European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 09, Issue 07, 2022

Cryo-cap: Simple office-based technique to minimize discomfort during scalp injections

Waleed Alsalhi [1*]

[1]College of Medicine, Majmaah University, Al- Majmaah 11952, Saudi Arabia
*Corresponence: *Dr. Waleed Alsalhi, Assistant Professor of Dermatology, College of Medicine, Majmaah University, Sultan bin Salman Street , Al-Majmaah 11952, Saudi Arabia
E- mail: w.alsalhi@mu.edu.sa

Abstract :

Introduction :
Scalp injections and microneedling both are treatment methods that cause pain and discomfort during the procedure and the majority of patients require or demand a form of anesthesia to ease the discomfort. Non-invasive methods for pain reduction during dermatological procedures include topical anesthetic drugs, skin cooling, and vibration. Skin cooling can lower the skin temperature during procedures, and thereby improve pain and discomfort (cryoanalgesia).
Method: Patient is asked to wear a frozen hypothermic gel helmet or Cryo-cap cooled in the refrigerator for 20-30 minutes before the procedure. Then we remove the cap and start immediately the injections .
Results: Subjective improvement in pain threshold and good patient tolerance during scalp microneedling which allowed us to perform faster during the treatment sessions.
simple, effective and it helps to avoid local anesthesia risks as well as its discomfort, and allows faster performance.
Conclusion: Cryo-caps or hypothermic gel helmets are simple yet effective technique to avoid local anesthesia risks as well as its discomfort, and allows faster performance.
Key Words: cryoanalgesia, Non-invasive, Pain

Background:
Scalp platelet rich plasma (PRP) is a globally increasing in-office procedure to treat hair loss, it involves either of two methods to deliver the platelet rich plasma to hair follicles; direct needle injection to the scalp and/or administration with microneedling of the scalp using automated needling device. Both methods cause pain and discomfort during the procedure and the majority of patients require or demand a form of anesthesia to ease the discomfort.

Non-invasive methods for pain reduction during dermatological procedures include topical anesthetic drugs, skin cooling, and vibration [1]. Skin cooling can lower the skin temperature during procedures, and thereby improve pain and discomfort (cryoanalgesia) [2].

We describe a simple way office-based solution to alleviate the discomfort of PRP and microneedling scalp procedure.

ISSN 2515-8260 Volume 09, Issue 07, 2022

Patient is asked to wear a frozen hypothermic gel helmet or Cryo-cap (fig-1) maintained at less than 15°C in the refrigerator, to cool the scalp for 20-30 minutes before the procedure. After removing the cap we start immediately the injection with simultaneous use vibratory handheld device for additional anesthesia. Gel-Cap can easily be disinfected with alcohol after procedure, and stored back in the refrigerator.

Figure 1: Patient wearing frozen hypothermic gel helmet or Cryo-cap.

We have found this technique useful when performing scalp needling or injections, because it simple, effective and it helps to avoid local anesthesia risks as well as its discomfort, and allows faster performance.

Discussion:

Microneedling is a minimally invasive dermatological procedure in which fine needles are rolled over the skin to puncture the stratum corneum. This therapy is used to induce collagen formation, neovascularization and growth factor production of treated areas. It has been used in a wide range of dermatologic conditions, including androgenetic alopecia (AGA) and alopecia areata, among others. Microneedling has been successfully paired with other hair growth promoting therapies, such as minoxidil, platelet-rich plasma and topical steroids, and shown to stimulate hair follicle growth [3].

The analgesic effect of low temperature has been known to man since earliest times. Hippocrates (460-377 BC)' left the first written record of the use of ice and snow packs as a local pain-relieving technique when applied before surgery, and similar reports can be traced through history [4].

The application of cold to peripheral nerves, whether by direct cooling of localised segments or by complete immersion of whole tissue in a cold environment, induces a reversible block

of conduction. The extent and duration of effect is dependent on the temperature attained in the tissues and the duration of exposure. When nerve fibres are progressively cooled a conduction block similar to that produced by local anaesthesia develops (cryoanesthesia) . At temperatures above 10°C dissociation of sensory modalities often occurs but commonly loss of motor function is noted first [5,6].

Both Katz *et al* [7] and Glynn *et al* [8] have demonstrated the postoperative value of cryoanalgesia. Patients undergoing thoracotomy who received intercostal nerve freezes, by direct application at the termination of surgery, had less postoperative pain than control groups of patients. Their requirements for analgesics were reduced, often by 50%, and they all recorded reduced pain scores throughout the postoperative period [8].

