Clinical Pathways

Fever in Patients with Intestinal Failure and Central Venous Catheter (CVC)

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An evidence-based guideline that decreases unnecessary variation and helps promote safe, effective, and consistent patient care.

Objectives of the Pathway



- Ensure effective and efficient treatment for febrile intestinal failure patients with indwelling catheters
- Provide standard of care practices among these patients upon presentation to the Emergency Department
- Decrease time to administration of antibiotics
- Identify potential areas of process improvement



Patients with Intestinal Failure (IF) often require central venous catheter (CVCs) for extended periods of time used for administration of parenteral nutrition (PN), which is required to maintain adequate growth and hydration.

This puts them at a risk of recurrent <u>central-line associated bloodstream</u> <u>infections</u> (CLABSIs), with rates being higher than other pediatric patients with central lines.





Bacterial translocation in patients with short bowel syndrome (SBS) is thought to contribute to the risk for recurrent CVC infection.

Septic complications, related to catheter-related <u>bacteremia</u> and <u>liver failure</u>, are the leading causes of morbidity and mortality in these PN-dependent patients.

Background: Frequency



In 2018, Szydlowski *et. al* performed a five-year retrospective study^a which showed **69% positivity**, with 60% being **enteral organisms**.

- Other pediatric populations with CLIs mostly have gram+ organisms.
- More than double of Heme-Onc patients with BSIs (20-30%).

Drews *et. al*'s two-year retrospective study^b in 2009 showed **62% positivity**.

Central blood culture pathogens ($N = 501$)	Ν	%	
*denotes Enteric organisms			
*Klebsiella species	99	19.8	
Coagulase-negative Staphylococcus	89	17.8	
*Escherichia coli	51	10.2	
*Enterococcus faecalis	46	9.2	
Candida species	41	8.2	
Methicillin-sensitive Staphylococcus aureus	37	7.4	
*Enterobacter species	35	7.0	
Methicillin-resistant Staphylococcus aureus	12	2.4	
*Vancomycin-resistant Enterococci	11	2.2	
Alpha-hemolytic Streptococcus	10	2.0	
*Bacillus species non-anthracis	10	2.0	
*Lactobacillus species	9	1.8	
* Citrobacter species	9	1.8	
*Serratia marcescens	8	1.6	
*Acinetobacter species	8	1.6	
* Proteus mirabilis	6	1.2	
Streptococcus pneumoniae	4	0.8	
Streptococcus, Non-hemolytic	3	0.6	
*Leuconostoc species	3	0.6	
*Pseudomonas	2	0.6	
Group B Streptococcus	2	0.6	
*Aeromonas hydrophila	1	0.2	
*Diphtheroids	1	0.2	
*Kluyvera ascorbata	1	0.2	
Neisseria species not Neisseria meningitides	1	0.2	
* Pantoea (Enterobacter) agglomerans	1	0.2	
Stenotrophomonas (Xanthomonas) maltophilia	1	0.2	
			-

a Children's Hospital of Pittsburgh b Children's Medical Center of Dallas



Blood Cultures

- Obtain culture from catheter tip
- Obtain both peripheral and central cultures

Treatment

- Vancomycin is recommended for institutions with high MRSA rate
- Empirical coverage for gram-negative bacilli based on local resistance pattern



There is a research-proven association between time to antibiotics (TTA) to survival in patients with sepsis or septic shock.

- A study^d published by Gaieski *et al.* in 2010 showed improved survival among patients who had TTA <1hr
- In 2006, Kumar *et al.* also showed that each hour's delay to TTA was associated with about 7.6% increase in mortality



Therefore, there are many efforts across different institution to reduce the time to antibiotics (TTA) for these patients.

- Hudgins *et al.* (2017) study^c found a reduction to TTA with the initiation of a QI
 project for increased education and order set initiation
 - \circ Mean TTA decreased from 112 to 39 minutes
 - ED LOS decreased from 286 to 247 minutes

