Surgical Conditions Affecting Neonates in Scotland Managed Clinical Network

MANAGEMENT OF BABIES WITH SUSPECTED OR CONFIRMED DUODENAL ATRESIA AFTER BIRTH

NOTE

This guideline is not intended to be construed or to serve as a standard of care. Standards of care are determined based on all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgement should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

Document Control Sheet

Title:	Management of babies with suspected or confirmed Duodenal Atresia after birth
Lead Author(s)	See Appendix 3
Date Published/	May 2025
Date Effective From:	May 2025
Version/Issue	1.1
Document Type:	Guideline
Document Status:	Final
Owner:	Surgical Conditions Affecting Neonates in Scotland (SCANS) Network
Approver:	SCANS Steering Group and Scottish Perinatal Network Neonatal Guideline Oversight Group
Approval Date:	May 2025
Contact:	nss.scans@nhs.scot
File Location:	

Revision History:

Version:	Date:	Summary of Changes:	Name:	Changes Marked:
1.0	Mar 2025	Original version		
1.1	June 2025	Added membership and details on document control and ownership	Carsten Mandt	No

This document has been prepared by NHS National Services Scotland (NSS) on behalf of the Surgical Conditions Affecting Neonates in Scotland (SCANS) Network. Accountable to Scottish Government, NSS works at the heart of the health service providing national strategic services to the rest of NHS Scotland and other public sector organisations to help them deliver their services more efficiently and effectively. SCANS is a collaboration of stakeholders involved in the care of babies with surgical conditions, who are supported by an NSS Programme Team to drive improvement across the care pathway.

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Management of babies with suspected or confirmed Duodenal Atresia after birth

These guidelines have been developed by the Steering Group of the Surgical Conditions Affecting Neonates in Scotland (SCANS) Managed Clinical Network. These recommendations are applicable to all healthcare professionals caring for babies with suspected or confirmed duodenal atresia (DA).

Throughout this document we use the term parent to mean all parents, carers and legal guardians, and the term mother to mean all women and people who have given birth.

The guidelines are underpinned by the following key principles:

1. Babies with DA should be managed on a surgical neonatal intensive care unit (NICU) with joint care provided by neonatologists and paediatric surgeons (1). For the purposes of these guidelines, the surgical NICUs are located in Glasgow (Royal Hospital for Children), Edinburgh (Simpson's Centre for Reproductive Health) and Aberdeen (Royal Aberdeen Maternity Hospital)
2. Network pathways and processes should be in place to ensure that:
    a. Where there is an antenatal suspicion of DA, the family receive multi-disciplinary counselling involving fetal medicine, neonatology and paediatric surgery, ideally as a joint session.
    b. Where there is an antenatal suspicion of DA, delivery is planned in a maternity unit co-located with a surgical NICU to negate the need for postnatal transfer and the potential separation of mother and baby.
    c. Where the diagnosis is suspected or confirmed postnatally, referral to the surgical NICU is performed in a timely manner, ideally within 1 hour. Referral should be via the **ScotSTAR emergency line 03333 990 222**, which will initiate a conference call.
    d. Repatriation from the surgical NICU to the local hospital is facilitated as soon as possible when clinically appropriate (2).

Contact details for the three surgical NICUs can be found in Appendix 1 at the end of this guideline.

Background

DA is a condition where the duodenum has not properly formed causing a high intestinal obstruction. Less than half of babies with DA will be diagnosed before birth. Those diagnosed antenatally are at less risk of complications due to upper GI losses, including hypovolaemia, electrolyte disturbance – typically a hypochloraemia alkalosis - and haemodynamic instability.

The care of a baby with DA may be directed depending on co-existing congenital anomalies. 30% may have an underlying genetic condition, such as Trisomy 21, and up to 20% may have associated congenital anomalies, for example VACTERL.

Delivery room (DR) management

Routine delay of umbilical cord clamping (DCC) for at least 60 seconds is recommended in babies who are not compromised at the time of birth. Suspected DA is not considered a contra-indication to DCC. (2-4)

- Neonatal staff with appropriate training and competencies should attend the delivery
- If required, stabilise the baby in accordance with NLS guidance
- Insert large born gastric tube (8F or 10F)
- Transfer the baby to NICU for ongoing care when stable

Ongoing neonatal unit management

1. Monitoring and vascular access

Standard NICU monitoring should be used. Secure peripheral venous access should be established early in the infant's admission to NICU. As many infants will need several weeks of parental nutrition, early insertion of a percutaneous long line (PICC) is recommended. Ideally, umbilical access should be avoided as umbilical lines will have to be removed during surgical repair.

