

HOW I DO IT PAEDIATRIC

A spoonful of sugar! Local anaesthetic and sucrose for minor procedures in newborns

Hannah Linkhorn MBChB, PGDip SurgAnat  0000-0002-0338-9635,^{1,a}

Sarah Gardiner MBBS, FRACS (Plast)  0009-0009-4466-4208¹

¹ Department of Plastic Surgery, Christchurch Hospital, Christchurch, NEW ZEALAND.

Keywords: neonate, polydactyly, preauricular tag, local anesthetic, sucrose

Submitted: October 12, 2023 AEST Accepted: April 19, 2024 AEST

DOI: 10.34239/ajops.116744

Australasian Journal of Plastic Surgery

Vol 8, Issue 1, 2025

Introduction

Preauricular skin tags and supernumerary digits (polydactyly) are common anomalies that parents often seek treatment for (**Figure 1**). Our preference for the best cosmetic outcome is surgical excision. Historically, patients over the age of 12 months have required a general anaesthetic for a minor surgical procedure. After observing a successful alternative at the Vancouver British Columbia Children's Hospital, a consultant-led service at Christchurch Hospital was implemented to perform minor procedures with local anaesthetic and sucrose analgesia in infants under six weeks of age.

Radial polydactyly has an incidence of 1 per 3000 live births and is more common in Caucasian and Asian populations. Ulnar polydactyly has an incidence as high as 1 per 143 live births in African ethnic groups and 1 per 1339 live births in Caucasian patients.¹ These are further classified into Type A (a well-developed digit requiring operative ablation) and Type B (a rudimentary or pedunculated appendage that can be managed with a simple procedure).²

Preauricular skin tags occur in 1.7 per 1000 live births. The tragus is derived from the first branchial arch and migrates from the lateral neck to the side of the head. The preauricular skin tag is a failure of complete fusion of the six hillocks.³ This is often an isolated deformity but it can be associated with other first and second branchial arch defects.

Sucrose analgesia

Sucrose analgesia is effective at reducing pain from single events—such as heel prick, venepuncture, intramuscular injection, nasogastric tube insertion and retinal examination—in infants of gestational age from 24 to 44 weeks.^{4–6}

The mechanism of action is not clearly understood. An early study in rats showed that sucrose increased endorphins through central opiate pathways with a positive calming effect. A

separate clinical study showed its effect in reducing crying in infants undergoing circumcision and heel prick tests.^{7,8}

The greatest reduction in physiological and behavioural pain is noted when sucrose is given two minutes prior to a painful procedure and this effect lasts approximately four minutes. Increasing the sucrose concentration reduces the proportion of time crying^{4,7,8} and is more effective when administered in combination with a pacifier.^{5,6}

^a Corresponding author: Hannah Linkhorn MBChB, PGDip SurgAnat; hannahlinkhorn@gmail.com

There is a very small risk of gagging but no major adverse side effects for single use.⁴

Sucrose 24% solution 0.5–2 mL (0.2–0.5 mL/kg) is a safe dose which can be administered via a syringe or on a pacifier.

Sucrose has been used for neonatal circumcision and, although it is not effective alone,⁴ if used in combination with local anaesthetic sucrose has been shown to be a positive adjunct.⁹

Operative technique

Referrals for skin tags and supernumerary digits are received from inpatient and community services. A consultation is arranged to examine the patient and inform parents of their options for removal. This could be under local anaesthesia (for neonates under six weeks of age) or general anaesthesia (for infants over 12 months of age). If the parent chooses local anaesthesia, the procedure is performed in the children's outpatient procedure room by a consultant plastic surgeon and a senior nurse (**Figure 2**).

1. The room is set up with a surgical bed, bipolar diathermy, procedure trolley, sterile pack and basic surgical instruments.
2. The baby is swaddled in a warm blanket with the nurse primarily caring for the infant. The

parent is seated on a chair beside the bed and is able to comfort their baby.

3. Sucrose 24% solution is administered on a pacifier or via syringe. A small amount is given at first and additional amounts are given as required (up to a maximum of 2 mL).
4. Xylocaine 1% with adrenaline is administered to the base of the supernumerary digit or skin tag. The area is prepped with aqueous povidone-iodine solution and a small window is made in one of the sterile disposable towels to create a sterile field.
5. Once anaesthetised, the base of the skin tag or the digit is excised with sharp iris scissors. We prefer to use iris scissors as we feel that we have more control over these if the baby does move.
6. Any accessory cartilage is trimmed so that it is not prominent under the skin. The adrenaline effect minimises blood loss and bipolar cautery is used for haemostasis as required.
7. When excising a supernumerary digit, the digit is tractioned and then excised at the base. Bipolar diathermy is applied to the neurovascular bundle. Traction on the neurovascular bundle will allow the digital nerve to retract and prevent neuroma.
8. Skin is closed with 5.0 fast absorbing plain gut suture and the wound is dressed with a double layer of Hypafix (Ethicon).
9. At one week we recommend using petroleum jelly to moisturise the area and help the sutures dissolve.
10. Patients are able to leave straight after the procedure and no observation period is required.



Fig 1. Rudimentary digit and preauricular skin tag in an infant

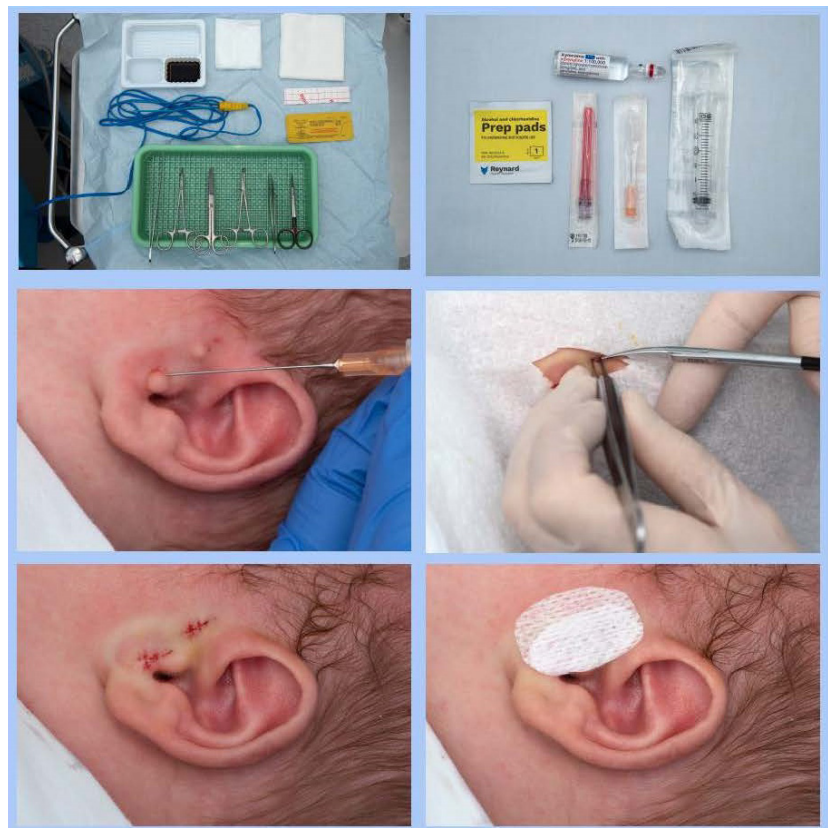


Fig 2. Surgical equipment and technique

Results

Over a 26-month period we received 27 referrals for infants under six weeks of age with preauricular skin tags or supernumerary digits. The mean age was 27 days (range 9–43 days).

There were 12 preauricular skin tags (10 unilateral, 2 bilateral) and 15 patients with polydactyly (12 unilateral and 3 bilateral). There was one referral from the neonatal unit that did not proceed with an intervention.

Procedural time for preauricular skin tags and supernumerary digits was 30 minutes for a unilateral case and 45 minutes for a bilateral case.

A survey was undertaken to assess parent satisfaction. All parents were phoned; 10 parents were able to be contacted and agreed to complete a post-procedure survey (38% response rate). Questions were asked about patient satisfaction, procedural concerns and complications. All respondents were very satisfied with the procedure using the 5-point Likert satisfaction scale (very satisfied, satisfied, neither satisfied or dissatisfied, not satisfied, very not satisfied). They also all reported that they would recommend this method to other parents and would choose this again if they had another baby with the same condition. There were no reported complications with postoperative pain, infection or scarring.

The survey did not require ethics approval; all parents consented to being part of the questionnaire and publishing of clinical photographs.

Discussion

This is a simple operative technique that could easily be adapted to other plastic surgery departments.

Similar methods have been described for minor procedures by a number of groups; however, each has slightly different age criteria and anaesthetic used.^{10–13}

In our experience, sucrose is effective in babies up to six weeks of age. We find that with the combination of sucrose, pacifier and swaddling they often sleep throughout the procedure. We have not performed this procedure in children

aged over 10 weeks and would prefer to schedule children who are aged over six weeks for a general anaesthetic at a later date.

Surgical excision has superior cosmetic outcomes compared to ligation. Up to 43 per cent of patients have a residual nubbin following suture ligation^{10,12,14} and excision reduces the risk of neuroma.

All responding parents had a positive experience and preferred their child to have the procedure as a neonate. Parents liked being at the bedside; it was quick, simple and better than they had expected. This positive feedback is consistent with other studies.¹¹

Performing this procedure in the outpatient setting is cost-effective thus allowing theatre resources to be otherwise used. The risks of general anaesthesia are not insignificant in young children and the SmartTots (Strategies for Mitigating Anesthesia-Related neuroToxicity in Tots) collaboration between the US Food and Drug Administration and the International Anesthesia Research Society recommends avoiding non-urgent surgical procedures requiring anaesthesia in children under three years old.¹⁵ Sucrose and local anaesthetic with adrenaline has been shown to have no adverse effects.⁴

Conclusion

We believe this is a simple, well-tolerated method of treatment with high parent satisfaction that avoids general anaesthesia and addresses the issue in a timely manner.

