

# Resolution of CaHA nodules with synergistic STS and cannula subcision

## Resolución de nódulos de hidroxapatita de calcio con la acción sinérgica de tiosulfato de sodio y subcisión

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### ABSTRACT

**BACKGROUND:** calcium hydroxylapatite (CaHA) is frequently used for cosmetic enhancement of facial, neck, and other body areas. An undesirable side effect of CaHA dermal filler injections are nodules, which can be seen and felt underneath the skin. Current treatments for resolution of CaHA nodules are controversial. Publications have suggesting a role for saline, hyaluronic acid, and sodium thiosulfate in resolving these nodules.

**MATERIAL AND METHODS:** we present two cases of patients with CaHA-induced nodules that were resolved with a combination of sodium thiosulfate, or in some cases, additional triamcinolone injection, and subcision.

**RESULTS:** two patients, ages 50- and 49-years old, presented with CaHA-induced nodules on the neck and face, respectively. The nodules were treated with a combination technique of a 1:1 dilution of 1% lidocaine and sodium thiosulfate (mixed 1:1), triamcinolone, and subcision. Up to three treatments using this technique resulted in resolution of visible CaHA nodules.

**CONCLUSIONS:** dermal CaHA nodules can be effectively treated with combination treatments consisting of 1% lidocaine and sodium thiosulfate, triamcinolone, and subcision.

**KEYWORDS:** calcium hydroxylapatite nodules, CaHA nodules, sodium thiosulfate, triamcinolone, subcision.

### RESUMEN

**ANTECEDENTES:** la hidroxapatita de calcio (CaHA) con frecuencia se usa con fines cosméticos en la cara, el cuello y otras áreas del cuerpo. Un efecto indeseable de los rellenos con CaHA son los nódulos que se pueden observar y palpar debajo de la piel. El tratamiento actual para estos nódulos es controversial. Diferentes publicaciones mencionan el papel de una solución salina con ácido hialurónico y tiosulfato de sodio para resolver estas lesiones.

**MATERIAL Y MÉTODOS:** presentamos dos casos con nódulos inducidos por CaHA que se resolvieron con una combinación de tiosulfato de sodio, y en algunos casos con inyecciones de triamcinolona intralesional y subcisión.

**RESULTADOS:** pacientes con edades de 50 y 49 años de edad se presentaron con nódulos inducidos por CaHA en el cuello y la cara, respectivamente. Los nódulos se trataron con una combinación de una dilución 1:1 de lidocaína al 1% y tiosulfato de sodio (mezcla 1:1), triamcinolona y subcisión. Los nódulos se resolvieron luego de tres meses con esta técnica.

**CONCLUSIONES:** los nódulos dérmicos por CaHA se pueden tratar de forma efectiva con una combinación de lidocaína al 1% y tiosulfato de sodio, triamcinolona y subcisión.

**PALABRAS CLAVE:** nódulo por hidroxapatita de calcio, nódulos por CaHA, tiosulfato de sodio, subcisión.

## Introduction

Calcium hydroxylapatite (CaHA) is a popular cosmetic filler without an established reversing agent. Injection of CaHA can result in long-lasting visible nodules or an uneven contour in which physician intervention is often desired. Sodium thiosulfate (STS, 250 mg/mL,

Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) has been used off-label for the treatment of visible nodules, however, histological reports of tissue necrosis and hemorrhage have raised concerns, which may limit its use.<sup>1</sup> The authors present two cases where STS successfully treated CaHA nodules without evidence of necrosis.

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**Figure 1. A)** A 50-year-old woman at baseline with visible calcium hydroxylapatite skin nodules along the anterior neck creases. **B)** A 50-year-old woman three months after five sodium thiosulfate injections of approximately 0.1 mL per nodule into calcium hydroxylapatite nodules of the neck.

### Case 1

A 50-year-old Mexican-American woman was referred to our clinic with 20 visible skin nodules along the creases of her neck. She received five injection sessions (2-weeks apart  $\times$  3, and then 1-month apart  $\times$  2), with a 1:1 dilution of 1% lidocaine 1.5 mL and STS 1.5 mL (250 mg/mL). We injected 0.1 mL per nodule. On the last 3 injection sessions, we also added 0.3 mL of intralesional triamcinolone (5 mg/mL) into the 2 largest nodules. At three months follow-up, she showed complete resolution of her CaHA induced nodules without evidence of skin necrosis. After more than 80 total injections she was left with a satisfactory aesthetic response, no complications, and no necrosis (**figure 1**).

### Case 2

A 49-year-old Mexican-American woman presented with a history of CaHA injected by a plastic surgeon in 2018. She was referred to our clinic for further management of CaHA nodules of the left cheek after unsuccessful intralesional 5-fluorouracil treatments by her referring dermatologist. We performed three monthly deep dermal/subcutaneous injections of STS, diluted 1:1 with buffered lidocaine, with the addition of subcision with a 22-gauge cannula at her third visit. At 1-month follow-up, she showed resolution of her CaHA nodule. Given the excellent response and high patient satisfaction, multiple other sites on her face were treated with the above formulation, with a few nodules receiving additional intralesional tri-



**Figure 2.** **A)** A 49-year-old woman with visible calcium hydroxyapatite skin nodules at the left cheek. **B)** A 49-year-old woman 1 month after three injections of 1% lidocaine and sodium thiosulfate (1:1) and 0.3 cc triamcinolone (5mg/mL). Injections of approximately 0.1 mL per nodule were used for the calcium hydroxyapatite nodules of the neck.

amcinolone 5 mg/mL. The patient tolerated srs well with no evidence of tissue necrosis (**figure 2**).

### Discussion

Calcium hydroxylapatite is a semi-permanent filler with volumizing and biostimulatory effects. It consists of caHA-based microspheres suspended in gel that act as a scaffold to induce collagen formation through fibroblast activation. caHA shares the same complications as its hyaluronic acid (HA) counterparts, which includes vascular occlusion, overcorrection, and nodule formation. However, while hyaluronidase is available to treat HA related adverse events, caHA lacks an established dissolving agent.

Sodium thiosulfate has been investigated as a potential tool given its efficacy in treating disorders of calcium deposition, including calcinosis cutis and calciphylaxis. In the aforementioned conditions, STS acts as a chelating agent, however, its mechanism of action in caHA is less clear. Earlier studies in porcine samples concluded that intralesional STS can dissolve caHA,<sup>2,3</sup> whereas more recent studies showed no indication that STS degraded caHA microspheres.<sup>1,4</sup> Instead, it is more likely that STS works through dispersion of caHA particles.<sup>1,4</sup> Danysz *et al.* theorized that the high osmolality of STS draws in water resulting in the dispersion of caHA particles, which are then phagocytosed. Importantly, this study also reported histologic findings of increased sub-

cutaneous necrosis, higher fibrin levels and higher level of hemorrhage.<sup>1</sup>

Although we have not seen evidence of epidermal necrosis when used in patients with caHA nodules, our technique differs from that of Danysz *et al.* in that we dilute STS in a 1:1 ratio with lidocaine prior to injection. Furthermore, we use the cannula to subcise the entire nodular area, which may additional help with dispersion of caHA microspheres. In our clinical experience of using STS to treat in vivo caHA nodules, no skin necrosis has been observed with this dilution and technique. The patients tolerated their treatments well with temporary and localized inflammatory and urticarial reactions.<sup>6</sup> Aksenenko *et al.* also presented a case series of 12 patients in which focal caHA nodules were successfully treated with STS applied through diadynamophoresis using a specialized device (Mustang-Physio-MELT-2K).<sup>5</sup>

Therefore, the technique with which STS is used may play a role in whether skin necrosis is seen. Given our own experience with this technique, we advocate for using a 1:1 dilution of STS and lidocaine when treating caHA nodules. Additional research into the optimal dilution and treatment technique (ie. through injection or diadynamophoresis) is necessary.

## REFERENCES

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