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 a temperature of ≥38°C or ≥100.4°F or Present with 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: ED Provider: Make NPO and hold TPN; do not reconnect home TPN after accessing CVL • STAT: Order labs, anaerobic and aerobic blood Access central venous access device cultures, and antibiotics1 (see dosing below) prior to Place PIV and start IV fluids assessing patient Obtain H&P .abs: obtain cultures prior to antibiotics Onset of fever, recent antibiotic treatment, hx of Obtain aerobic and anaerobic blood cultures from infection/bacteremia/sepsis; cause of intestinal all lumens of CVL and aerobic and a naerobic failure, hx of organ transplantation, medication peripheral blood cx hx (immunosuppressive agents), prior PICU If peripheral blood cx delays antibiotics, defer admissions due to CLABSI CBC w diff, CRP, chem 10, LFTs, Coags, UA/Ucx Consider further work up as indicated: Type and screen (if patient appears anemic or 1edications low H/H documented from clinic) Do NOT give NSAIDs Cortisol (if long term corticosteroids or shock; if Hold on giving acetaminophen 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 ¹GIVE 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 g8hr (max 2 g/dose) - give first AND Vancomycin IV (max: 3 g/day) – start after ceftazidime <52 weeks PMA[†]/about <3 mo old: 15 mg/kg q8hr or as determined by pharmacy based on estimated AUC</p> ≥52 weeks PMA[†]/about ≥3 months old – 11 years old: 70 mg/kg/day div q6hr ≥12 yrs old: 60 mg/kg/day div q8hr If alleraic to ceftazidime: 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 Observe the patient in the ED for 1 hour after first antibiotic dose finishes (there is a risk of gram negative 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 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 blood culture is negative x2 days 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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Pathway.

We will be reviewing each component in the following slides.

This is the Intestinal Failure with Fever Clinical

Inclusion Criteria:

This pathway is specifically for patients with intestinal failure who also have an indwelling CVC (Broviac, PICC, or port) and presents with:

- fever, **or**
- signs suggestive of a CLABSI (Central Line Associated Blood Stream Infection).

Exclusion Criteria:

This pathway should exclude any oncology patient (who should instead follow the Oncology Patient with Fever Clinical Pathway), bone marrow transplant patients, patients on dialysis or have hemodialysis catheters. These patients require separate work up and management plans.

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

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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 a temperature of ≥38°C or ≥100.4°F or
- Present with 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)

CXR, COVID-19/III/IKSV PCR (if respiratory symptoms). If vinit testing negative, consider sending respiratory BioFire if results will alter margement. 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

³GIVE 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 (max: 3 g/day) start after ceftazidime
- <52 weeks PMA[†]/about <3 mo old: 15 mg/kg q8hr or as determined by pharmacy based on estimated AUC</p>
- ≥52 weeks PMA[†]/about ≥3 months old 11 years old: 70 mg/kg/day div q6hr
- ≥12 yrs old: 60 mg/kg/day div q8hr

If allergic to ceftazidime.

- 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

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

If the patient meets the inclusion criteria:

- They will first be triaged and cared by the nursing team.
- The MD/Provider will initiate the pathway's order set, which will include orders for labs and antibiotics.
- There will then be simultaneous assessments done by the provider, and lab collection/antibiotics preparation and administration by the RN.
- The patient will then be treated and observed.

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 Bro Initial ED Management: ED Triage: Triage ESI level 2 ED RN: ED Provider: Make NPO and hold TPN; do not reconnect home TPN after accessing CVL Access central venous access device Place PIV and start IV fluids assessing patient Obtain H&P • Labs: obtain cultures prior to antibiotics Obtain aerobic and anaerobic blood cultures from all lumens of CVL and aerobic and a naerobic 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

- STAT: Order labs, anaerobic and aerobic blood cultures, and antibiotics¹ (see dosing below) prior to
- 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 0 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

	*
	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
•	Consult ID if: history of multi-drug resistant organism, blood culture is positive, or team wishes to continue vancomycin beyond 36 hour (or use another restricted antimicrobial)
•	Repeat daily blood cultures from all lumens until blood culture is negative x2 days
•	Discussion on salvage of line per primary team (GI)
•	Hold enteral feeds for 24 hours due to increased risk of bacterial translocation
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$ \land$	Discharge Criteria/Instructions:

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

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

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Triage and Nursing

- Triage the patient and place in an exam room *as soon as possible*
- Obtain vitals
- Notify the ED provider immediately if the patient:
 - Has abnormal vitals (e.g., fever, tachycardia, widened pulse pressure, hypotension)
 - O Appears ill
 - Has altered mental status or is lethargic
 - Or, if the patient's parent has significant concerns
- Make NPO and hold TPN; be sure not to reconnect the home TPN after accessing the CVL

Labs:

- Before giving antibiotics, obtain cultures (both aerobic and anaerobic cultures) and labs. Label the specimens accordingly.
- LFTs: gram negative sepsis is a risk factor for cholestasis

Medications:

 HOLD on giving acetaminophen until labs obtained and do *not* give NSAIDS

	Initial ED Management:	Ing Central Venous Catheter (CVC) such as Broviac, PICC or port who:
ED RN:	ED Triage: Triage ESI level 2	
 Make NPO and hold TPN; do not reconnect home 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 a naerobic peripheral blood cx If peripheral blood cx delays antibiotics CBC w diff, CRP, chem 10, LFTs, Coags, UA/Ucx Medications: Do NOT give NSAIDs Hold on giving acetaminophen 	s, defer •	 <u>ED Provider:</u> STAT: Order labs, anaerobic and aerobic blood cultures, and antibiotics¹ (see dosing below) prior to assessing patient Obtain H&P Onset of fever, recent antibiotic treatment, hx or 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
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CLINICAL PATHWAY: Fever in a Patient with Intestinal Failure and Central Venous Catheter (CVC)

If blood culture is positive, use blood culture and BCID results to narrow and tailor antibiotics

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(or use another restricted antimicrobial)

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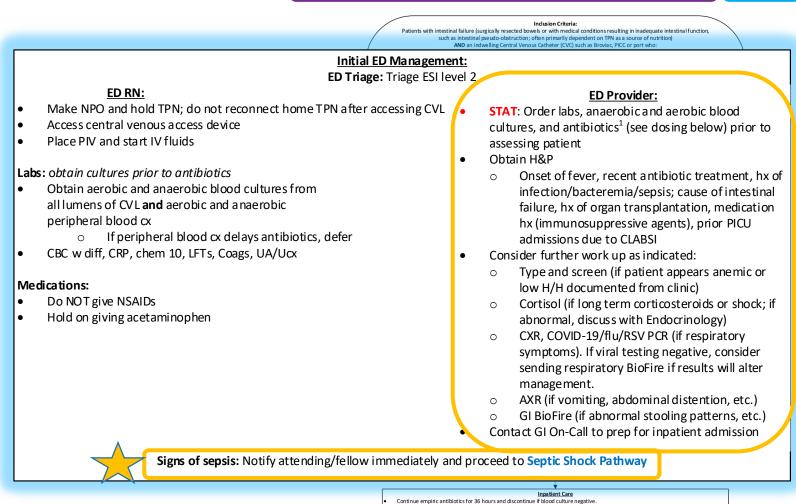
Discussion on salvage of line per primary team (GI)

Consult ID if: history of multi-drug resistant organism, blood culture is positive, or team wishes to continue vancomycin beyond 36 hours

Discharge Criteria/Instructions:

Provider Role:

- The provider will order cultures, labs, and antibiotics *prior to* assessing the patient.
- The provider will then assess the patient. If the patient is in septic shock, the provider should proceed to the Septic Shock Clinical Pathway.
- The H&P should include specific questions listed here
- Additional tests can be considered, as necessary
- The provider will then call the on-call GI attending and prepare for inpatient admission



Antibiotics:

- The goal is to give antibiotics *within* 1 hour of initial presentation.
- Give antibiotics through CVL if patent, rotating through each lumen.
- Empiric antibiotics include:
 - Ceftazidime (give first), AND
 - Vancomycin (give second)
- If there is an allergy to ceftazidime:
 - o Use ciprofloxacin (in place of ceftazidime) AND vancomycin
- If there are additional/other drug allergies, consult GI and Infectious Diseases for further management

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 a temperature of ≥38°C or ≥100.4°F or Present with 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 oncern for Multi-System Inflammatory Children in Children (MIS-C) (see MIS-C Clinical Pathwa 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) - qive first AND Vancomycin IV (max: 3 g/day) – start after ceftazidime <52 weeks PMA[†]/about <3 mo old: 15 mg/kg q8hr or as determined by pharmacy based on estimated AUC \geq 52 weeks PMA[‡]/about \geq 3 months old – 11 years old: 70 mg/kg/day div g6hr ≥12 yrs old: 60 mg/kg/day div g8hr

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Additional Interventions:

- Acetaminophen:
 - If there is evidence of liver dysfunction, consult with the on-call GI provider prior to administering
 - Acetaminophen can be given for temperatures above 38°C (101°F) or pain if:
 - the patient has no evidence of liver dysfunction (or cleared by GI to give)
 - has not yet received acetaminophen, or
 - it has been 6 hours since the last dose
 - Dose: give 15 mg/kg PO. Do not administer it PR.

