Effectiveness of hypnoanalgesia for dermatological surgery in children: Randomised clinical trial

NCT CHT00028

Document Date: March 15, 2019

PI: Peláez Pérez JM

1 Anaesthesia and Resuscitation Service, Toledo Hospital Complex. Toledo. Spain

30 De Barber Avenue, 45004 Toledo - SPAIN

Email:pelaezju@hotmail.com

Keywords: Hypnosis, hypnoanalgesia, anxiety, pain, paediatric surgery, dermatology

State of the art. Justification.

Since the development of "hypnosedation" by anaesthesiologist Faymonville et al. in 1977[1], the combination of hypnosis and conscious sedation techniques with low-dose intravenous drugs, or local or locoregional anaesthetic infiltration, has demonstrated multiple advantages. These advantages have been observed both in the preoperative phase, given the correlation between preoperative anxiety and postoperative pain [2, 3], in the perioperative phase, with efficacy observed in minimally invasive procedures and awake craniotomy[4, 5], and in the postoperative phase, with evidence of a reduction in nausea and vomiting, pain and early awakening and discharge[6, 7].

Better knowledge of the technique and its greater use in operating theatres has led to the abandonment of the concept of sedation in favour of that of analgesia, which is why the term hypnoanalgesia is now used instead of hypnosedation. Patients treated under hypnosis show greater comfort and lower levels of anxiety[8, 9]. In addition, the high receptivity and suggestion reached with hypnosis during anaesthesia help to reduce analgesic and sedative doses during and after the surgical procedure, which facilitates recovery[10, 11].

Doctors and surgeons in the early 19th century already pointed out that children and adolescents were particularly "sensitive" to hypnotic techniques, showing good response to hypnotherapeutic strategies[12]. However, most studies of hypnosis and pain have been conducted in adults. The mechanisms of action proposed for non-pharmacological comprehensive therapies in adults may differ in the paediatric population due to, among other reasons, possible developmental effects, requiring specific studies in that population[10, 13-15].

Objectives

The aim of this study is to assess whether the use of hypnoanalgesia in dermatological surgery in the paediatric population reduces

1. the need for sedation and analgesia during the procedure, and
2. its impact on pain

a. in the immediate post-operative period and
b. after 24 hours.

Secondary objectives are

1. to assess the degree of acceptance of the procedure and
2. to evaluate the efficacy of the technique according to the age of the patients and, therefore, their suggestibility.

PATIENTS AND METHODS

Design

1:1 parallel group unicenter randomized clinical trial.

Randomisation and masking

Randomisation will be carried out in blocks, depending on the day of the operation (day with hypnosedation or day with distraction), without the dermatologists or the anaesthetist performing the operation having prior knowledge of either the assigned day or the "suggestibility" of the cases, respectively.

The blinding will be achieved by assigning different investigators to each phase of the study, with one designated as responsible for recruitment (MQD), another for intervention and control (JMPP), and another for subsequent evaluation in the post-anaesthesia recovery unit (URPA) and at 24 hours (responsible nursing staff).

Participants

Children scheduled for dermatological surgery will be recruited for major outpatient surgery (MOS) at the National Paraplegic Centre.

The following inclusion criteria are established:

1. age between 5 and 16
2. any gender / sex

3. A class I or II of anaesthetic risk according to the American Society of Anesthesiologists,
4. to be in a percentile between P3 and P97 in weight and height,
5. without known drug allergies, and
6. having fasted 6 hours for solids and 2 hours for water.

The following exclusion criteria have been established:

1. mental retardation
2. attention deficit,
3. behavioural disorders,
4. previous treatment with hypnosis,
5. history of neurological pathology or psychomotor retardation,
6. previous pain-related pathology,
7. obstructive sleep apnoea syndrome (OSAS)

Recruitment will be carried out by the principal investigator from the surgical waiting list for a period of 5 months.

All patients who meet the inclusion criteria will be given informed consent and an information sheet, both on the anaesthetic procedure and on hypnosis as an adjuvant technique.

Intervention, control and procedures

Patients will be randomly distributed to one of the following groups:

- *Intervention group:* A technique of rapid conversational hypnosis, with focus on therapeutic suggestion (guiding the patient into a hypnotic trance), adapted to the cognitive development. Induction with hypnotic suggestion focuses and accompanies the child's body sensations and allows their active participation. After standard sedation, therapeutic suggestion is maintained throughout the surgery and in the post-hypnotic period before awakening.
- *Control group*: A high-tech distraction technique (Apple®), passive and chosen by the child, either an animated video or his or her favourite music. After standard

intravenous sedation, the child is taken to the operating theatre to watch his or her favourite video or music and this is maintained throughout the procedure.

Procedures and concomitant treatments

In the previous anaesthesia consultation, the therapeutic alliance is established with all the children, regardless of the group assigned, giving them the opportunity to choose their favourite experience of therapeutic suggestion, according to their age and level of cognitive maturity.

Patients and tutors are given a behavioural therapeutic session to reduce the anxiety and fear associated with the procedure and to eliminate any negative connotations associated with medical hypnosis.

Prior to surgery, the pre-surgical checklist will be completed. The entire surgical team has received training in conversational hypnosis and attention-distracting techniques from the principal investigator, a paediatric anaesthetist, with academic qualifications and experience in clinical hypnosis.

In the anteroom of the operating room, all children will be offered to play, such as with fruit-smelling markers to colour the inside of the anaesthetic mask (Stabylo®).

During surgery, standard sedation will be performed either intravenously or inhalationally as an option. In the endovenous induction, an initial dose of propofol of 2.5 mg/Kg will be injected, registering the additional amount needed. If the additional doses are not sufficient, a short duration opioid, alfentanil, will be administered at a dose of 10-15 micrograms/kg. For inhalation induction, a mixture of nitrous oxide and oxygen (60/40) will be administered at tidal volume with an external Mapelson C circuit (Maquet Flow-i C20®). Finally, the surgeon, in agreement with the anaesthetist, used local anaesthesia with 2% subcutaneous lidocaine.

Waking up will be carried out in the operating theatre with subsequent transfer to the Post-Anaesthesia Care Unit (PACU), where, in addition to control of constants, pain will be assessed using adapted scales (see variables and measurements below), and analgesics will be administered where necessary (if VAS>4 paracetamol will be used, 15 mg/kg, and if pain persisted, magnesium metamizole at a dose of 20 mg/kg).

Evaluation and Outcome Measures

The following outcome variables are established:

- Main variable: Total dose of propofol and additional need for opioids during the operation, measured in mg/kg of weight as recorded intra-operatively.
- Impact on pain and analgesic needs, both in the immediate post-operative period and 24 hours after the operation, measured by pain scales adapted to age and cognitive maturation (Visual Analogical Scale (VAS) from 10 years and Face Drawing Scale or FPS-r from 5 to 9 years), need for paracetamol, ibuprofen or other analgesics. The scales are given to the children by the nurse in charge at the PACU, who will be also responsible for the 24-hour post-surgery follow-up, and did not know the group to which each patient belonged. The analgesic need will be collected from the medical logs.
- Degree of satisfaction with the procedure, using a scale of 1 to 10, administered at the time of discharge from hospital to the children or their guardians.

Statistical analysis

For the descriptive analysis, central tendency and dispersion measures will be used (median and 25^{th} to 75^{th} percentiles, P_{25-75}) for quantitative variables, and absolute and relative frequencies for qualitative ones. The comparison of the outcome measures between the intervention group and the control group will be carried out by means of non-parametric tests: chi-square and Fisher's exact test for qualitative outcome measures, and Mann-Whitney's U for the quantitative ones.

An age-based subgroup analysis will be conducted (under 7 years and over).

The significance level will be set at a value of $p<0.05$ and the analysis will be carried out with Excel®.

A sample of 30 patients will be calculated to detect a 40 mg dose difference between the two groups, with a risk α of 0.05 and a risk β of 0.20 in a bilateral contrast and assuming a common standard deviation of 33.3 and a loss to follow-up rate of 10%.

Ethical aspects

The study will be conducted in accordance with the WHO code of ethics (Declaration of Helsinki) on human experimentation and will seek approval by the Clinical Research Ethics Committee of the Toledo Hospital Complex.

FINANCING

This study has no funding.

REFERENCES

1. Faymonville ME, Mambourg PH, Joris J, Vrijens B, Fissette J, Albert A, et al. Psychological approaches during conscious sedation. Hypnosis versus stress reducing strategies: a prospective randomized study. Pain. 1997;**73**:361-7.

https://doi.org/10.1016/s0304-3959(97)00122-x

2. Duparc-Alegria N, Tiberghien K, Abdoul H, Dahmani S, Alberti C, Thiollier AF. Assessment of a short hypnosis in a paediatric operating room in reducing postoperative pain and anxiety: A randomised study. J Clin Nurs. 2018;**27**:86-91.

https://doi.org/10.1111/jocn.13848

3. Fortier MA, Weinberg M, Vitulano LA, Chorney JM, Martin SR, Kain ZN. Effects of therapeutic suggestion in children undergoing general anesthesia: a randomized controlled trial. Paediatr Anaesth. 2010;**20**:90-9.

https://doi.org/10.1111/j.1460-9592.2009.03225.x

4. Miller K, Tan X, Hobson AD, Khan A, Ziviani J, O'Brien E, et al. A Prospective Randomized Controlled Trial of Nonpharmacological Pain Management During Intravenous Cannulation in a Pediatric Emergency Department. Pediatr Emerg Care. 2016;**32**:444-51.