Physiologically, when nerve fibres are progressively cooled, a conduction block similar to that produced by local anaesthesia develops. At temperatures above 10°C dissociation of sensory modalities often occurs [9]. Therefore, cryoanesthesia can be achieved when cutanous temperature reach around 10-15°C for 25-30 minutes [9,5,10]. Komen *et al*, found that scalp temperature will reach a constant level of approximately 18°C after 45 minutes of cooling [11].

Scalp cooling has an important role to minimizing chemotherapy-induced alopecia (CIA) . when the optimum subcutaneous scalp skin temperature reaches less than 22°C and epicutaneous temperature of less than 19°C for 30 to 45 minutes before the drug infusion [11].

Several techniques have been used to induce scalp hypothermia: chilled air, bags with crushed ice, frozen Cryogel packs or packs with an endothermic cooling reaction, special caps with Cryo-gel and an insulation layer, and caps connected to a cooling device using air or fluid as a medium and equipped with a thermostat, Although bags with ice as well as special caps are both well tolerated, caps are lighter in weight and easier to apply, which might offer a comfort advantage [9].

To accelerate the scalp cooling process, wetting the hair by water or the numbing cream prior application of the cold cap could increase the conductivity of the hair layer, resulting in a faster reduction in scalp skin temperature [12].

Scalp cooling is generally well-tolerated with high levels of comfort and acceptability with evidence of only minor and reversible side effects [13, 14]. The most often reported side effects of scalp cooling include headaches, complaints of coldness and/or uncomfortable sensations, and claustrophobia [13, 14]. Scalp cooling is contraindicated for patients with cold sensitivity, cold agglutinin disease, cryoglobulinemia, cryofibrinogenemia, and post-traumatic cold dystrophy [13].

References:

1. Sharma P, Czyz CN, Wulc AE. Investigating the efficacy of vibration anesthesia to reduce pain from cosmetic botulinum toxin injections. Aesthet Surg J. 2011;31(8):966-971. doi:10.1177/1090820X11422809
2. Nelson JS, Majaron B, Kelly KM. Active skin cooling in conjunction with laser dermatologic surgery. Semin Cutan Med Surg. 2000;19(4):253-266. doi:10.1053/sder.2000.18365
3. Fertig RM, Gamret AC, Cervantes J, Tosti A. Microneedling for the treatment of hair loss?. *J Eur Acad Dermatol Venereol*. 2018;32(4):564-569. doi:10.1111/jdv.14722
4. HIPPOCRATE*AS.phorisms, vol4; Heracleitus on the Universe*, translated by W.H.S. Jones. London: Heinemann, 1931;*5* 165;*7:*201.
5. D. C. SINCLAIR, J. R. HINSHAW, SENSORY CHANGES IN NERVE BLOCKS INDUCED BY COOLING, Brain, Volume 74, Issue 3, September 1951, Pages 318–335.
6. DENNY-BROWND, ADAMS RD, BRENNERC, DOHERTYMM. The pathology of injury to nerve induced by cold. Journal of Neuropathology and Experimental Neurology 1945;4 305-23.
7. KATZJ., NELSONW, FOREST R, BRUCEDL. Cryoanalgesia for post-thoractomy pain. Lancet 1980; 1: 512-13.
8. GLYNNCJ, LLOYDJW, BARNARJDW. Cryoanalgesia in the management of pain after thoracotomy. Thorax 1980;35 325-7.
9. Komen MM, Smorenburg CH, van den Hurk CJ, Nortier JW. Factors influencing the effectiveness of scalp cooling in the prevention of chemotherapy-induced alopecia.
10. Evans PJ. Cryoanalgesia. The application of low temperatures to nerves to produce anaesthesia or analgesia. Anaesthesia. 1981 Nov;36(11):1003-13. doi: 10.1111/j.1365-2044.1981.tb08673.x. PMID: 7316118.
11. Komen MMC, Smorenburg CH, Breed WPM et al. Optimal preinfusion cooling time in patients treated with chemotherapy and scalp cooling. Eur J Cancer 2011;47:S320.)
12. Janssen FE, van Leeuwen GM, van Steen- hoven AA. Modelling of temperature and perfusion during scalp cooling. Phys Med Biol 2005;50: 4065– 4073.).
13. Grevelman EG, Breed WP. Prevention of chemotherapy-induced hair loss by scalp cooling. Ann Oncol 2005;16:352–358.

14. Massey CS. A multicentre study to determine the efficacy and patient acceptability of the Paxman Scalp Cooler to prevent hair loss in patients receiv ing chemotherapy. Eur J Oncol Nurs 2004;8:121– 130.