THAMES VALLEY & WESSEX NEONATAL OPERATIONAL DELIVERY NETWORK

WESSEX CARE PATHWAY FOR TERM INFANTS REFERRED WITH BILIOUS VOMITING FOR EXCLUSION OF MALROTATION	
Approved by/on:	**Thames Valley & Wessex Neonatal ODN Governance Group 19 January 2017**
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Related documents	**References** 1. **Malrotation of the intestine,** Torres A.M, Ziegler M.M, World Journal of Surgery, 1993, Vol 17, pp 326 -333. (Incidence) 2. **Colour of bile vomiting in intestinal obstruction in the newborn: questionnaire study,** Walker, G M et al, British Medical Journal, 2006, Vol 332, pp1363-1365. 3. **Bilious Vomiting in the newborn: how often is it pathologic?** Godbole P., Stringer M.D, Journal of paediatric Surgery, 2002 Vol 37, pp 909 -911. 4. **Green for danger! Intestinal malrotation and volvulus,** Williams H, Archives of disease in Childhood Education and Practice Edition, 2007, Vol 92, ep 87-91. 5. **Testicular Torsion: A race against time,** Kapoor S, International Journal of Clinical Practice, 2008, Vol 62, pp 821-827. 6. **2013/14 NHS standard contract for neonatal critical care retrieval (transport)** 7. **The burden of excluding malrotation in term neonates with bile stained vomiting ,** Drewett M, Johal N, Keys C, Hall N , Burge D Pediatr Surg Int Feb 2016
Implications of race, equality & other diversity duties for this document	**This guideline must be implemented fairly and without prejudice whether on the grounds of race, gender, sexual orientation or religion.**

Contents

The procedural aspects of this guideline can be found in the document entitled:-

Guideline Proforma **-** Care Pathway for neonates with bilious vomiting to exclude Malrotation.

Executive Summary

Malrotation results from a failure of the gastro intestinal tract to complete normal rotation and fixation as it returns to the abdominal cavity at eight to ten weeks gestation. The incidence of malrotation is estimated at 1:500 live births[1]. However acute presentation in the neonatal period is estimated in our network to be about 1:6000. The most concerning feature is the lack of fixation which may permit the small bowel to twist around its narrow base with possible compromise to the superior mesenteric artery (volvulus). The tighter the twist, the more the midgut suffers from obstruction of the lumen, obstruction of venous and lymphatic return, and obstruction of arterial inflow, thus threatening midgut viability. Unless treated in a timely manner there may be extensive ischaemic damage and loss of small bowel resulting in short gut syndrome and parenteral nutrition dependence or death.

The purpose of this care pathway is to provide guidance for the multi-disciplinary team to ensure optimal management of a term neonate referred to the neonatal/paediatric surgical service for exclusion of malrotation and volvulus in the presence of bilious vomiting.
A UHS review demonstrated that out of 166 patients referred with bilious vomiting for exclusion of malrotation by upper GI contrast approximately 10% had malrotation. Although most of these patients at laparotomy did have concomitant volvulus only a small number had ischaemic bowel resection. One baby died. The main issue with this pathology is the identification of the baby who has ischaemic bowel and predicting how long from first presentation it takes to develop dead gut[6].
Prediction and identification of these infants is challenging, complete examination and assessment by a senior clinician should be undertaken prior to referral for review and contrast. Contrast studies should be undertaken in local hospitals wherever possible in well infants as soon as possible.

1.0 Introduction

Early consideration for the need for surgical intervention may mean the difference between intestinal salvage and catastrophe. Any term neonate with bilious vomiting should have the diagnosis of malrotation and volvulus considered and mandates immediate assessment and evaluation. In the absence of a clear diagnosis the safe approach is to rule out the possibility of malrotation first. The gold standard investigation is an upper gastrointestinal contrast study, by a consultant paediatric radiologist, to determine duodeno-jejunal fixation. If clinical and abdominal signs warrant, immediate emergency laparotomy should be undertaken.

It is reported that 30% of neonatal malrotation cases present in the first three to seven days of life and fifty percent by one month of age. Bilious vomiting is the initial symptom, but abdominal distention is often absent. Typically these infants will have passed meconium. Blood may be passed per rectum or be seen in gastric aspirates. If there is associated volvulus causing ischaemic damage there may be progression to abdominal distension, the baby will become unwell with unstable haemodynamic and a metabolic acidosis will develop.

1.2 Scope

This care pathway is applicable to term infants referred to the surgical team with bilious vomiting and no other definite surgical pathology who are in a neonatal unit, or, if the infant has been home, up to ten days of age. Term infants older than 10 days who have been home will be considered for admission to either G4 or PICU at UHS as clinically appropriate.

Admission criteria are in accordance with the neonatal unit (NU) operational policy and Paediatric Intensive Care Unit (PICU) facilities for surgical neonates. It should not be applied to the assessment and management of preterm infants with bilious aspirates.

1.3 Purpose

The purpose of this care pathway is to provide guidance for the multi-disciplinary team to ensure optimal management of a term neonate referred to the neonatal/paediatric surgical service for exclusion of malrotation and volvulus in the presence of bilious vomiting.

2.0 Definitions

Bilious vomiting	Emesis containing green bile suggestive of bowel obstruction distal to the ampulla of Vater[1]	
Malrotation	Failure during embryonic development of normal rotation of the midgut	
Volvulus	Twisting of part of the intestine	
Total Parenteral Nutrition	Nutrition provided by central intravenous route	TPN
Upper Gastro Intestinal contrast study	An upper gastrointestinal (UGI) series is an investigation performed under X-ray looking at the upper and middle sections of the gastrointestinal tract	UGI
SONeT	Southampton Oxford Neonatal Transport service	
UHS	University Hospital Southampton NHS Foundation Trust	

3.0 Roles and Responsibilities

All staff involved in the care of the newborn within the Wessex Neonatal Operational Delivery Network should be aware of this Care Pathway for term infants referred to the surgical team with bilious vomiting for exclusion of malrotation. Most referrals should be made by the neonatologist or paediatrician responsible for the initial care and assessment of the newborn baby. Malrotation and volvulus is one possible cause of bile vomiting in the newborn although studies have shown many infants with bile vomiting do not have surgical pathology[2].

All babies with suspected surgical pathology will have a designated Consultant Paediatric Surgeon, with joint responsibility with a Consultant Neonatologist if admitted to the neonatal unit, in accordance with operational policy. If surgical pathology is excluded it is the responsibility of the Consultant Paediatric Surgeon to handover responsibility for ongoing management as applicable and document accordingly.

4.0 Guideline Key Principles

<u>Criteria for referral to the surgical team</u>

In the presence of malrotation and volvulus ninety five percent of term infants develop bilious vomiting. Bile vomit is described as green emesis (see Appendix 2). The surgical literature states any term neonate with bilious vomiting mandates immediate assessment and evaluation[4] and should have this diagnosis considered.

The decision to refer a term infant with bilious vomiting is a clinical one by the neonatologist/paediatrician and all infants should have been clinically assessed by a senior clinician prior to referral. An UGI contrast examination should be considered and undertaken in the local hospital in well infants where possible before a decision is made to refer the baby. If this is not possible senior clinical review prior to referral to the surgical team should be undertaken.

Process of making surgical referrals

It is recommended that the time between reaching criteria for surgical referral and being in a position to have a laparotomy should be no more than six hours[5].

Surgical referrals should be made to either the on call middle grade paediatric surgical doctor or on call Consultant Paediatric Surgeon.

1. The on call paediatric surgical team will identify an appropriate cot for admission and then ring back to the referring unit to confirm cot availability. Ideally this should be a cot on the PICU to minimise the need for further transfers.

2. If a cot is not available this must be discussed with the on call Consultant Paediatric Surgeon before the referral is refused.

3. Arrangements for transfer should be made to SONeT call centre once the referral is accepted by surgical team. (SONeT Southampton Oxford Neonatal Transport Service)

4. SONeT call centre can conference the paediatric surgeon, neonatologist, local clinician, +/- PICU clinician simultaneously to avoid multiple calls.

Initial m**anagement**

- A size 8 nasogastric tube should be placed for gastric decompression to prevent further vomiting and aspiration. This should be done before any diagnostic or therapeutic manoeuvers are performed.

- Intravenous access should be established for administration of intravenous fluids.

- A plain abdominal film should be performed and made available to the receiving team at UHS.

- Consideration to the need for blood cultures and antibiotics should be made in line with the clinical assessment.

Emergency Transfers

Currently transfer of an infant with bilious vomiting is not considered to be of a time critical nature nationally[6]. However SONeT aim to respond as soon as possible within 6 hours and will respond as time critical if the patient is unwell. Users of SONeT service ensure that all referral requests are made in a timely manner after referral of the infant to the paediatric surgical team has been accepted.

