

GUIDELINE FOR SURFACTANT ADMINISTRATION VIA LARYNGEAL OR SUPRAGLOTTIC AIRWAY (SALSA) TO TREAT NEONATES WITH RESPIRATORY DISTRESS SYNDROME

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

Introduction

This guideline aims to provide an additional method of surfactant administration that is less traumatic and easier when compared to current methods used on our neonatal unit. The need for neonatal intubation proficiency is not required. This should provide to staff an additional option for surfactant administration and avoidance of delays in surfactant administration.

This guideline is for use by the following staff groups:

Neonatal Medical and Nursing teams

Lead Clinician(s)

Dr Paul Watson

Consultant Paediatrician

Approved by Paediatric Governance Meeting on: 16th April 2025

Approved by Medicines Safety Committee on: 11th June 2025

Review Date:

This is the most current document and should be used until a revised version is in place

Key amendments to this guideline

Date	Amendment	Approved by:

Preterm babies are prone to respiratory distress syndrome (RDS) due to surfactant deficiency. The risk of death and bronchopulmonary dysplasia (BPD) have been shown to be reduced by treatment with surfactant. The standard method of surfactant administration involves endotracheal intubation and a period of mechanical ventilation and we know that mechanical ventilation can damage the fragile preterm lungs.

Several less invasive techniques for surfactant administration with reduced requirement for mechanical ventilation have been introduced into clinical practice. Six randomised controlled trials involving 395 babies have shown that RDS can be treated by administering surfactant via supraglottic airway devices. All these randomised controlled trials were generated in tertiary units. However, the greatest potential for benefit from these devices is likely to be in non-tertiary units. The success rate of Laryngeal mask airway (LMA) insertion at first attempt in infants was reported to be 69 – 100%.

I-gel® © Intersurgical Ltd has been found to be easy to use even in inexperienced users.

Inclusion Criteria

- Birth weight > 1250grams
- Gestational age > 28weeks
- RDS confirmed on chest x-ray or lung ultrasound
- Sustained FiO₂ of > 30% on CPAP
 - Can be considered at lower FiO₂ if oxygen requirement is rising and the baby has increased work of breathing

Exclusion Criteria

- Previous intubations
- Imminent intubation
- Pneumothorax
- One previous attempt at i-gel surfactant
- Major congenital abnormalities like maxillofacial, tracheal or known pulmonary malformations and confirmed or suspected congenital cardiac disease

Location

Surfactant administration via size 1 i-gel should be carried out on the neonatal unit where full monitoring and emergency equipment are available.

Personnel

Staff members involved in this procedure are:

- Medical staff
- Nursing staff
- Advanced Neonatal Nurse Practitioners
- Middle Grade Paediatrician/ANNP to attend all cases of surfactant administration via i-gel to supervise and ensure the guideline is followed, appropriate documentation in patient notes.

Equipment Required (See Images below)

- Ergonomic T-Piece with Duckbill port (SALSA t-piece) connected to the Neopuff base
- I-gel size 1
- *Optional - Laryngoscope handle and appropriately sized blade can be used if preferred*
- Lubricating gel
- Surfactant giving set
- CO2 detector which fits onto end of SALSA t-piece
- Appropriately sized face mask
- Suction and large bore suction catheters (size 10Fr)
- Orogastric tube (to insert after procedure) and fixation tapes
- Intubation equipment readily available
- Sucrose or MEBM if available
- Non – sterile gloves and apron

Medications (prescribe on front of prescription chart)

- Caffeine Citrate 20mg/kg IV to be given prior to procedure
- Curosurf® dosing as per neonatal formulary. 1st dose = 200mg/kg/dose, 2nd and 3rd doses 100mg/kg/dose. Vials available 120mg/1.5mL and 240mg/3mL
- Atropine 20 microgram/kg IV prescribed and drawn up to use as required
- Sodium Chloride 0.9% IV flush to test IV access and for use with Atropine if needed