2. Analgesia and sedation

Monitoring of pain/sedation using an appropriate assessment tool should be part of routine care. If analgesia/sedation is required this should be administered according to local guidance.

3. Refer/discuss with specialist centre

Once stabilised babies born out with one of the three regional surgical NICUs should be discussed with the nearest specialist team as soon as possible after birth. A conference call involving ScotSTAR Neonatal Transport Service should be initiated to facilitate timely transfer.

4. Fluid balance

Intravenous fluid management should be guided by local practice. Babies with DA may initially have high gastric losses, and consideration should be given to replacing these if volumes in excess of 20ml/kg are aspirated, especially if accompanied by signs of hypovolaemia. Normal (0.9%) saline with additional potassium chloride (10mmol/500ml) is recommended as replacement fluid.

5. Antibiotics

Antibiotics are not routinely required unless there are other risk factors for, or clinical signs of sepsis.

6. Enteral feeding

Enteral feeding is delayed until after confirmation of the diagnosis and surgical correction. The infant should receive all nutrition parenterally prior to surgical correction of DA. Remain nil by mouth with a gastric tube on free drainage and regular aspiration as instructed. Breast milk is recommended as there are lifelong benefits and mothers should receive appropriate lactation support to enable them to establish their milk supply whilst baby is nil by mouth; information about donor milk should also be given if required. Early involvement of a specialist neonatal dietician is advised if there are issues with weight gain and growth.

7. Surgical review

For antenatally suspected DA, surgical review should occur promptly following admission to the neonatal unit. Otherwise, surgical review should occur at the earliest opportunity following suspected diagnosis of DA. It is anticipated that pending surgical review, all infants will be nil by mouth and have a gastric tube in place. An abdominal x-ray should be performed to confirm the diagnosis – the appearance of a double bubble is characteristic of DA. In all patients with DA, consideration has to be given that this may represent an obstructed malrotation. The presence of distal gas on AXR should raise suspicion and prompt further discussions around appropriate investigation and management.

8. Specialist review / investigations

Mortality associated with DA is <10% and is related to the presence of associated anomalies, or prematurity rather than the DA. Routine echocardiography and renal ultrasound are recommended for babies with DA. If any features of trisomy 21 are noted or there is any uncertainty around this diagnosis, definitive genetic testing should be performed after obtaining consent from parents

Surgical management

1. Pre-operative work up

Surgical management of these patients requires appropriate preparation. The following principles should apply:

- Informed consent should be taken by the surgeon performing the procedure in a quiet and comfortable area with support from nursing and neonatal staff.
- Patients should have documentation of any major cardiac abnormalities.
- The position of the anus should have been documented and the operating surgeon aware.
- Samples should be sent for group and save according to local guidelines.

2. Surgery

DA rarely requires urgent surgical management and timing of surgery is dependent on the clinical condition of the baby and any associated abnormalities. Where possible, the following key principles should be adhered to:

- Surgical management should be undertaken in normal working hours if possible as this ensures that the most appropriate staff are on site to manage what can be a complex patient
- The presence of anorectal malformation or oesophageal atresia will change the urgency of the surgery for these patients
- Anaesthetic care should be provided by a paediatric anaesthetist with experience managing complex surgery in neonates
- Both open and minimally invasive repair are considered acceptable management of DA
- A duodeno-duodenostomy is the preferred method of repair, but some more complex scenarios may require a duodeno-jejunostomy
- Care should be taken to look for any proximal or distal atresia as some patients can have multiple atresias
- A trans-anastomotic tube (TAT) may be inserted. This is usually inserted via the nose, and bypasses the anastomosis to sit in the distal bowel.
- TAT presence may allow earlier introduction of milk feeds, as guided by post-operative review.
- If a TAT is used, then gastric drainage should initially be performed via an orogastric tube (OGT)
- If no TAT is inserted then a nasogastic (NG) tube should be kept.

3. Post-operative care

All patients should be managed in the neonatal intensive care unit after surgery. Some will remain intubated and ventilated. The following key principles apply:

- Feeds can be commenced via TAT or NGT at the surgeon's discretion. There is some evidence in the literature that TAT feeds can be commenced within 24 hours
- Parenteral nutrition should continue until adequate feed volumes are tolerated
- If a TAT is used, it should remain in place until patient has graded to oral/gastric feeding
- Routine contrast studies are not recommended unless there is a concern about stricture or a second atresia.