1. Each case will be individually triaged to determine the urgency of transfer and escort for transfer. Local teams usually have responsibility to transfer neonates admitted from home to paediatric wards. Currently it is recommended that such admissions are discussed on a case by case basis.

2. In case SONeT is busy with other time critical transfer at the time of request and baby is considered unwell; the SONeT contingency plan will be followed.

3. If the infant is to be transferred by the local team

   - Call ambulance control centre (local Trust to insert code e.g. #5012 or 01273 486465)
   - Request "999 HCP Immediate Blue Light Transfer". This indicates to the control centre that it is a health care professional requesting immediate transfer by ambulance of a patient requiring emergency treatment.
   - There is no need to request a specific ambulance base/equipment or personnel (if you do, this may cause delay)
   - Give the call handler the name and age of patient, whether they are ventilated or not, who will be accompanying them and their destination. No further information is required.

Surgical review following admission

It is necessary to have an available cot organised prior to accepting the referral. There is multi-disciplinary acceptance that "drive through contrasts studies" are not safe practice. All patients should have had a senior clinical assessment prior to contrast.

Neonates must be reviewed by the surgical team following admission to either the NICU, PICU. In a very small number of cases immediate laparotomy may be warranted. If an UGI contrast is required this must be discussed with the on call Consultant Paediatric Surgeon before the request is submitted.

For infants transferred by SONeT it may be possible to take the infant to PICU, keep the baby in the transport incubator while the baby is assessed, then accompany the baby to radiology with a PICU nurse and then back to PICU. This cannot be seen as routine practice and will be circumstance dependant each time.

Upper Gastro Intestinal Imaging

The gold standard is that UGI contrasts are undertaken by a Consultant Paediatric Radiologist. Requests should be made to the radiology department by the surgical team following admission of the patient, as outlined below. The paediatric radiology team at UHS accept that these studies should be performed in a timely manner and will prioritise according to clinical need.

1. In core working hours (9-5): a request for UGI should be made through the paediatric X-ray department reception desk who will co-ordinate accordingly.

2. Outside core working hours: requests should be made by the surgical team directly to the on call paediatric radiologist registrar. The radiology registrar will then organise accordingly and liaise back to the surgical team.

Management following surgical assessment

Infants who have a surgical diagnosis will be managed by the paediatric surgical team. A very small proportion of infants will require the ongoing input of tertiary services whether surgery is indicated or not.

1) UHS Patients

If no surgical problem is identified it should be documented in the medical notes if care is to be transferred to the neonatal medical team.

2) Network referrals

If no surgical problem is identified consideration will be made by the surgical team as to where ongoing management is best placed, options include;

1) Repatriation to the referring hospital for medical management

2) Ongoing management at UHS.

All patients should have had a clinical assessment and the majority of infants with a normal contrast and no surgical problem will be repatriated to their local unit for ongoing care. A referral should be made to SONeT for the repatriation. It may be possible to repatriate these babies immediately following a surgical assessment but others will need to remain in Southampton until they can be repatriated. Timing of repatriation will be dependent on the SONeT activity and in accordance to SONeT transfer policy.

Consideration will be made by the UHS teams as to where the infant is best placed until repatriation can occur. If the infant has been admitted to PICU it may be appropriate to transfer the infant to the NICU whilst awaiting repatriation to be facilitated or for ongoing tertiary assessment.