Preparation for Procedure

- Discuss with parents why their baby needs surfactant, the benefits and potential risks of surfactant administration.
- Ensure parents have been offered support during the procedure e.g. midwife or nurse
- Babies should be on CPAP with clinical and/or radiological evidence of RDS. Where the baby is on high flow with worsening respiratory distress or rising oxygen requirement, the baby should be changed to nasal CPAP and observed for at least 30minutes. Consider repeating the CXR based on clinical findings on examination of baby and time interval from previous CXR.
- Ensure loading dose of IV caffeine citrate has been given.
- Ensure baby has a functioning cannula.
- Continuous monitoring of heart rate and oxygen saturations.
- Ensure measures in place to maintain normothermia. Check temperature before and after procedure.
- Baby should be positioned supine as for intubation.
- Swaddle baby (leaving chest visible) and provide comfort holding
- Administer Sucrose or MEBM orally as needed before procedure
- Ensure the port on the SALSA t-piece is patent by passing the introducer through it and that the surfactant giving set catheter passes easily. If the port is not patent replace the SALSA t-piece.
- Connect the SALSA t-piece to the neopuff it can be used in the standard way to provide PEEP and IPPV.
- Set the PIP, PEEP and oxygen as per UK Resus council guidance.
- Maintain the same PEEP and FiO2 that baby required whilst on CPAP.
- Ensure suction is working.
- Draw up prescribed dose of Curosurf.
- Remove i-gel from packaging.

- The stomach should be emptied of contents and air immediately prior to procedure and orogastric tube removed.

Role Allocation during procedure

- One staff member should lead the SALSA procedure with 2 others assisting.
- The i-gel should be inserted and held in place by a team member responsible for airway control during the procedure.
- A second member of the team should carry out all additional manoeuvres including attaching and removing the CO₂ detector, re-attaching the t-piece circuit to the i-gel, passing the surfactant catheter and giving the Curosurf.
- A third person will be required to pass an orogastric tube, aspirate the stomach contents, fix the orogastric tube, check temperature before and after procedure etc.

Insertion of i-gel and administration of Curosurf

- Lubricate the back and sides of the i-gel.
- Tilt the baby's head back slightly, open the mouth and apply jaw thrust.
- Insert the tip of the i-gel along the hard palate with the open side facing the tongue. Move the tongue out of the way using either a finger or the blade of the laryngoscope. Continue until you feel a resistance when the i-gel tip sits on the oesophagus. The opening of the i-gel mask should cover the entrance to the larynx.
- Attach the CO₂ detector and SALSA t-piece ensuring appropriate PEEP is delivered.
- Confirm placement with CO₂ detector changing to yellow. Reposition if required.
- Remove CO₂ detector and connect SALSA t-piece directly to i-gel.
- Monitor heart rate and oxygen saturations. There may be transient bradycardia with or without desaturation and apnoeas with insertion and removal of the i-gel. These often resolve spontaneously. If not give a brief period of IPPV via SALSA t-piece and increase oxygen as per usual.
- Pass the surfactant catheter through the side port and into the i-gel
- For size 1 i-gel: insert catheter to a depth of 16cm. Ensure that the catheter is not coiled back upwards. There may be resistance as the catheter nears the end of the i-gel. Gentle manipulation or injection of a small amount of Curosurf to lubricate the tip of the catheter may help to overcome the resistance.
- Give the Curosurf over 2 to 5 minutes as tolerated. If baby desaturates, becomes bradycardic or apnoeic pause briefly to allow baby to recover or give a period of IPPV and increased oxygen via the i-gel via the SALSA t-piece.
- Remove the surfactant catheter from the i-gel.
- Ensure the CPAP mask or prongs are back in place prior to removing the i-gel and baby continues on the standard nasal CPAP.









Post Procedure






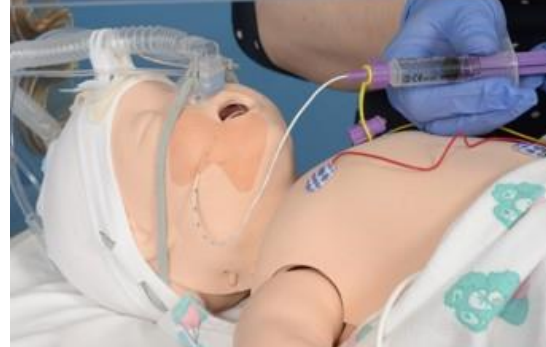
- Check and document vital signs and temperature.
- Pass a new orogastric tube and aspirate the stomach.
- Document any residual surfactant obtained from orogastric tube. If more than 50% of the administered dose of Curosurf is aspirated from the stomach post SALSA, the risk of clinical deterioration increases and these babies should be closely monitored and may require a second dose of surfactant via ETT (InSurE) based on clinical status 2 hours after the procedure.
- Continue on nasal CPAP and wean oxygen and PEEP as tolerated.
- Post procedural blood gas should be considered with clinical progress.

