID-19/flu/RSV PCR (if respiratory symptoms). If viral testing negative, consider sending respiratory BioFire if results will alter management.
  - AXR (if vomiting, abdominal distention, etc.)
  - GI BioFire (if abnormal stooling patterns, etc.)
- Contact GI On-Call to prep for inpatient admission

Signs of sepsis: Notify attending/fellow immediately and proceed to Septic Shock Pathway

[1]GIVE ANTIBIOTICS WITHIN 1 HOUR OF PRESENTATION!

Do not wait until labs have returned to start antibiotics.

- **Start empiric antibiotics and give through CVL if patent; rotate infusions through each lumen:**
  - Ceftazidime IV 150 mg/kg/day div q8hr (max 2 g/dose) - *give first* **AND**
  - Vancomycin IV – *start after ceftazidime*
    - ≤44 weeks PMA‡/about ≤1 month old: 15 mg/kg x1
    - >44 weeks PMA‡/about >1 month old: 20 mg/kg x1 (initial max dose 2 g/dose)
    - Subsequent dosing per hospital pharmacy vancomycin protocol to avoid AKI
- *If allergic to ceftazidime:*
  - If no renal dysfunction[1]: piperacillin/tazobactam IV 300 mg/kg/day div q6hr (max 4.5 g/dose) **AND** vancomycin IV
  - If renal dysfunction[1]: ciprofloxacin IV 30 mg/kg/day div q8hr (max 400 mg/dose) **AND** Vancomycin IV
- *If other drug allergy exists or history of multi-drug resistant organism:* consult GI and Infectious Diseases (ID)

‡PMA (Post-Menstrual Age) = gestational age + postnatal age

[1]**Definition of Acute Kidney Injury (AKI)**
(It should be noted that this definition does not apply to children <1 year of age)

AKI is defined by having either:

- At least a 50% increase in Scr above baseline* and new Scr ≥0.5 mg/dL OR
- An increase by 0.3 mg/dL from baseline*, and new Scr ≥0.5 mg/dL

*If a baseline creatinine is unknown, estimate baseline Cr using the Schwartz Calculation ($baseline\ creatinine = (0.413 * \text{height } cm)/120\ GFR$). For patients with Chronic Kidney Disease (CKD), use the CKiD U25 Calculator.

- Observe the patient in the ED for 1 hour after first antibiotic dose finishes (there is a risk of endotoxic shock that can occur after the first antibiotic dose)
- Transfer to Med/Surg vs PICU depending on clinical stability

Inpatient Care

- Continue empiric antibiotics for 36 hours and discontinue if blood culture negative.
  - If blood culture is positive, use blood culture and BCID results to narrow and tailor antibiotics. Duration of antibiotics will depend on organism and whether CVL is retained or removed – consider ID consultation.
- Consult ID if: history of multi-drug resistant organism, blood culture is positive, or team wishes to continue vancomycin beyond 36 hours (or use another restricted antimicrobial)
- Repeat daily blood cultures from all lumens until 1 set of blood cultures is negative for 48 hours
- Discussion on salvage of line per primary team (GI)
- Hold enteral feeds for 24 hours due to increased risk of bacterial translocation

Discharge Criteria/Instructions:

Clinically stable, negative blood cultures with antibiotic plan in place, follow up plan in place

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