Patient consent

Patients/guardians have given informed consent to the publication of images and/or data.

Conflict of interest

The authors have no conflicts of interest to disclose.

Funding declaration

The authors received no financial support for the research, authorship, and/or publication of this article.



CC-BY-4. This is an open access article distributed under the Creative Commons Attribution 4.0 International License (CC-BY-4) which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited. View this license's legal deed at <http://creativecommons.org/licenses/by/4.0> and legal code at <http://creativecommons.org/licenses/by/4.0/legalcode> for more information.

References

- 1 Watson BT, Hennrikus WL. Postaxial type-B polydactyly. Prevalence and treatment. *J Bone Joint Surg Am*. 1997;79(1):65–68. <https://doi.org/10.2106/00004623-199701000-00007> PMID:9010187
- 2 Kozin SH. Embryology of the upper extremity. In: Wolfe SW, Hotchkiss R, Pederson WC, Kozin SH, Cohen MS (eds). *Green's Operative Hand Surgery*. 7th ed. Elsevier, 2017. pp 1232–1233.
- 3 Khachemoune B. Review of accessory tragus with highlights of its associated syndromes. *Int J Dermatol*. 2014(53):1442–1446. <https://doi.org/10.1111/ijd.12369> PMID:25266223
- 4 Stevens B, Yamada J, Ohlsson A, Haliburton S, Shorkey A. Sucrose for analgesia in newborn infants undergoing painful procedures. *Cochrane Database Syst Rev*. 2016, Issue 7. Art No: CD001069. <https://doi.org/10.1002/14651858.CD001069.pub5> PMID:27420164 PMCID:PMC6457867
- 5 Carbajal R, Chauvet X, Courdec S, Oliver-Martin M. Randomised trial of analgesia effects of sucrose, glucose and pacifiers in neonates. *BMJ*. 1999;319:1393–1397. <https://doi.org/10.1136/bmj.319.7222.1393> PMID:10574854 PMCID:PMC28282
- 6 Haouri N, Wood C, Griffiths G, Levene M. The analgesic effect of sucrose in full term infants: a randomized controlled trial. *BMJ*. 1995;310:1498–1500. <https://doi.org/10.1136/bmj.310.6993.1498> PMID:7787595 PMCID:PMC2549876
- 7 Blass E, Fitzgerald E, Kehoe P. Interactions between sucrose, pain and isolation distress. *Pharmacol Biochem Behav*. 1987;26:483–489. [https://doi.org/10.1016/0091-3057\(87\)90153-5](https://doi.org/10.1016/0091-3057(87)90153-5) PMID:3575365
- 8 Blass EM, Hoffmeyer LB. Sucrose as an analgesic for newborn infants. *Pediatrics*. 1991;87:215–218. <https://doi.org/10.1542/peds.87.2.215> PMID:1987534
- 9 Sharara-Chami R, Lakissian Z, Charafeddine L, Milad N, El-Hout Y. Combination analgesia for neonatal circumcision: a randomized controlled trial. *Pediatrics*. 2017;140:e20171935. <https://doi.org/10.1542/peds.2017-1935> PMID:29150457
- 10 Mullick S, Borschel GH. A selective approach to treatment of ulnar polydactyly: preventing painful neuroma and incomplete excision. *Pediatr Dermatol*. 2010;27(1):39–42. <https://doi.org/10.1111/j.1525-1470.2009.01071.x> PMID:20199408
- 11 Samendra H, Wade RG, Glanvill L, Wormald J, Jain A. Primary treatment of type B post-axial ulnar polydactyly: a systematic review and meta-analysis. *JPRAS Open*. 2022;34:21–33. <https://doi.org/10.1016/j.jpra.2022.05.002> PMID:36120500 PMCID:PMC9478869
- 12 Mills JK, Ezaki M, Oishi SN. Ulnar polydactyly: long-term outcomes and cost-effectiveness of surgical clip application in the newborn. *Clin Pediatr*. 2014;53(5):470–473. <https://doi.org/10.1177/0009922813514479> PMID:24345998
- 13 Carpenter CL, Cuellar TA, Friel MT. Office-based post-axial polydactyly excision in neonates, infants, and children. *Plast Reconstr Surg*. 2016;137:564–568. <https://doi.org/10.1097/01.prs.0000475787.67693.e7> PMID:26818291
- 14 Chopan M, Sayadi L, Chim H, Buchanan PJ. To tie or not to tie: a systematic review of postaxial polydactyly and outcomes of suture ligation versus surgical excision. *Hand*. 2020;15:303–310. <https://doi.org/10.1177/1558944718810885> PMID:30417703 PMCID:PMC7225879
- 15 Rappaport BA, Suresh S, Hertz S, Evers AS, Orser BA. Anesthetic neurotoxicity: clinical implications of animal models. *N Engl J Med*. 2015;372:796–797. <https://doi.org/10.1056/NEJMp1414786> PMID:25714157