Management of Pediatric Post-Endoscopy Fever: Reducing Unnecessary Healthcare Utilization with a Clinical Care Guideline

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BACKGROUND

- Endoscopy is a common procedure to diagnose & manage GI disease in children
- Limited published data on adverse events (AE) in pediatric endoscopy
- 21.6% of AE's reported at our institution related to fever[1]

AIMS

- To examine rates of post-endoscopy fever (PEF)
- To describe clinical outcomes associated with PEF
- To evaluate the effect of a care algorithm in managing PEF cases

METHODS

- Prospective database of fever episodes within 72 hours following endoscopy at CHCO
- Fever episodes captured by parental report, ED visit, and/or hospital admissions
- 8-year period (July 2010-Dec 2018)
- 33 months into study period, PEF Clinical Care Guideline (CCG) was created (Figure 1) to standardize care and reduce unnecessary referrals
- Compared rates of hospital utilization before & after implementation of CCG

RESULTS

Figure 1. Post-Endoscopy Fever Clinical Care Guideline

Inclusion Criteria			Exclusion Criteria
□ Patient with temperature of ≥100.5 °F			□ Patient with central line
□ Patient has had a [a]GI procedure within the past 72 hours			□ On immunosuppression other than steroids or any transplant patient
**Categorize patient into the highest acuity level (green, yellow, red) that they are eligible for			
Data	**Green**	**Yellow**	**Red (must have ≥ 3 elements)**
[b]ASA	1	≥2	≥ 3
Interventional procedure	–	+	+
On steroids (any other immunosuppression should exclude patient)	–	+	+
Fever duration (hours)	<24	24-48	>48
General Appearance	Well	Sick, but not impacting [c]ADL's	Ill-appearing, impacting ADL's
[d]URI signs/symptoms and/or ill contacts	+	–	–
New GI signs/symptoms	–	+	+
Poor hydration	–	–	+
Interventions	**Green**	**Yellow**	**Red**
	□ Tylenol □ Refer to [e]PCP □ Call GI clinic with changes: • Fever >24 hr • Impact on ADL • Poor hydration • Vomiting • Diarrhea • Bleeding • New abdominal pain □ Route encounter to primary GI [f]MD/[g]RN	□ If 1 sign/symptom, follow Level 1 □ If ≥2 signs/symptoms, follow Level 2	□ Outpatient Fellow/Attending to determine level of intervention □ Family may anticipate call back within 30 minutes □ Encourage call back to GI Triage Line should provider response not occur within 30 minutes or if any concerning changes (see list) □ For life-threatening concerns, instruct family to call 911 or visit local [h]ED
		Level 1: □ Tylenol □ Monitor □ Call GI clinic *next day* to provide update or sooner with concerning changes (see list) □ Route encounter to primary GI MD/RN	Level 2: □ Tylenol □ Monitor □ Call GI clinic *later in day* to provide update or sooner with concerning changes (see list) □ Route encounter to primary GI MD/RN
		Level 1: □ GI office visit within 24 hours □ Route encounter to primary GI MD/RN *and* outpatient on-call providers	Level 2: □ ED referral □ Route encounter to primary GI MD/RN *and* outpatient on-call providers

Table 1. Characteristics of Post-Endoscopy Fever Cases

	Pre-CCG (n=41)	Post-CCG (n=109)	Total (n=150)	p-value
Average Age (SD)	6.53 years (±5.33 years)	8.21 years (±5.05 years)	7.76 years (±5.18 years)	0.08
Gender	M = 27 (65.9%) F = 14 (34.1%)	M = 59 (54.1%) F = 50 (45.9%)	M = 86 (57.3%) F = 64 (42.7%)	0.20
Interventional Procedure	11 (26.8%)	21 (19.3%)	32 (21.3%)	0.31
Procedures done by GI fellow	17 (41.5%)	38 (34.9%)	55 (36.7%)	0.46
Identified Endoscopy-Related Infection	2 (4.9%)	4 (3.7%)	6 (4.0%)	0.74
Rate of Post-Endoscopy Fever	41/6207 (0.66%)	109/20893 (0.52%)	150/27100 (0.55%)	0.20

- Of 150 PEF cases, only 6 patients had identified endoscopy-related infection (4.0% of fever cases and 0.02% of all endoscopies)
  - 3 patients with perforation
  - 2 patients with aspiration pneumonia
  - 1 patient had percutaneous liver biopsy at the time of EGD was and found to have cholangitis with bacteremia

Table 2. Post-Endoscopy Fever Outcomes

Fever Category	Pre-CCG (n=41)	Post-CCG (n=109)	p-value
Grade 1: Phone call/ Observation	12 (29.3%)	72 (66.1%)	<0.0001*
Grade 2: ED/Office visit	20 (48.8%)	30 (27.5%)	0.01*
Grade 3: Admission/ Antibiotics	8 (19.5%)	5 (4.6%)	0.004*
Grade 4: PICU/Surgery	1 (2.4%)	2 (1.8%)	0.81
≥Grade 2	29 (70.7%)	37 (33.9%)	<0.0001*

- ED visits and admissions declined significantly following introduction of the PEF CCG with no observed adverse patient outcomes associated with use of the CCG

Table 3. Rates of Fever by Type of Procedure

Procedure Type	Rate of Fever	p-value
Diagnostic Procedures (n=23,150)	0.51%	0.02
Interventional Procedures (n=3,950)	0.81%	
Total Procedures (n=27,100)	0.55%	

DISCUSSION

- Fever is mediated by circulating pyrogens (IL-1, IL-6, TNF-α) released in response to infectious pyogens *or* non-infectious inflammatory states, tissue damage, and toxins[2, 3]
- PEF in children rarely represents clinically significant infection & may be due in part to inflammation from tissue damage and/or physiologic stress
- Unanticipated care for the assessment of PEF is costly & can result in unneeded hospitalization, diagnostic testing, and patient/caregiver anxiety
- Implementation of a a PEF CCG may reduce unnecessary care while maintaining patient safety, although multi-center studies are needed to confirm overall safety of similar CCG's
- Rates of PEF were significantly higher in interventional cases than purely diagnostic endoscopy, which may support the hypothesis that fever in the majority of these cases may be related to release of inflammatory cytokines, proportional to the degree and/or duration of mucosal contact

REFERENCES

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