- No need to repeat Chest x-ray unless there is clinical deterioration.
- Update parents on how baby tolerated procedure and discuss next steps.
- The SALSA procedure should be documented the patient badgernet notes.

Images (Taken from NHSGGC Guideline)

	
Equipment required	
	
Prepare the Duckbill Port by passing the surfactant catheter or stylet to ensure it is patent	
	
Connect circuit to neopuff, set PEEP, PIP and oxygen	Attach CO2 detector and place in incubator

	
Aspirate and remove orogastric tube, ensure optimal CPAP and monitoring	Give dose of sucrose/MEBM
	
Lubricate the back and sides of the I-Gel and the tip of the surfactant giving set	
	
Insert I-Gel and hold in place	
	
Connect the circuit and ensure pedicap colour change, repositioning the LMA if required.	

	
Remove the CO2 detector and connect the circuit directly to the LMA.	Introduce the surfactant catheter through the duckbill port.
	
Advance the catheter to 16cm ensuring it has not coiled. A small amount of surfactant can be given to lubricate the lumen of the LMA if needed.	Give the surfactant slowly over 2-5 mins. In the case of bradycardia, apnoea or desaturation pause and provide IPPV and PEEP as required.
	
Ensure the nasal CPAP is fitted correctly before removing the LMA.	Replace and then aspirate the orogastric tube documenting the volume of any surfactant.

References

1. Abdel-Latif ME, Walker E, Osborn DA. Laryngeal mask airway surfactant administration for prevention of morbidity and mortality in preterm infants with or at risk of respiratory distress syndrome. Cochrane Database of Systematic Reviews 2024, Issue 1. Art. No.: CD008309. DOI: 10.1002/14651858.CD008309.pub3.
2. British National Formulary for Children (BNFc). 2023-2024 London: British Medical Association and Royal Pharmaceutical Society of Great Britain
3. Roberts CT, Manley BJ, O'Shea JE, Stark M, Anderson C, Davis PG, Buckamster A (2020) Supraglottic airway devices for administration of surfactant to newborn infants with respiratory distress syndrome: a narrative review. Archives of Disease Childhood: Fetal and Neonatal Edition. [Accessed September 2024]
4. Sweet DG, Carnielli VP, Greisen G, Hallman M, Klebermass-Schrehof K, Ozek E, Te Pas A, Plavka R, Roehr CC, Saugstad OD, Simeoni U, Speer CP, Vento M, Visser GHA, Halliday HL. European Consensus Guidelines on the Management of Respiratory Distress Syndrome: 2022 Update. Neonatology. 2023;120(1):3-23. doi: 10.1159/000528914. Epub 2023 Feb 15. PMID: 36863329; PMCID: PMC10064400.
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6. Tracy MB, Priyadarshi A, Goel D, Lowe K, Huvanandana J, Hinder M (2018) How do different brands of size1 laryngeal mask airway compare with face mask ventilation in a dedicated laryngeal mask airway teaching manikin? Archives of Disease Childhood: Fetal and Neonatal Edition. [Accessed September 2024]
7. West of Scotland Neonatology Managed Clinical Network. Surfactant Administration via Laryngeal Mask Airway (LMA). Standard Operating Procedure. October 2020.
8. Yang C, Zhu X, Lin W, Zhang Q, Su J, Lin B, Ye H, Yu R (2016) Randomised controlled trial comparing laryngeal mask versus endotracheal intubation during neonatal resuscitation – a secondary publication. BMC Paediatric. [Accessed September 2024]

Monitoring

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the Policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: <i>(Responsible for also ensuring actions are developed to address any areas of non-compliance)</i>	Frequency of reporting:
	WHAT?	HOW?	WHEN?	WHO?	WHERE?	WHEN?
Procedure	Efficacy of procedure and any adverse events related to procedure	Observing trends in procedure (or other surfactant administration) needing repeating Observing any adverse events from procedure through DATIX and Neonatal M&M	In line with the standard guideline review as a minimum, so every 3 years or more frequently if recommendations change / DATIX or adverse event occurs	Neonatal Consultants	Discussed at Neonatal Unit Meeting, or Neonatal M&M	Monthly meetings, Quarterly M&Ms

