Scar management protocol at RNSH Severe Burns Unit: Intra-lesional steroid injections in the management of hypertrophic burns scars

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Introduction

Intra-lesional steroid injection is a widely accepted treatment for hypertrophic scarring secondary to burns and is often used in refractory cases where non-invasive methods have already failed. However, despite decades of use in multiple centres, the literature is surprisingly scant when it comes to high level trials on the use of steroid injections in burns hypertrophic scars specifically, or when these are most effective in relation to scar maturation. Additionally, there is very little evidence on the management of hypertrophic scars alone rather than in combination with keloids despite increasing evidence that they are separate pathological entities. This poster aims to highlight an area of potential future research examining the most effective timing of intra-lesional steroid injections in the management of hypertrophic scars.

Current protocol

Following a major burn the RNSH Severe Burns Unit completes an intensive follow up plan to minimise scar tissue and monitor for early signs of hypertrophic scarring. After wound closure patients are immediately fitted for compression garments to be worn 23hours a day. A basic assessment of the risk of hypertrophic scarring is carried out by the occupational therapy team focused on depth of injury, time to heal, age, skin type and location of injury. During follow up scars are monitored by the allied health team using the Modified Vancouver Scar Scale and a significant degree of clinical judgement with management tailored to the scar characteristics. Additional scar therapy includes massage, splinting and silicone sheets. In refractory cases, intra-lesional triamcinolone acetonide injections are also used however the point at which scars are deemed refractory has not been standardised and are largely clinician dependent. This results in a wide timeframe to first injection within the patient cohort and has raised the question whether there is an optimum point during scar maturation when intra-lesional therapy has the greatest efficacy.

Literature search

A literature search on intra-lesional steroid therapy in the management of hypertrophic scarring was performed on Medline, Embase, PubMed and the Cochrane database. Search terms used where [Hypertrophic scar*] AND [intra-lesional steroid OR triamcinolone acetonide] AND [management OR therapy OR intervention OR treatment]. This returned a total of 319 journal articles. After reviewing the articles title and abstracts, duplicates, animal models, case studies and reviews were eliminated. Of the remaining articles 33 were comparative studies on intra-lesional steroid injections into proliferative pathological scars. Of note, only 3 of these studies examined hypertrophic scars rather than a combination of hypertrophic scars and keloids. Zero studies examined intra-lesional steroid therapy in the management of hypertrophic scars as a result of burns alone.

Discussion

The pathophysiology of hypertrophic scarring is incompletely understood but is known to involve increased inflammation, fibroblast proliferation and imbalances of cytokines and growth factors such as TBG-beta involved in the synthesis of extracellular matrix components. Steroids both systemically and locally inhibit fibroblast proliferation thus reducing collagen synthesis and resultant scar bulk. Intralesional steroid injections have been used in the management of hypertrophic scars since the 1950s and have been researched in comparative studies since Ketchum et. al. in 1966. However, while the pathophysiology of hypertrophic scarring is yet to be fully appreciated, advances in our understanding have not been reflected in the research or practice of intra-lesional steroids. Despite having a similar appearance macroscopically, hypertrophic scars and keloids have been shown to have different microscopic and molecular components with differing genetic contributors. (Finnerty 2016) However, very little research has been performed on a hypertrophic scar population alone and those that have been done focus on linear scars following a surgical incision. No comparative trial was found on intralesional steroid therapy for hypertrophic scarring in a burns population.

Another area lacking in research was the timing of intra-lesional steroid therapy in relation to scar maturation. Hypertrophic scars are known to undergo 3 main phases, a proliferative phase for the first 3-6 months followed by a maturation phase and finally remission. (Berman, 2017) This literature search found only one article that addressed this issue authored by Song et. al and published in the June 2018 edition of the *Journal of Cosmetic Dermatology*. This was a non randomised trial examining the effects of triamcinolone acetonide injections on hypertrophic scars and keloids in the proliferative and maturative phase concluding better results with the latter. This was a single centre trial with questionable methods and further studies are required to conclude when intra-lesional steroids are most efficacious.

Conclusion

In an age where medicine is increasingly being tailored to individual patients' genomic makeup, the non-specific evidence of Intra-lesional steroid therapy for hypertrophic burns scarring stands out as medicine of the past. There are significant gaps in the current research on hypertrophic scarring specifically and the appropriate timing of intralesional steroids in the natural course of hypertrophic scarring. Future studies are needed on hypertrophic scarring in the burns setting looking at the timing of intra-lesional steroid injections in relation to scar maturation to enable a standardised protocol to be developed to ensure each patient receives the best standard of care. We propose a RCT with patients randomised to receive intra-lesional triamcinolone acetonide in the proliferative or maturative phase as determined by clinical assessment, followed by scar biopsy and 6-12month follow-up to monitor scar response.

Until the cause of hypertrophic scars is fully understood and prevention becomes attainable, clinicians need to continue to strive to provide the best possible treatment for patients suffering both the physical and psycho-social sequelae of hypertrophic scarring rather than rely on incomplete evidence based on outdated pathophysiology. A RCT is required to determine the best time during the natural history of hypertrophic scarring for intra-lesional steroid therapy.

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