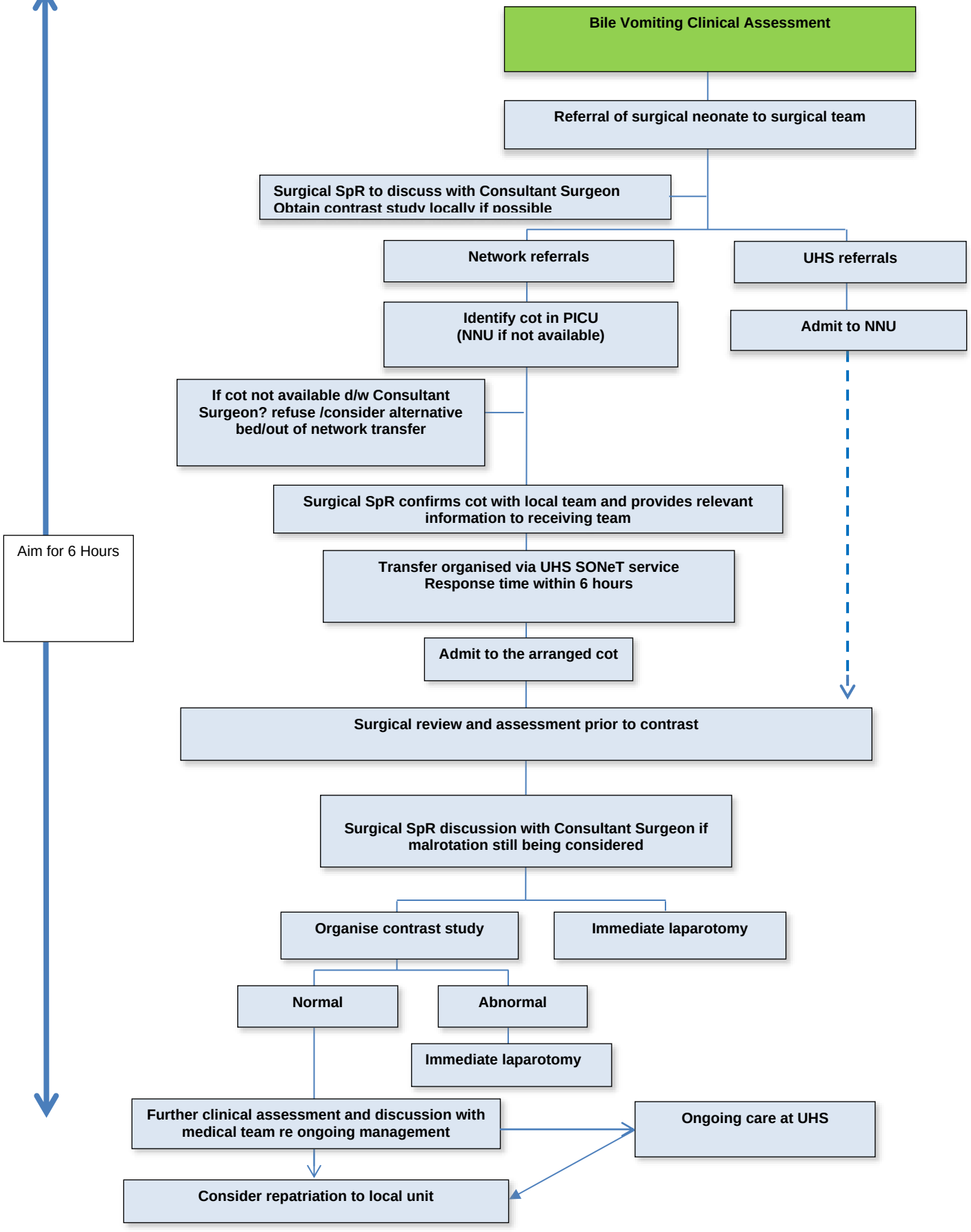
5.0 Arrangements for Review of the Policy

This policy will be reviewed every 3 years as appropriate.

Version Control:

Version	Date	Details	Author(s)	Comments
1	Feb '15	Final for ratification	Melanie Drewett	Wessex Neonatal Clinical Forum
1.7	Jan '17	Updated to reflect the Network Transport Services. Document reviewed and Emergency Transfer (page 6) revised by Dr Puddy and Mr Keys.	Melanie Drewett Mr Charles Keys Dr Victoria Puddy	Approved by TV&W Neonatal ODN Governance Group
1.8	Mar '17	Transposed to the Network format. Link for the Related Trust Documents removed as not available outside UHS, therefore Dr Victoria Puddy removed from the Author list.	Melanie Drewett Mr Charles Keys Dr Victoria Puddy	Updated as requested
1.9	Apr '17	Network Manager/Chair to approve	Melanie Drewett Mr Charles Keys	Approved
Review Date: February 2018 **Currently being reviewed in 2022**				

Appendix 1: Pathway for term infants with bile vomiting for exclusion of malrotation



Appendix 2 – Green vomiting as reflected by boxes 5 - 8.

Fig 1: BMJ. Jun 10, 2006; 332(7554): 1363. Ref (2)

It is generally advocated that there should be prompt assessment of any infant with green vomiting (5-8).

Note yellow vomiting does not exclude mechanical obstruction.