References

North Lincolnshire and Goole NHS Foundation Trust 2021-2024 Guideline for surfactant administration via i-gel to treat neonates with respiratory distress syndrome.
 Worcestershire Acute Hospitals NHS Trust Guideline for Surfactant Replacement Therapy 2022-2024

Contribution List

Contribution List

This key document has been circulated to the following individuals for consultation;

Designation
Dr Paul Watson Consultant Paediatrician
Elizabeth Goodwin Neonatal Clinical Nurse Educator
Linda McDonald ANNP (Advanced Neonatal Nurse Practitioner)
Dr Vivi Weckemann Neonatal Lead Consultant
Dr Wasiullah Shinwari Clinical Director Consultant Paediatrician
Louise Williams Neonatal and Paediatric Lead Pharmacist
Lara Greenway Matron for Neonatal Services
Dr Peter Van der Velde Consultant Paediatrician
Dr Anna Gregory Consultant Paediatrician
Dr Liza Harry Consultant Paediatrician
Dr Prakash Kalambettu Consultant Paediatrician

This key document has been circulated to the chair(s) of the following committee's / groups for comments;

Committee
Neonatal Unit Development Meeting September 11 th 2024
Paediatric Governance Meeting
Medicines Safety Committee

Supporting Document 1 - Equality Impact Assessment Tool



Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form

Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust	X	Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	Dr Paul Watson Consultant Paediatrician
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Details of individuals completing this assessment			
	Name	Job title	e-mail contact
	Linda McDonald	ANNP	linda.mcdonald13@nhs.net
	Beth Goodwin	NNU Clinical Educator	elizabeth.goodwin11@nhs.net
Date assessment completed	24/10/2024		

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	Introduction of guideline for surfactant administration via laryngeal or supraglottic airway (salsa) to treat neonates with respiratory distress syndrome. Trust taking part in international SURFSUP trial. Evidence including national and European guidance reviewed as per reference list. Training strategy including face to face and video medical and nursing education sessions. Audit document created and in place.		
What is the aim, purpose and/or intended outcomes of this Activity?	Introduce new method of less invasive surfactant administration		
Who will be affected by the development & implementation of this activity?	<input type="checkbox"/> Service User <input checked="" type="checkbox"/> Patient <input type="checkbox"/> Carers <input type="checkbox"/> Visitors	<input checked="" type="checkbox"/> Staff <input type="checkbox"/> Communities <input type="checkbox"/> Other _____	

Is this:	<input type="checkbox"/> Review of an existing activity <input checked="" type="checkbox"/> New activity <input type="checkbox"/> Planning to withdraw or reduce a service, activity or presence?
What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.)	Introduction of alternative non invasive method of delivering surfactant
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	Circulated to neonatal senior staff and paediatric directorate
Summary of relevant findings	Approved

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale.** Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential <u>posit</u> <u>ive</u> imp act	Potential <u>neut</u> <u>ral</u> imp act	Potential <u>neg</u> <u>ativ</u> <u>e</u> imp act	Please explain your reasons for any potential positive, neutral or negative impact identified
Age		X		
Disability		X		
Gender Reassignment		X		
Marriage & Civil Partnerships		X		
Pregnancy & Maternity		X		
Race including Traveling Communities		X		
Religion & Belief		X		

Equality Group	Potential <u>posit</u> <u>ive</u> imp act	Potential <u>neut</u> <u>ral</u> imp act	Potential <u>neg</u> <u>ativ</u> <u>e</u> imp act	Please explain your reasons for any potential positive, neutral or negative impact identified
Sex		X		
Sexual Orientation		X		
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic deprivation, travelling communities etc.)		X		
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)		X		

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
	NA			
	NA			
	NA			
How will you monitor these actions?	NA			
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)	NA			

Section 5 - Please read and agree to the following Equality Statement**1. Equality Statement**

- 1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation
- 1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.
- 1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	Linda McDonald (ANNP)
Date signed	24/10/2024
Comments:	Nil
Signature of person the Leader Person for this activity	Dr Paul Watson
Date signed	24/10/2024
Comments:	Nil

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	No
2.	Does the implementation of this document require additional revenue	No
3.	Does the implementation of this document require additional manpower	No
4.	Does the implementation of this document release any manpower costs through a change in practice	No
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	No
	Other comments:	No

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval.