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A Descriptive Study on Causes and Management of Vomiting Among Children Admitted to Gastroenterology and Hepatology Unit of Assiut University Children Hospital

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Abstract

Introduction: Vomiting is a complex behavior. It is usually composed of three linked activities: nausea, retching and expulsion of stomach contents. In a recent comprehensive publication, nausea is defined as unpleasant sensation of the imminent need to vomit, usually referred to the throat or epigastrium; a sensation that may or may not ultimately lead to the act of vomiting. Vomiting, in contrast, is a physical event that results in rapid forceful evacuation of gastric contents in retrograde manner from stomach up to and out of mouth.

Patients and methods: One year descriptive cross sectional study included 1301 infants and children admitted to gastro-enterology and hepatology unit of Assiut University Children Hospital during the period from August 2015 to July 2016 presenting with vomiting. Their age varied from 1 month to 17 years, they were 786 male and 515 female.

Results: Regarding to the age and with exclusion of gastroenteritis it was found that most common GI cause of vomiting in infancy is Gastro-Esophageal Reflux Disease (GERD) (12%) while most common non-GI causes of vomiting in infancy is respiratory infections (14.7%). In toddler and children, it was found that most common GI cause of vomiting is intussusception (2.2%) while most common non-GI causes of vomiting is meningitis (6.7%). In Adolescences it was found that most common GI cause of vomiting is *H. pylori* infection (10.4%).

Conclusion: From this study we concluded that the commonest cause of vomiting in infancy was GERD while in children was Intussusception and in adolescence was *H. pylori* infection, the most common surgical cause of vomiting was CHPS, abdominal U/S and gastrografin were useful tools for diagnosis of CHPS, vomiting with convulsions was most probably due to CNS infection, outcome of both medical and surgical cause was very satisfactory, percentage of infectious gastroenteritis was 96.4%, however bacterial infection was limited to 8.8% of the cases.

Keywords: Vomiting; Children; Gastroenteritis

Introduction

Vomiting is a protective reflex that results in forceful ejection of stomach contents up to and out of the mouth. It is a common complaint and may be the presenting symptom of several life-threatening conditions. It can be caused by a variety of organic and non-organic disorders; Gastro Intestinal (GI) or outside of GI [1]. The primary care practitioner needs to remember that vomiting does not localize the problem to the GI system in young infants but can be a non-specific manifestation of an underlying systemic illness such as a urinary tract infection, sepsis, or an inborn error of metabolism. Non-organic causes are much more difficult to identify and often are viewed as diagnoses of exclusion. Examples of non-organic causes of vomiting are psychogenic vomiting, cyclic vomiting syndrome, abdominal migraine and bulimia [2].

Initial evaluation is directed at assessment of airway, breathing and circulation, assessment of hydration status and red flag signs (bilious or bloody vomiting, altered sensorium, toxic/septic/apprehensive look, inconsolable cry or excessive irritability, severe dehydration, concern for symptomatic hypoglycemia, severe wasting). Management priorities include treatment of dehydration, stoppage of oral fluids/feeds and decompression of the stomach with nasogastric tube in patients with bilious vomiting [1].

Patient and Methods

One year descriptive study included 1301 infants and children admitted to gastro-enterology and hepatology unit of Assiut University Children Hospital during the period from August 2015 to July 2016 presenting with vomiting. Their age varied from 1 month to 17 years, they were 786 male and 515 female.

Inclusion criteria

All cases presented with vomiting either isolated or associated with other symptoms.

Exclusion criteria

Neonates are not included in our study.

Full thorough history and clinical examination were done to all cases: age, sex, weight, diarrhea, constipation, abdominal distention, respiratory symptoms, sore throat, dysuria, polyuria, convulsions, fever, hemodynamic stability, dehydration. Abdominal tenderness, bowel sounds, neurological, cardiac, chest, abdominal examinations.

Results

All cases were subjected to the following investigations: complete blood picture, serum creatinine, serum electrolytes, random blood

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glucose, arterial blood gases. The following investigations were done according to clinical symptoms and signs associated with vomiting in every case as liver enzymes, pancreatic amylase, urinalysis, cerebro-spinal fluid, blood culture, chest X-ray, abdominal ultrasound, CT scan, GI endoscopy and gastrograffin studies. The metabolic and endocrinal essay was done when indicated (Tables 1-7).

Discussion

After exclusion of gastroenteritis, Table 1 show that commonest GI cause of vomiting in infancy is GERD (12%) while most common non-GI causes of vomiting in infancy is upper respiratory infections (14.7%).

Diagnosis	Age					
	Infants (1-12 months)		Toddlers and children (1-12 years)		Adolescents (12-18 years)	
	N (195)	%	N (75)	%	N (54)	%
GI causes (N=150)						
GERD	39	12	6	1.8	0	0
CHPS	27	8.3	0	0	0	0
Esophageal Achalasia	0	0	2	0.6	3	0.9
Gastritis	0	0	6	1.8	3	0.9
Biliary Colic	0	0	0	0	4	1.2
H. Pylori Infection	0	0	0	0	34	10.4
Hepatitis	0	0	2	0.6	0	0
Intussusception	4	1.2	7	2.2	0	0
Malrotation	7	2.2	0	0	0	0
pancreatitis	0	0	1	0.3	5	1.5
Non-GI causes (N=174)						
Acute Otitis Media (AOM)	47	14.4	0	0	0	0
Bronchopneumonia	1	0.3	5	1.5	0	0
Congenital adrenal hyperplasia	1	0.3	0	0	0	0
Diabetic Ketoacidosis	0	0	1	0.3	0	0
hydrocephalus	5	1.5	2	0.6	0	0
Inborn Error of Metabolism	2	0.6	0	0	0	0
Intra-cranial Hemorrhage	4	1.2	6	1.8	0	0
Meningitis	18	5.5	22	6.7	0	0
Renal Colic	0	0	0	0	2	0.6
Renal tubular Acidosis (RTA)	1	0.3	0	0	0	0
Sepsis Syndrome	24	7.3	11	3.3	0	0
unknown diagnosis	2	0.6	0	0	3	0.9
Urinary Tract Infection (UTI)	13	4	4	1.2	0	0

Table 1: GI causes and non-GI causes of vomiting according to the age after exclusion of gastroenteritis.

	GI causes		Non GI causes		P value
	N	%	N	%	
Abdominal distention	39	25.8	12	6.9	<0.001**
Convulsions	0	0.0	56	32.2	<0.001**
Dysuria/Urine retention	0	0.0	17	9.8	<0.001**
Polyuria/Polydipsia	0	0.0	2	1.1	0.186
Cough/Dyspnea	0	0.0	6	3.4	0.021*
Constipation	11	7.3	0	0	<0.001**
Fever (≥ 38°)	28	18.5	111	63.8	<0.001**
Pallor	29	19.2	56	32.2	0.008**
Jaundice	3	2	18	10.3	0.002**
Irritability	0	0	40	23	<0.001**

Table 2: Symptoms of GI cause and non-GI causes of vomiting other than gastroenteritis.

this is comparable with American Academy of Pediatrics (AAP) [3]. In toddler and children, it was found that commonest GI cause of vomiting is intussusception (2.2%) while most common Non-GI causes of vomiting is meningitis (6.7%) however this is disagree with AAP [3] who stated that most common GI cause of vomiting is GERD and most common non-GI cause of vomiting is Urinary Tract Infection (UTI). In Adolescences it was found that commonest GI cause of vomiting is H. Pylori infection (10.4%) and this is agree with Ozen et al. who states that the age for *H. pylori* infection is Adolescences [4], although the commonest presentation is recurrent abdominal pain [5].

Regarding the associated symptoms with vomiting (Table 2), there was statistically significant difference between GI and non-GI causes of vomiting. abdominal distention was most associated symptom in cases with vomiting due to GI causes (25.8%). this may be due to most of our cases were intestinal obstruction (Malrotation and Intussusception) after excluding cases of gastroenteritis. this agrees with Bales and Liacouras [6] who stated that intestinal obstruction is commonly associated with abdominal distention. On other hand, the most associated symptom in cases with vomiting due to non-GI causes was fever (63.8%) followed by convulsions (32.2%). This most probably is due to CNS infections or hydrocephalus and intra-cranial Hemorrhage. This is comparable to that reported by Prober and Mathew who stated that convulsions occur in 20-30% of patients with meningitis [7].

Regarding the clinical signs (Table 3), there was statistically significant difference between GI and non-GI causes of vomiting. Dehydration (25.2%) was the most common sign in cases with vomiting due to GI causes after excluding cases of gastroenteritis. This may be related to poor oral intake and/or persistent vomiting. This agrees with Granado-Villar et al. [8]. On other hand, it was observed that most common sign in cases with vomiting due to non-GI causes was disturbed consciousness (37.3%) followed by signs of meningeal irritation and ↑ ICP (31.6%). This was due to CNS infections. This agrees with Prober and Mathew who stated that Alterations of mental status are common among patients with meningitis and may be the consequence of increased ICP [7].

Regarding laboratory investigations (Table 4), it was observed that all laboratory investigations are significantly different between GI and non-GI causes of vomiting. Anemia (≤ 11 g/dl, microcytic hypochromic) was present in 86.8% of the cases with vomiting due to GI causes. This may be related to poor oral intake and may be due to associated parasitic infestation. Leukocytosis (>10.5 × 10^3 cells/mm^3) was present in 35.1% of the cases with vomiting due to Non-GI causes. This is most probably due to CNS infections and respiratory infections. Positive antibodies against *H. pylori* infection in serum was present in 19.9% of cases diagnosed as *H. pylori* infection. This agrees with Blanchard and Czinn [5] who stated that serologic assays using

	GI causes		Non GI causes		P value
	N	%	N	%	
Disturbed Consciousness	3	2	65	37.3	<0.001**
Dehydration	38	25.2	40	23	0.647
↑ or ↓ bowel sounds	18	11.9	0	0	<0.001**
Hepato and/or splenomegaly	5	3.3	19	10.9	<0.001**
Red Currant Jelly Stool	10	6.6	-	-	
Chest Crepitation	0	0	15	8.6	<0.001**
Bulging Red Tympanic Membrane	0	0	38	21.8	<0.001**
Signs of Meningeal irritation and ↑ ICP	0	0	55	31.6	<0.001**

Table 3: Signs of GI cause and non-GI causes of vomiting other than gastroenteritis.

	GI causes (n=151)		Non GI causes (n=174)		P value
	No.	%	No.	%	
Anemia (<11 g/dl)	131	86.8	129	74.2	<0.001**
Leukocytosis (>10.5 × 10^3 cells/mm^3)	25	16.6	61	35.1	<0.001**
Random Blood Glucose (<60 mg/dl)	6	4	19	10.9	0.025*
Metabolic Acidosis	5	3.3	38	21.8	<0.001**
Serum transaminases	2	1.3	17	9.8	0.001**
(+ve) Antibodies against *H. pylori* in serum	30	19.9	0	0	0.002**

Table 4: Lab investigations of GI cause and non-GI causes of vomiting other than gastroenteritis.

	GI causes (n=150)		Non-GI causes (n=174)		P value
	No.	%	No.	%	
Plain erect findings					
Gaseous Distention	8	5.3	-	-	-
Air fluid level	10	6.6	-	-	
Chest x-ray Findings					
Bronchopneumonia and/or lung collapse	5	3.3	17	9.7	0.001**
Abd. U/S Findings					
Gaseous Distention	4	2.6	1	0.6	0.009**
Radio-opaque stones (gall bladder and/or kidney)	4	2.6	2	1.1	
Picture of Intussusception	11	7.3	0	0	
Picture of CHPS	15	10	0	0	
Edemetous pancreas	6	4	0	0	

Table 5: Radiological investigations of GI cause and non-GI causes of vomiting other than gastroenteritis.

	No.	%
Persistent vomiting (≥ 4 times/h)	243	24.8
Dehydration	725	74.3
Fever (≥ 38°C)	544	55.7
Abdominal distention	386	39.5
Convulsions	300	30.7
Bloody diarrhea ± Tensmus	133	13.6
Protein energy malnutrition (PEM) by Wt/age	75	7.6
Impaired Conscious level	62	6.4

Table 6: Associated symptoms and signs in all studied patients with acute gastroenteritis.

validated immunoglobulin G antibody detection may be helpful for screening children for the presence of *H. pylori* [5].

Regarding abdominal U/S (Table 5), picture suggestive of CHPS was present in 15 cases out of 27 with GI causes of vomiting. This agrees with Niedzielski et al. who stated that the specificity and sensitivity of ultrasound in diagnosing CHPS in the hands of experienced pediatric radiologists are very high with 98 and 100%, respectively [9]. Regarding plain erect, air-fluid level picture of intestinal obstruction was present in 10 cases out of 18 with GI causes of vomiting. This agrees with Bales and Liacouras who stated that a plain radiograph is the initial diagnostic study and can provide valuable information about potential associated complications, Upright or cross table lateral views typically demonstrate a series of air–fluid levels in the distended loops [6].

Regarding cases of vomiting due to acute gastroenteritis (Table 6), it was observed that dehydration (74.3%) was most common symptom followed by fever (55.7%). This agrees with Bhutta who stated that without early and appropriate rehydration, many children with acute diarrhea would develop dehydration with associated complications [10].

Etiology of gastroenteritis	NO.	%
Infectious	941	96.4
Non-infectious	35	3.6

Table 7: Etiology of gastroenteritis in all studied patients with acute gastroenteritis.

Regarding etiology of gastroenteritis (Table 7), it was observed that infectious causes of gastroenteritis were present in 96.4% of the cases. This may be due to bacterial, viral, parasitic or fungal infections. Graves Reported that viral gastroenteritis represent 50%-70%, bacterial gastroenteritis represent 15%-20%, parasitic gastroenteritis represent 10%-15% of total cases of gastroenteritis [11]. This is confirmed from our results where leukocytosis was present in 8.8%, this indicate that the use of antibiotics in diarrhea is of limited scope. Therefore the use of antibiotics in acute gastroenteritis should be limited to cases of specific enteric bacterial infection, systemic infection, infections in immunocompromised patients

Conclusion

From this study we concluded that the commonest cause of vomiting in infancy was GERD while in children was Intussusception and in adolescence was *H. pylori* infection , the most common surgical cause of vomiting was CHPS, abdominal U/S and gastrografin were useful tools for diagnosis of CHPS, vomiting with convulsions was most probably due to CNS infection, outcome of both medical and surgical cause was very satisfactory, percentage of infectious gastroenteritis was 96.4%, however bacterial infection was limited to 8.8% of the cases.

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