Sucrose 24%
NEWBORN USE ONLY

2021

Alert	Sucrose for this purpose is a medication and needs to be prescribed and documented on the medication chart.
Indication	Analgesia –relief of pain for infants undergoing minor procedures.
Action	Orally mediated increase in endogenous opioids and multi-sensorial stimulation.
Drug type	
Trade Name	Sucrose Oral Solution 24% (Phebra). SweetUms 24% Sucrose (Atris)
Presentation	24% sucrose oral solution 1 mL.
Dose	0.1 mL (=0.024 g or **2 drops**) of sucrose 24% as required (1)
Dose adjustment	Not applicable.
Maximum DAILY dose	ANMF consensus: <32 weeks: 1 mL; 32-40 weeks: 2.5 mL; ≥40 weeks: 5 mL
Total cumulative dose	
Route	Oral
Preparation	
Administration	Administer onto buccal mucosa – under tongue or anterior tongue toward cheek. Do not administer directly into the stomach via an intra-gastric tube. Administer 2 minutes prior to the procedure. Offer a pacifier if this is part of the infant's care. Encourage non-nutritive sucking, as it may increase the pain relief effect. Dose can be repeated at the time of commencement.
Monitoring	Monitor for signs of gagging and choking. Monitor for effectiveness — reduction in behavioural and physiological signs of pain.
Contraindications	Infants with known intolerance to sucrose or fructose.
Precautions	Use with caution in preterm neonates, intubated infants, infants who are muscle relaxed, infants with confirmed or suspected necrotising enterocolitis, infants with altered or impaired gag and swallow reflexes and infants who are nil by mouth. Major procedures (e.g. insertion of a chest drain) requiring increased pain relief — consider other pain relief measures. Infants requiring investigations for hypoglycaemia and inborn errors of metabolism.
Drug Interactions	Nil
Adverse Reactions	Sucrose is generally well tolerated. Administration may be associated with minor oxygen desaturation, choking, bradycardia and brief apnoeas.[1]
Compatibility	Not applicable.
Incompatibility	Not applicable.
Stability	Single use only.
Storage	Store below 25°C.
Excipients	
Special Comments	Breast milk is the first choice and sucrose is used when breast milk is not available. Oral sucrose should be used in addition to other supportive non-pharmacological measures.
Evidence	**Background** Sucrose has been shown to be an effective analgesic for minor procedures in neonates. Analgesic effect appears to be a biphasic mechanism. There is initially an immediate response, within 10 seconds, due to the taste of sucrose. This is followed by the second mechanism of release of endorphins. The peak effect appears to be 2 minutes and therefore it is common practice to use a 2 minute interval prior to the painful procedure.(2) **Efficacy** Sucrose is effective for reducing procedural pain from single events such as heel lance, venepuncture and intramuscular injection in both preterm and term infants. Sucrose is not effective in reducing pain from circumcision. The effectiveness of sucrose for reducing pain/stress from other interventions such as arterial puncture, subcutaneous injection, insertion of nasogastric or orogastric tubes, bladder catheterisation, eye examinations and echocardiography examinations are inconclusive. For

	eye examinations, there is limited evidence that sucrose may confer some pain relief when combined with other pain reducing interventions.(3) (LOE I, GOR A). Combined intervention of sucrose and non-nutritive sucking are more effective in providing analgesia than single intervention in term neonates undergoing heel lance.(4) (LOE II/GOR B). There were very few studies conducted in extremely preterm infants < 27 weeks gestation. Sucrose is possibly effective in reducing pain from immunisations from 1 to 12 months. (LOE I GOR B) Administration of glucose/sucrose had similar effectiveness as breastfeeding for reducing pain.(5) (LOE I GOR B) **Dose:** A multicentre Canadian RCT reported by Stevens et al in 2018 determined the minimally effective dose of 24% sucrose for reducing pain in 24-42 weeks GA infants undergoing a heel lance procedure. The minimal dose of 0.1 mL was as effective as 0.5 mL and 1.0 mL in reducing the pain intensity scores.(1) Earlier RCTs also reported smaller volumes of 0.05 mL were effective in preterm neonates. (6-8) **Sucrose strength:** The dose effect doesn't seem to be different with different strengths of sucrose (12.5%, 25%, 50%). (6, 7) **Repeat doses:** Johnston et al, in their RCT, found that 3 doses of 0.05 mL of sucrose at 2 minute intervals before and during the heel stick procedure in preterm neonates were more effective in reducing pain scores than a single dose prior to procedure. (8) There are no studies to provide evidence on the maximum number of doses that can be given in a day. Stevens et al, in their RCT, administered 0.1 mL of 24% sucrose before each painful procedure and mean number of procedures per baby varied from 3.1 to 11.8 per day. No major short term adverse effects were noted.(9) **Safety** Sucrose is generally well tolerated with reported adverse effects minor and similar in the sucrose and control groups.(1-3, 6-8, 10, 11) (LOE I, GOR A). Additional research is needed to determine the effect of repeated sucrose administration on pain intensity. There are no long-term studies on neurodevelopmental outcomes. However, Johnston et al observed neurobehavioural changes at term corrected age in infants < 31 weeks post-conceptual age receiving a cumulative dose > 1 mL in 24 hours (LOE II, GOR C).(12, 13) **Pharmacodynamics** The greatest analgesic effect occurs when sucrose is administered approximately two minutes before the painful stimulus. The peak effect appears to occur at two minutes and lasts approximately four minutes.(2, 3)
Practice points	
References	1. Stevens B, Yamada J, Campbell-Yeo M, Gibbins S, Harrison D, Dionne K, et al. The minimally effective dose of sucrose for procedural pain relief in neonates: a randomized controlled trial. BMC Pediatrics. 2018;18(1):85. 2. Bucher H-U, Von Siebenthal K, Keel M, Wolf M, Duc G. Sucrose reduces pain reaction to heel lancing in preterm infants: a placebo-controlled, randomized and masked study. Pediatric research. 1995;38(3):332-5. 3. Stevens B, Yamada J, Ohlsson A, Haliburton S, Shorkey A. Sucrose for analgesia in newborn infants undergoing painful procedures. Cochrane database of systematic reviews. 2016(7). 4. Thakkar P, Arora K, Goyal K, Das R, Javadekar B, Aiyer S, et al. To evaluate and compare the efficacy of combined sucrose and non-nutritive sucking for analgesia in newborns undergoing minor painful procedure: a randomized controlled trial. Journal of Perinatology. 2016;36(1):67-70. 5. Shah PS, Herbozo C, Aliwalas LL, Shah VS. Breastfeeding or breast milk for procedural pain in neonates. Cochrane Database of Systematic Reviews. 2012(12). 6. Haouari N, Wood C, Griffiths G, Levene M. The analgesic effect of sucrose in full term infants: a randomised controlled trial. Bmj. 1995;310(6993):1498-500. 7. Ramenghi LA, Griffith GC, Wood CM, Levene MI. Effect of non-sucrose sweet tasting solution on neonatal heel prick responses. Archives of Disease in Childhood-Fetal and Neonatal Edition. 1996;74(2):F129-F31. 8. Johnston CC, Stremler R, Horton L, Friedman A. Effect of repeated doses of sucrose during heel stick procedure in preterm neonates. Neonatology. 1999;75(3):160-6.

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