Clinical Pathways Program

Guideline: PEDIATRIC CYCLIC VOMITING SYNDROME, INPATIENT AND EMERGENCY DEPARTMENT

Updated: August 26, 2022

Clinical algorithm:

Evaluation Phase

Inclusion Criteria:
- At least 4 vomits an hour for 1 hour
- Intense attacks last 1 hour to 10 days and are at least a week apart
- 5 attacks total or 3 in 6 months
- Attacks are stereotypical for that individual

Do not delay IVF and abortives administration.

Work-up:
- CMP, phosphorous, magnesium, POC glucose PRIOR TO HYDRATION
- Urine pregnancy test for all pubertal females
- EKG if not previously obtained or known history of cardiac disease

Review records and if not previously done:
- Upper GI series to evaluate for malrotation
- Abdominal US to evaluate for hydronephrosis / UPJ obstruction

Consider at any time:
- Ultrasound of the abdomen & pelvis
- Lipase
- CT Abdo/ Pelvis
- esophagastroduodenoscopy

Consider during an attack:
- ALT/GGT
- lipase +/- amylase

All attacks precipitated by:
- fasting
- intercurrent illness
- high protein meal

Result of testing explains vomiting.

No findings suggestive of another disorder

Consider brain MRI or quick MRI to look for hydrocephalus

Obtained at the beginning of attack before IV fluid:
- glucose
- electrolytes for anion gap
- urine ketones
- lactate
- ammonia
- serum amino acids
- urine organic acids
- consider plasma carnitine & acylcarnitine
- Beta OH-butyrate

Abnormal neurologic exam:
- Severe alteration of mental status
- Abnormal eye movements
- Papilledema
- Motor asymmetry
- Gait abnormality
(*May not need metabolic evaluation)

Brain MRI, EEG

Probable Cyclic Vomiting Syndrome.

Refer to Treatment Phase Algorithm.
Treatment Phase

**Emergency Department Phase**

**HIGHEST PRIORITY:**
- D10 0.9NS + 20 mEq KCl at maintenance rate after labs.
- Correct emetogenic ketosis
- Use Y connector for other meds/ saline boluses as needed

**ABORTIVES:**
- IV ketorolac 0.5-1 mg/kg max MAX 30 mg
- Famotidine 0.25 mg/kg IV max 20 mg
- Ondansetron 0.3 mg/kg max 16 mg
- Children over 12 in first few hours: sumatriptan 6 mg SQ or nasal spray 20 mg
- For patients with known CVS diagnosis presenting with ER protocol incorporate abortives and sedatives as per personalized protocol

**Initial 24 hours:**
- FEN: D10 0.9NS + size appropriate KCl, correct losses.
- Analgesic: ketorolac 0.5 mg/kg IV q6h
- Famotidine 0.25 mg/kg IV max 30 mg q 6h
- Anti-emetic: Schedule ondansetron 0.3 mg/kg IV max 8 mg q8h
- Sedation: Schedule lorazepam 0.1 mg/kg IV q6h max starting 2 mg
- Low stimulation in the patient’s room.
- Alternative: schedule prochlorperazine 0.5-1 mg/kg IV q8h max 10 mg with diphenhydramine 1 mg/kg IV q8h (less effective than lorazepam), could consider both.
- Vitals: Routine VS w/a and non-stim VS with continuous pulse ox while asleep – assess for Sato Variant, hypertension associated variant of CVS
- Assess for comorbidity: cannabis use – add heat packs PRN, hot showers

**Symptoms not resolved, admit to Pediatric Hospitalist.**

**NO IMPROVEMENT**
- 24-48h Add olanzapine 2.5-5 mg qHS x3 days, space 1 hour from lorazepam (alternative haloperidol). Obtain EKG
- At 48 hours recheck electrolytes – if anion gap >1.8 initiate PPN early at 1.5 g/kg aminos acids. However if metabolic labs not normal at admit and/or concerning metabolic history, biochemical genetics consult before PPN.
- At 48h consider GI consult.
- At 48h consider brain MRI or quick MRI to look for hydrocephalus if not yet obtained.

**IMPROVEMENT:**
- > 24 hours + tolerating some PO/ symptoms better?
- Trial sedatives as PRN nausea first.
- Trial ondansetron as PRN second.
- Allow regular diet.
- PT consult if deconditioning

**START PROPHYLAXIS (PPX) ONCE TOLERATING PO:**
- Discharge on prophylactic for severe CVS (requiring hospitalization) – Start while admitted once tolerating PO.
- First line cyproheptadine 0.25-0.5 mg/kg/day BD-TID, or single night time dose if excessive daytime sedation. MAX 4 mg/dose or 12 mg /day.
- Alternatives:
  - Over age 5 amitriptyline 0.2-0.3 mg /kg./day qHS increase 5-10 mg weekly. Obtain baseline EKG.
  - Second line Propranolol

**IF PATIENT HAS THE FOLLOWING COMORBIDITIES ADD ADDITIONAL PROPHYLAXIS AT DISCHARGE WITH:**
- Catamenial pattern: continuous low dose birth control
- Migraine: neurology consult for recommendations for PPX (propranolol, topiramate)
- Mitochondrial dysfunction L carnitine (50-75 mg/kg/day) and riboflavin (10 mg/kg/day), expect improvement after 3-4 months
- POTS, high salt diet

**Diet:** regular meals, no fasting for all patients. If fasting is trigger, high carb snacks between meals, before bed or exertion.

**Exercise:** Regular, or referral to PT if de-conditioning

**Sleep:** hygiene discussion, melatonin 3-10 mg qHS if poor sleep or fatigue

**Discharge planning:**
- Refer to Pediatric Gastroenterology
- Patient should have a protocol to present to ER. It should state diagnosis and medications which were effective as abortives – if known. The need for prehydration labs and early D10 containing fluids should be emphasized.
- If evidence of hypertension and extreme lethargy, next ER presentation should include testing for HPA axis dysfunction (sato variant) if presenting within 1.5 h of symptom onset including ACTH, cortisol, ADH.
Clinical guideline summary

CLINICAL GUIDELINE NAME: Pediatric Cyclic Vomiting Syndrome

PATIENT POPULATION AND DIAGNOSIS: Pediatric patients 3 years to 18 years who present to the emergency department or inpatient with recurrent episodes of nausea and emesis.

APPLICABLE TO: Helen DeVos Children’s Hospital

BRIEF DESCRIPTION: This practice pathway covers the diagnosis, workup, and acute management of pediatric cyclic vomiting syndrome.

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OWNING EXPERT IMPROVEMENT TEAM (EIT): Pediatric Hospitalist

MANAGING CLINICAL PRACTICE COUNCIL (CPC): Children’s Health

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OTHER TEAM(S) IMPACTED: Nursing, Pharmacy, Physical Therapy

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References:


Li B. Managing Cyclic vomiting syndrome in children: beyond the guidelines European J of Peds 2018 (177)1435-1442.

NASPHAGN consensus statement on the diagnosis and management of Cyclic Vomiting syndrome. J of Pediatric Gastroenterology and Nutrition 2008 (47) 379-393.