



Bilious vomiting in the newborn: how often is further investigation undertaken?

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Index words:

Bile vomiting;
Newborn;
Malrotation

Abstract

Background/Purpose: Pediatric surgeons consider bile vomiting in the neonate a potential surgical emergency. The reported rate of surgical intervention is 30% to 40%, but as most neonates are born outwith pediatric surgical centers, referral of these babies is at the neonatologists' discretion. The aim of this study was to determine the referral policy of neonatologists in the West of Scotland for a neonate with bile vomiting.

Methods: Questionnaires were sent to all neonatologists in the West of Scotland to determine the management plan for a neonate with a single bile vomit or repeated bile vomits. Respondents were asked to indicate whether they would advocate postnatal ward observation, admission to the special care baby unit, abdominal x-ray, or upper gastrointestinal contrast study, or refer to pediatric surgeons. Respondents were asked to prioritize these options numerically.

Results: A return rate of 81% was achieved. Most neonatologists (80%) would admit a neonate with a single bile vomit to the special care baby unit, but more than 50% did not consider an upper gastrointestinal contrast study appropriate. One third felt that pediatric surgical referral is not appropriate for a single bile vomit. In a neonate with persistent bile vomiting, pediatric surgical referral was considered the highest priority.

Conclusion: Neonatologists use a policy of observation for neonates with a single bile vomit. Those neonates with no further bile vomiting are unlikely to be referred. Pediatric surgeons are not referred a significant proportion of neonates that vomit bile.

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Standard teaching in pediatric surgery is that bile vomiting in a neonate indicates intestinal obstruction until proven otherwise. In the absence of clinical signs allowing a positive diagnosis, an upper gastrointestinal (GI) contrast study is recommended to specifically exclude intestinal malrotation and volvulus. These maxims are based on the experience that 30% to 40% of neonates that vomit bile require surgical intervention [1,2]. However, as most neo-

nates are born outwith pediatric surgical centers, the cohort of patients being investigated and treated represents a selected group based on the discretion of the referring neonatologist. This study aims to determine the referral practices of neonatologists for neonates with bile vomiting.

1. Methods

A questionnaire was designed to determine the management plan for a neonate with bile vomiting. The color of the vomiting was not specified. Questionnaires were sent to all

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- Further observation on postnatal ward only
- Admit to SCBU for further observation
- Abdominal x-ray
- Upper GI contrast study
- Referral to pediatric surgeons

Fig. 1 Management options for neonate with bile vomiting.

clinicians involved in the acute management of the neonate in the West of Scotland, and respondents were also asked to specify if they had on-site access to radiology or pediatric surgeons. Management options were given (Fig. 1), and respondents were asked to allocate a score for each option ranging from 1 (most appropriate) to 5 (least appropriate). These options were given initially for a well neonate that has a single bile vomit and subsequently for a neonate that remains clinically well but has repeated bile vomits. On return of the questionnaires, a mean score for each option was calculated. Options not deemed appropriate were allocated a score of 6. Thus, the options considered more appropriate have the lowest mean score.

2. Results

A return rate of 81% was achieved (26 of 32). In a baby with a single bile vomit (Table 1), most neonatologists (80%) feel that the most appropriate management is to admit the patient to the special care baby unit (SCBU) for further observation; and this option has the lowest mean score (1.5 ± 0.20). After this course of action, the next most appropriate step is to obtain an abdominal x-ray (mean score, 2.2 ± 0.25). Thirty-one percent and 54%, respectively, did not consider it appropriate to seek pediatric surgical advice or to order an upper abdominal contrast study, although most (77%) do not have on-site access to either.

The priority in management options changes with further bile vomits, with pediatric surgical referral taking precedence over all other options (mean score, 2.3 ± 0.26). However, only 38% of respondents scored surgical referral

Table 1 Results for treatment options in a neonate with a single bile vomit

	Most appropriate	Not appropriate	Mean score (\pm SEM)
Admit to SCBU	18 (69%)	1 (4%)	1.5 ± 0.20
Abdominal x-ray	6 (23%)	2 (8%)	2.2 ± 0.25
Surgical referral	0	8 (31%)	4.2 ± 0.27
Upper GI contrast	0	14 (54%)	4.8 ± 0.27
Postnatal ward	5 (19%)	21 (81%)	5.0 ± 0.39

"Most appropriate" options received a score of 1. More appropriate options have a lower mean score.

Table 2 Results for treatment options in a neonate with repeated bile vomits

	Most appropriate	Not appropriate	Mean score (\pm SEM)
Surgical referral	10 (38%)	1 (4%)	2.3 ± 0.26
Abdominal x-ray	9 (35%)	11 (42%)	3.3 ± 0.46
Upper GI contrast	4 (15%)	10 (38%)	3.9 ± 0.37
Admit to SCBU	6 (23%)	16 (62%)	4.3 ± 0.44
Postnatal ward	0	24 (92%)	5.9 ± 0.05

See annotation of Table 1 for description.

above all other options (Table 2); and one respondent did not feel it appropriate to involve pediatric surgeons even in persistent bile vomiting. Continued observation on SCBU or the postnatal ward was not deemed appropriate by 62% and 92%, respectively.

3. Discussion

Bile vomiting in a neonate is one of the cardinal signs of intestinal obstruction; and as pediatric surgeons, we feel this finding mandates prompt investigation and surgical intervention if necessary [3]. This maxim is supported by cases of previously well neonates with catastrophic midgut ischemia at laparotomy because of small bowel volvulus, where the only abnormal sign in the early stages was vomitus containing bile. This questionnaire study highlights the fact that a number of babies who vomit bile that are managed by neonatologists undergo no further investigations and that cases managed by surgeons represent a selected minority group.

In neonates with a single bile vomit, most neonatologists would admit to the SCBU for further observation and an abdominal x-ray, although 19% felt that continued observation on the postnatal ward is appropriate. Pediatric surgical referral was deemed appropriate by 70% of respondents but only after SCBU admission and x-ray. It is unclear how many would arrange a surgical referral for the patient if no abnormality was discovered. In cases of persistent bile vomiting, most neonatologists would advocate transfer to the care of a pediatric surgeon. Most respondents in this study do not have on-site access to pediatric surgeons, and inter-hospital transfer would be necessary for further investigation and management. In cases where intestinal ischemia had developed at the time of the first bile-stained vomit, further delay in appropriate investigation and management could result in critical intestinal loss.

This study shows that most babies in the West of Scotland who have had a single bile vomit and who are subsequently well have no further investigations performed. Malrotation if present will therefore not be identified. In the absence of such evidence, the consequences of this approach will potentially put some babies who do indeed have malrotation at risk.

Malrotation can present in the older child [4] or adulthood [5,6] and can be associated with significant morbidity and mortality [7]. Establishing a diagnosis early in life offers the possibility of prophylactic surgery, in the form of a Ladd procedure, or a high index of suspicion and prompt intervention in the event of complications if management is expectant.

A policy of more aggressive investigation raises issues about the management of babies with borderline contrast findings. The position of the duodenal-jejunal flexure shows some variability in the neonate [8], and the ramifications of a false-positive finding would be unnecessary surgery. A prospective study of upper GI contrast studies in all babies with bile vomiting would help further investigate this question.

The adage remains pertinent that “bile vomiting in infancy represents intestinal obstruction until proven otherwise.” Pediatric surgeons and neonatologists should be aware that there may be a significant number of patients who have had a single bile vomit in whom the diagnosis

remains unproven and that those with malrotation thus continue to be at risk of volvulus.

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