https://doi.org/10.1097/PEC.0000000000000778

5. Lohkamp LN, Mottolese C, Szathmari A, Huguet L, Beuriat PA, Christofori I, et al. Awake brain surgery in children-review of the literature and state-of-the-art. Childs Nerv Syst. 2019;**35**:2071-7.

https://doi.org/10.1007/s00381-019-04279-w

6. Browne PD, den Hollander B, Speksnijder EM, van Wering HM, Tjon ATW, George EK, et al. Gut-directed hypnotherapy versus standard medical treatment for nausea in children with functional nausea or functional dyspepsia: protocol of a multicentre randomised trial. BMJ Open. 2019;**9**:e024903.

https://doi.org/10.1136/bmjopen-2018-024903

7. Calipel S, Lucas-Polomeni MM, Wodey E, Ecoffey C. Premedication in children: hypnosis versus midazolam. Paediatr Anaesth. 2005;**15**:275-81.

https://doi.org/10.1111/j.1460-9592.2004.01514.x

8. Lynn SJ, Kirsch I, Barabasz A, Cardena E, Patterson D. Hypnosis as an empirically supported clinical intervention: the state of the evidence and a look to the future. Int J Clin Exp Hypn. 2000;**48**:239-59.

https://doi.org/10.1080/00207140008410050

9. Pelaez-Perez JM. Entrée dans l'IRM. Le tunnel magique et filin. Revue Hypnose & Thérapies brèves. 2019:50-2.

10. Kuttner L. Pediatric hypnosis: pre-, peri-, and post-anesthesia. Paediatr Anaesth. 2012;**22**:573-7.

https://doi.org/10.1111/j.1460-9592.2012.03860.x

11. Mackey EF. An Extension Study Using Hypnotic Suggestion as an Adjunct to Intravenous Sedation. Am J Clin Hypn. 2018;**60**:378-85.

https://doi.org/10.1080/00029157.2017.1416279

12. Oleness K, Kohen DP. Hypnosis and Hypnotherapy with children. 4th ed. New York: Guillford; 1996.

13. Richardson J, Smith JE, McCall G, Pilkington K. Hypnosis for procedure-related pain and distress in pediatric cancer patients: a systematic review of effectiveness and methodology related to hypnosis interventions. J Pain Symptom Manage. 2006;**31**:70-84.

https://doi.org/10.1016/j.jpainsymman.2005.06.010

14. Wood C, Bioy A. Hypnosis and pain in children. J Pain Symptom Manage. 2008;**35**:437-46.

https://doi.org/10.1016/j.jpainsymman.2007.05.009

15. Faymonville ME, Laureys S, Degueldre C, DelFiore G, Luxen A, Franck G, et al. Neural mechanisms of antinociceptive effects of hypnosis. Anesthesiology. 2000;**92**:1257-67.

https://doi.org/10.1097/00000542-200005000-00013

16. Tosti G. Definitions et rouages de l'hypnosis. In: Eyrolles G, editor. Le grand livre de l'hypnose. Paris2016. p. 38-40.

17. Vanhaudenhuyse A, Boly M, Balteau E, Schnakers C, Moonen G, Luxen A, et al. Pain and non-pain processing during hypnosis: a thulium-YAG event-related fMRI study. Neuroimage. 2009;**47**:1047-54.

https://doi.org/10.1016/j.neuroimage.2009.05.031

18. Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H, Gibson S, et al. The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises. Pain. 2020.

https://doi.org/10.1097/j.pain.0000000000001939

19. Montgomery GH, DuHamel KN, Redd WH. A meta-analysis of hypnotically induced analgesia: how effective is hypnosis? Int J Clin Exp Hypn. 2000;**48**:138-53.

https://doi.org/10.1080/00207140008410045

20. Montgomery GH, Schnur JB, Kravits K. Hypnosis for cancer care: over 200 years young. CA Cancer J Clin. 2013;**63**:31-44.

https://doi.org/10.3322/caac.21165

21. Manyande A, Cyna AM, Yip P, Chooi C, Middleton P. Non-pharmacological interventions for assisting the induction of anaesthesia in children. Cochrane Database Syst Rev. 2015:Cd006447.

https://doi.org/10.1002/14651858.CD006447.pub3

22. Friedrichsdorf SJ. Multimodal pediatric pain management (part 2). Pain Manag. 2017;**7**:161-6.

https://doi.org/10.2217/pmt-2016-0051

23. Thompson T, Terhune DB, Oram C, Sharangparni J, Rouf R, Solmi M, et al. The effectiveness of hypnosis for pain relief: A systematic review and meta-analysis of 85 controlled experimental trials. Neurosci Biobehav Rev. 2019;**99**:298-310.

https://doi.org/10.1016/j.neubiorev.2019.02.013