AND an indwelling Central Venous Catheter (C Present with a temperature of ≥38°C or ≥100.4°F <u>or</u> Present with signs and symptoms suggestive of Central Line <i>i</i>	Associated Blood Stream Infection (CLABSI) such as hypothermia, fatigue, feeding intolerance, general feeling of ill-being or parental concerns
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Observation and Transfer of Care:

Observation:

- Observe the patient in the ED for 1 hour after the first antibiotic dose *finishes*
 - Patients with intestinal failure and CVCs are at risk of gram negative endotoxic shock, which usually occurs *after* the first antibiotic dose

Transfer:

 Transfer the patient to the med/surg floors or the PICU after clinical assessment and consultations with GI and/or PICU teams

Fev	Ver in a Patient with intestinal Failure and Central Venous Catheter (CVC)	REPLACE CLIN JUDGMENT.
	Indusion Criteria: Patients with intestinal failure (surgically resected bowels or with medical conditions resulting in inadequate intestinal function, such as intestinal geeudo-obstruction; often primarily dependent on TPN as a source of nutrition) AND an indueling Central Venous Catheter (CVC) such as Broviac, PICC or port who: • Present with a temperature of 238°C or 2100.4°F or • Present with signs and symptoms suggestive of Central Line Associated Blood Stream Infection (CLABSI) such as hypothermia, changes in stoc/lostomy output, vomiting, abdominal pain, feeding intolerance, general feeling of il-being or parental concer • Ecclusion Citeria: Hematology/oncology patients (see Oncology Patient with Fever Clinical Pathway), bone marrow transplant patients, patients on dialysis, hemodalysis catheters, concern for Multi-System inflammatory 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 Phace PIX and start IV/fuids StAT: Order labs, anaerobic and aerobic blood cutures, and antibiotics' (see dosing below) prior to assessing patient	
	Obtain H&P Labs: obtain cultures prior to antibiotics Obtain aerobic and anaerobic blood cultures from Obtain aerobic and anaerobic blood cultures from	

CLINICAL PATHWAY:

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

symptoms). If viral testing negative, consider sending respiratory BioFire if results will alter
management.
 AXR (if vomiting, abdominal distention, etc.)
Grigo
Contact GI On-Call to prep for inpatient admission
Signs of sepsis: Notify attending/fellow immediately and proceed to Septic Shock Pathway
³ 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 (max: 3 g/day) – start after ceftazidime <52 weeks PMA⁴/about <3 mo old: 15 mg/kg a8hr or as determined by pharmacy based on estimated AUC
 S2 weeks PMA /about <3 mo oid: 15 mg/kg dain of as determined by phamacy based on estimated AOC ≥52 weeks PMA[†]/about ≥3 months old – 11 years old: 70 mg/kg/day div g6hr
 ≥12 vrsold: 60 mg/kg/day div q8hr
If allergic to ceftazidime:
 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
Observe the patient in the ED for 1 hour after first antibiotic dose finishes (there is a risk of gram negative endotoxic shock that can occ
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
Consult ID if: history of multi-drug resistant organism, blood culture is positive, or team wishes to continue vancomycin beyond 36 hou
(or use another restricted antimicrobial) Repeat daily blood cultures from all lumens until blood culture is negative x2 days
Discussion on salvage of line per primary team (GI)
Hold enteral feeds for 24 hours due to increased risk of bacterial translocation
Discharge Griteria/Instructions:
Clinically stable, negative blood cultures with antibiotic plan in place, follow up plan in place

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THIS PATHWAY SERVES AS A GUI

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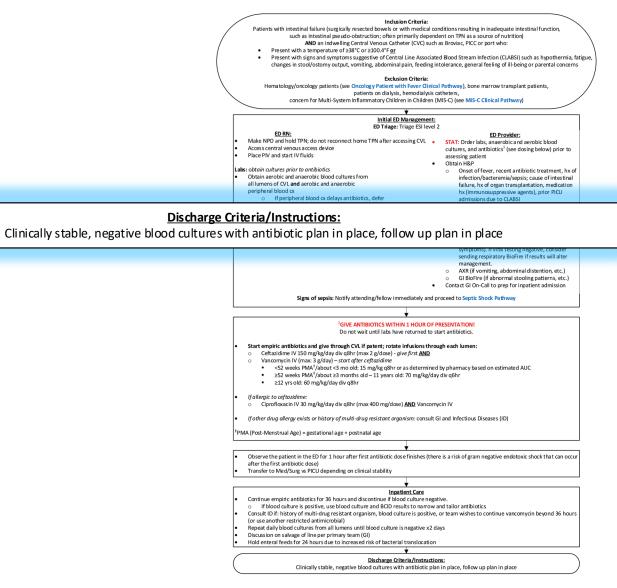
Inpatient Care

- Note that enteral feeds should be HELD for 24 hours!
- Empiric antibiotics should continue until cultures from all lumens are negative for 36 hours.
- If the blood culture is positive, utilize sensitivities and BCID results to tailor antibiotics.
- Blood cultures should be repeated until cultures are negative for 2 days.
- Considerations for consulting ID are listed here.
- Discussions on salvaging the line is per the primary team.

	Indusion 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 a temperature of 238° C or 2100.4°F or Present with a 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 all-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: ED Provider:
	Make NPO and hold TPN; do not reconnect home TPN after accessing CVL STAT: Order labs, anaerobic and aerobic blood Access central vanous access device
<u>Inpatier</u>	
Continue empiric antibiotics for 36 hours and discontinue if blood	culture negative.
If blood culture is positive, use blood culture and BCID result	s to narrow and tailor antibiotics.
Consult ID if: history of multi-drug resistant organism, blood cultur	re is positive, or team wishes to continue vancomycin beyond 36 hours
(or use another restricted antimicrobial)	
Repeat daily blood cultures from all lumens until blood culture is n	egative x2 days
Discussion on salvage of line per primary team (GI)	
Hold enteral feeds for 24 hours due to increased risk of bacterial to	malecation
Fiold enteral leeds for 24 mours due to indicased fisk of bacterial ti	O OF DISTING IN BUILDING SCONE (FRANCE 113, 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 gßhr (max 2 g/dose) - give f/rst <u>AND</u> Vancomycin IV (max 2 g/day) - start direc ceftadiame • Vancomycin IV (max 2 g/day) - start direc ceftadiame • Sz weeks PMA//about 23 moold: 15 mg/kg gßhr or as determined by pharmacy based on estimated AUC • SZ weeks PMA//about 23 monits old - 11 years old: 70 mg/kg/day div gßhr • 212 yrs old: 60 mg/kg/day div g8hr
	If allergic to ceftazidime: Ciprofloxacin IV 30 mg/kg/day div q8hr (max 400 mg/dose) <u>AND</u> 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
	Observe the patient in the ED for 1 hour after first antibiotic dose finishes (there is a risk of gram negative endotoxic shock that can occur
	Observe the patient in the CD of a floor after hiss antibook dose finishes (there is a fisk of gram negative endotoxic shock that can occur after the first antibiotic dose) Transfer to Med/Surg vs PKU depending on clinical stability
	Continue empiric antibiotics for 36 hours and discontinue if Blood culture negative. O If blood culture is positive, use blood culture and 800 results to narrow and tailor antibiotics Consult ID if: history of multi-dug resistant organism, blood culture is positive, or team wishes to continue vancomycin beyond 36 hours (or use another restricted antimicrobia) Repeat daily blood cultures from all unrens until blood culture is negative x2 days Discussion on salvage of line per primary team (GI) Hold enteral feeds for 24 hours due to increased risk of bacterial translocation
	Continue empiric antibiotics for 36 hours and discontinue if blood culture negative. o If blood culture is positive, use blood culture and BCD results to narrow and tailor antibiotics Consult ID is 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 blood culture is negative x2 days Discussion on salvage of lume per primary team (GI)

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Discharge Criteria:

 Discharge criteria includes clinical stability, negative blood cultures with an antibiotic plan in place, and adequate follow up in place after discharge.

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LAST UPDATED: 0

Quality Metrics



- % patients with pathway order set usage
- Time from ED arrival to antibiotic order
- Time from antibiotic order to administration
- Time from ED arrival to antibiotic administration
- ALOS (ED, minutes)
- ALOS (IP/OBS days)

Pathway Contacts



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- Karan Emerick, M.D.
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About Connecticut Children's Pathways Program

Clinical pathways guide the management of patients to optimize consistent use of evidence-based practice. Clinical pathways have been shown to improve guideline adherence and quality outcomes, while decreasing length of stay and cost. Here at Connecticut Children's, our Clinical Pathways Program aims to deliver evidence-based, high value care to the greatest number of children in a diversity of patient settings. These pathways serve as a guide for providers and do not replace clinical judgment.