References

1. BAPM Service and Quality standards for provision of Neonatal Care in the UK, November 2022
2. Intrapartum Care for healthy women and babies. NICE guideline CG190, updated 2022, recommendation 1.14.14
3. RCOG Scientific Impact Paper 14, Clamping of the Umbilical Cord and Placental Transfusion, February 2015
4. Newborn Resuscitation and support of transition of infants at birth Guidelines, Resuscitation Council UK, 2021
5. *Congenital duodenal obstruction in the UK: a population-based study*, Bethel et al, Archives of Disease in Childhood, Fetal & Neonatal Edition, 2020; 105(2), 178-183

Appendix 1: Contact details for 3 Surgical Units in Scotland

- **Glasgow**

Royal Hospital for Children: Receiving consultant neonatologist 0141 452 2114 and / or on call consultant paediatric surgeon via switchboard 0141 201 0000

- **Edinburgh**

On call paediatric surgical registrar or consultant paediatric surgeon via switchboard 0131 536 0000 and on call consultant neonatologist via same number

- **Aberdeen**

On call consultant neonatologist and on call consultant paediatric surgeon via switchboard 0845 456 6000. Alternatively contact the neonatal unit directly on 01224 552602.

Appendix 2: Transport Recommendations

Transfer of the infant with duodenal atresia
Infants with duodenal atresia (DA) born in a non-surgical centre will require an emergency transfer to a surgical unit for assessment and on-going management. These patients are at a high risk of deterioration and must be managed with caution.

Referral process
Infants presenting with DA require transfer to the neonatal surgical regional centres in either Aberdeen, Edinburgh or Glasgow.

- Every effort should be made to ensure that these infants deliver in the appropriate surgical centre. Where that is not possible, planning should begin on presentation to their local centre for prompt transfer after birth.
- Referral is made by calling the **ScotSTAR emergency number 03333 990 222** and the relevant surgical and neonatal teams should be brought into the call. If the baby has been delivered, dispatch of the transport team should not be delayed by difficulties in bringing others onto the conference call. The call should be made before birth wherever possible, to allow confirmation of cot destination and immediate stabilisation plans to be made without delaying transfer.
- Referrals of these infants should be should be triaged by the on-call neonatal transport consultant and the team dispatched accordingly.

Transfer Considerations

- Follow the Delivery room management on page two of this guideline.
- Leave the NG tube on free drainage and aspirate regularly. Close monitoring/documentation of output is necessary as these can be large and persistent in these infants. Losses should be replaced when >20mls/kg/day in a well perfused infant. If replacing losses please use 0.9% sodium chloride with 10 millimoles of potassium per 500ml bag.
- Secure 2 points of IV access.
- IV fluids/ medications should be in 50ml syringes in preparation for transfer.
- Analgesia or sedation needs to be considered prior to transfer and handling of the baby. This is not usually required with this condition unless ventilated for a respiratory reason.
- Ensure an Abdominal X-Ray has been performed at the referring centre and that this has been seen by the team transferring the infant.
- Duodenal atresia can be associated with other anomalies and Trisomy 21.

Appendix 3: SCANS Steering Group Membership

Claire Adamson	Clinical Nurse Manager	NHS Lothian
James Andrews	Consultant Paediatric & Neonatal Surgeon	NHS Greater Glasgow & Clyde
Shona Cowan	Consultant Obstetrician	NHS Lothian
Paul Cullis	Consultant Paediatric & Neonatal Surgeon	NHS Lothian
Janice Gibson	Consultant Obstetrician	NHS Greater Glasgow & Clyde
Lorna Hood	Nurse Consultant	NHS Forth Valley
Suzanne Krosnar	Consultant, Theatre and Anaesthetics	NHS Lothian
Pamela Lamont	Fetal Medicine Midwife	NHS Lothian
Jacinta Leonard	Staff Nurse, Critical Care	NHS Lothian
Andrew MacLaren	Consultant Neonatologist	NHS Greater Glasgow & Clyde & ScotSTAR
Carsten Mandt	Senior Programme Manager, SPN	NHS NSS
Carolyn McConnell	Neonatal Nurse	NHS Greater Glasgow & Clyde
Elaine McCover	Sonographer	NHS Grampian
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Vix Monnelly	Consultant Neonatologist	NHS Lothian
Inass Osman	Consultant Obstetrician	NHS Ayrshire & Arran
Neil Patel	Consultant Neonatologist	NHS Greater Glasgow & Clyde
Yatin Patel	Consultant Paediatric Surgeon	NHS Grampian
Rachel Richmond	Patient Representative	CDHUK
Lauren Shaw	Consultant Neonatologist	NHS Tayside
Judith Simpson	Consultant Neonatologist	NHS Greater Glasgow & Clyde
Ben Stenson	Consultant Neonatologist	NHS Lothian
Lisa Steven	Consultant Paediatric Surgeon	NHS Tayside
Gregor Walker	Consultant Paediatric & Neonatal Surgeon	NHS Greater Glasgow & Clyde