

Neonatal Bilious Vomiting as a Predictor for Neonatal Intestinal Obstruction

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ABSTRACT

Background: Neonatal bilious vomiting is a more clinical symptom that can be difficult to diagnose and assess immediately due to its relationship with actual life-threatening illnesses, like neonatal intestinal obstruction. The study examines the relationship between neonatal diagnosis, particular X-ray or contrast imaging results, conclusive vomiting diagnosis, gestational age, weight, age of presentation, or gender.

Methods: This is a cross-sectional study of 42 patients collected from Al Zahraa Teaching Hospital in Al-Najaf from January 2022 to January 2023. The data for all neonates collected are Gestational age (weeks), Weight (kg), Age of presentation (months), Gender, X-ray diagnosis (Diagnostic, invert gram, Negative, Nonspecific, Suggestive), Contrast diagnosis (Diagnostic, no need, Normal and Suggestive), and finally, definitive diagnosis.

Results: There was a significant association between the diagnosis and specific X-ray or contrast imaging results, but there was a lack of significant association between definitive diagnosis and gestational age, weight, age of presentation, or gender. However, there was a significant association in diagnosing conditions like small bowel atresia, anorectal atresia, sepsis, and Meconium ileus based on imaging characteristics.

Conclusion: Neonates with bilious vomiting disclose an essential association between imaging outcomes and diagnoses as small bowel atresia and anorectal malformations, with X-ray and contrast imaging having an essential role in diagnosis.

Keywords: Bilious, Neonatal, Intestinal, Obstruction, Predictor, Vomiting

Introduction

Neonatal bilious vomiting, a more clinical symptom, presents challenges in immediate diagnosis and assessment due to its association with potentially life-threatening illnesses such as neonatal intestinal obstruction. The term "neonate" refers to each baby's first 28 days of life, which is considered a critical period when infants are highly susceptible to numerous health problems. During this critical period, prompt diagnosis and effective management of symptoms can significantly impact the outcome. A variety of factors, ranging from congenital malformations to acquired illnesses, can cause bilious vomiting,

which is characterized by the ejection of bile-stained material, signaling an obstruction in the small gut tract (1,2). Neonatal intestinal obstruction can arise from a variety of causes, including atresias, stenosis, malrotation with volvulus, Hirschsprung's illness, and meconium ileus. Each of these illnesses presents an exclusive pathophysiological experiment that, if not quickly diagnosed and managed, can lead to devastating complications like sepsis, intestine necrosis, and mortality. Therefore, the clinical manifestation of bilious vomiting in a neonate poses a serious concern, necessitating critical diagnostic

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procedures such as imaging and surgical intervention. Bilious vomiting is a serious symptom that can be diagnosed based on its pathophysiological support. It shows that there is a blockage preventing bile from entering the digestive tract, which means there is a major obstruction (3,4). The foundation of neonatal carefulness is to quickly identify and accurately diagnose the causes of intestinal obstruction. Healthcare specialists need to be acutely aware of the effects of bilious vomiting. It is not just the presence of this symptom but also knowing its occurrence, consistency, and related clinical signs that can lead clinicians to an exact diagnosis. Additionally, the management approaches for these situations are as varied as their causes, from surgical operation to medical treatment (5, 6). Neonatal bilious vomiting as an analyst for intestinal obstruction is essential for numerous causes. Initially, it provides insights into the patterns and prevalence of this symptom in neonates with intestinal obstacles. Then, it improves the understanding of diagnostic methods and the efficiency of numerous interferences (7, 8). The study aims to establish a correlation between the neonatal diagnosis and specific X-ray or contrast imaging results, as well as a relationship between the definitive diagnosis of vomiting and factors such as gestational age, weight, age of presentation, or gender.

Methods

The study conducted a cross-sectional analysis on 42 patients from Al Zahraa Teaching Hospital in Al-Najaf, spanning from January 2022 to January 2023. Direct interviews with mothers collected the data for all neonates, which included gestational age (weeks), weight (kg), age of presentation (months), gender, X-ray diagnosis (diagnostic, invert gram, negative, nonspecific, suggestive), contrast diagnosis (diagnostic, no need, normal and suggestive), and finally, a definitive diagnosis. We conducted the statistical study using SPSS 22, incorporating frequency and percentage measures for categorical data. We use the chi-square test to evaluate the relationship between categorical variables with more than two variables and the Fisher Exact Test for two by two variables, with a significance level of 0.05 or below.

Ethical Approval

The study was conducted after approval by the Ethics Committee of the Faculty of Medicine, University of Kufa (no. 38, in 2/5/2022).

Results

Cross-sectional study of 42 neonates with a history of bilious vomiting, mean gestational age (37.1 ± 1.9) weeks, mean weight (3 ± 0.5) kg, 57.1% of neonates are less than 38 weeks of gestation, 50% of them weigh less than 3 kg, and 50% more than 50 kg. Only 16.7% of neonates receive a diagnosis by X-ray, with 26.2% showing either negative or suggestive results. While 19% of neonates received a contrast diagnosis, 47.6% did not require one (Table 1).

Table 1. Distribution of neonate according to study variables

Variables	No.	Percentage	
Gestational age (weeks)	<38	24	57.1
	≥38	18	42.9
Weight (kg)	<3	21	50.0
	≥3	21	50.0
Age of presentation (months)	<12	32	76.2
	≥12	10	23.8
Gender	Female	18	42.9
	Male	24	57.1
X-ray diagnosis	Diagnostic	7	16.7
	invert gram	6	14.3
	Negative	11	26.2
	Suggestive	7	16.7
Contrast diagnosis	Diagnostic	8	19.0
	no need	20	47.6
	Normal	11	26.2
	Suggestive	3	7.1

As shown in Figure 1, 26.11% of neonates were diagnosed with normal conditions, 16.67% of neonates were diagnosed with small bowel atresia and sepsis, and 14.29% of neonates were diagnosed with anorectal courses.

As shown in Table 2, there is no significant association between definitive diagnosis and gestational age of neonate, weight, age of presentation, and gender.

As shown in Table 3, there is a significant association between definitive diagnosis and X-ray diagnosis: 100% of neonates diagnosed by X-ray as small bowel atresia, 100% of neonates have invertograms on X-ray diagnosed as anorectal atresia, and 100% of neonates have nonspecific X-rays diagnosed as sepsis. Also, there is a significant association between definitive diagnosis and contrast diagnosis; 100% of neonates have normal contrast results diagnosed as normal conditions, while 100% of neonates have suggestive contrast diagnosed as Meconium Ileus.

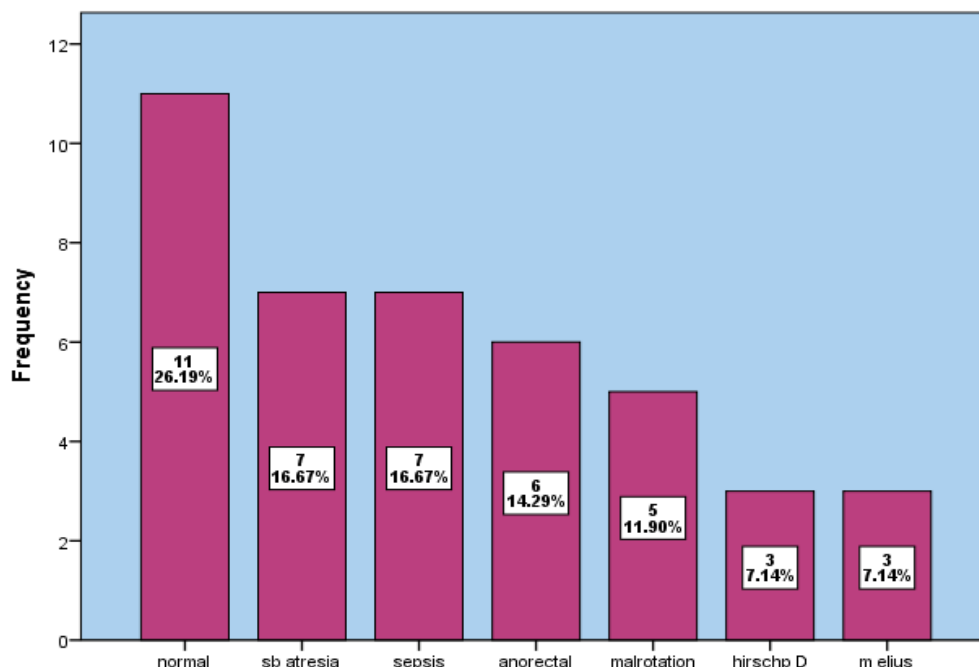


Figure 1. Distribution of neonate according to definitive diagnosis

Table 2. Association between definitive diagnosis and gestational age of neonate, weight, age of presentation, and gender

	Diagnosis							Total	P-value	
	anorectal	hirschp D	m elius	malrotation	normal	S.B.atresia	sepsis			
G age (weeks)	<38	4	2	0	1	8	3	6	24	0.08
	≥38	2	1	3	4	3	4	1	18	
Weight (Kg)	<3	3	2	1	2	5	3	5	21	0.8
	≥3	3	1	2	3	6	4	2	21	
Age on Arrival (months)	<12	6	2	3	4	7	7	3	32	0.1
	≥12	0	1	0	1	4	0	4	10	
Gender	Female	3	1	1	1	3	5	4	18	0.5
	Male	3	2	2	4	8	2	3	24	
		12.5%	8.3%	8.3%	16.7%	33.3%	8.3%	12.5%	100.0%	

P-value ≤ 0.05 (significant).

Table 3. Association between definitive diagnosis and X-ray diagnosis and contrast diagnosis

	Diagnosis							Total	P-value	
	anorectal	hirschp D	m elius	malrotation	normal	S.B.atresia	sepsis			
X Ray	diagnostic	0	0	0	0	0	7	0	7	0.0001
	invertogram	6	0	0	0	0	0	0	6	
	negative	0	0	0	0	11	0	0	11	
	nonspecific	0	0	0	0	0	0	7	7	
	suggestive	0	3	3	5	0	0	0	11	
		0.0%	27.3%	27.3%	45.5%	0.0%	0.0%	0.0%	100.0%	

Table 3. Continued

	diagnostic	0	3	0	5	0	0	0	8	
		0.0%	37.5%	0.0%	62.5%	0.0%	0.0%	0.0%	100.0%	
	no need	6	0	0	0	0	7	7	20	
Contrast	normal	30.0%	0.0%	0.0%	0.0%	0.0%	35.0%	35.0%	100.0%	0.0001
		0	0	0	0	11	0	0	11	
		0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	
	suggestive	0	0	3	0	0	0	0	3	
		0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	

P-value \leq 0.05 (significant).

Discussion

This study, characterized by a mean gestational age of 37.1 ± 1.9 weeks and a mean weight of 3 ± 0.5 kg, the demographic outline often reported in neonatal studies gives a pertinent background for the observed results. Particularly, 57.1% of the neonates were born less than 38 weeks of gestation, with 50% weighing less than 3 kg. These demographics underline the susceptibility to gastrointestinal complications, including bilious vomiting, which requires an understanding of diagnostic and management approaches. At less than 1 year of age, 76.2% of neonates experience vomiting, with a higher incidence in male neonates (57.1%). This is consistent with other studies that suggest a higher risk of bilious vomiting in younger and male neonates (9, 10). However, the diagnostic efficacy of radiographic interventions is convincing; X-rays only diagnosed 16.7% of neonates, and a significant percentage had non-specific or suggestive outcomes. This finding aligns with another study highlighting the difficulties in diagnosing neonatal intestinal obstructions based on standard X-ray results (11). Interestingly, the study found no significant association between the definitive diagnosis and the neonate's gestational age, weight, age of presentation, or gender. This suggests that while these demographic factors are critical in understanding the health status of neonates, they may not directly influence the diagnostic outcome for neonatal intestinal obstruction. On the other hand, the strong link between a clear diagnosis and specific radiographic findings (X-ray and contrast diagnoses) shows how important targeted imaging is for finding the real reasons behind bilious vomiting. In the current study, the finding that 100% of neonates were diagnosed with small bowel atresia by X-rays highlights the specificity of radiographic indicators for this illness. Correspondingly, the relationship between anorectal atresia and specific inverted gram results on X-rays delivers a diagnostic clarity that can direct clinical decision-making. Also, the idea

that newborns with vague X-ray results have sepsis is a big problem when trying to figure out what is wrong with newborns who are vomiting bile (12, 13). The current study also contributes to the diagnostic implication of contrast imaging. The fact that all neonates with normal contrast outcomes received a normal state diagnosis suggests that contrast imaging can effectively rule out intestinal obstruction. Equally, the definitive relationship between suggestive contrast findings and the M. elius diagnosis underlines the usefulness of this imaging modality in recognizing exact pathologies (14). While demographic factors may not directly affect the diagnostic results, the specificity of radiographic results in recognizing underlying causes is unquestionable (15).

Conclusion

Neonates with bilious vomiting disclose an essential association between imaging outcomes and diagnoses, such as small bowel atresia and anorectal malformations, with X-ray and contrast imaging having an essential role for diagnosis.

Acknowledgments

None.

Conflicts of interest

There was no conflict of interest.

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