Comparative study between intralesional steroid injection and silicone sheet versus silicone sheet alone in the treatment of pathologic scars

Thesis

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ABSTRACT

BACKGROUND: Pathologic scars present a difficult management problem for physician searching for optimal therapeutic approach.

OBJECTIVE: To compare the clinical response of hypertrophic scars after treatment with intralesional steroid injection combined with silicone sheet versus silicone sheet alone.

MATERIALS AND METHODS: The study was a randomized, prospective study. Twenty patients were treated with intralesional injection triamcinolone acetonide by dermo-jet combined with silicone sheet, and ten patients were treated with silicone sheet alone. The response of treatment was evaluated by the Vancouver scar scale (vascularity, pigmentation and thickness) with the improvement of symptoms (pain and /or pruritus) and Ultrasonography to measure scar tissue thickness.

RESULTS: patients who treated with intralesional triamcinolone acetonide combined with silicone sheet showed an improvement regarding symptoms (pain and / or pruritus), also they showed an improvement according to Vancouver scar scale (vascularity, pigmentation and thickness) and Ultrasonographic assessment showed marked decrease in scar thickness, but patients who treated with silicone sheet alone showed an improvement regarding symptoms, Vancouver scar scale and ultrasonographic assessment but less than first group.

CONCLUSION: This study shows that combination therapy with intralesional triamcinolone acetonide injection 40mg/ml with silicone sheet appears to be superior to treatment by silicone sheet alone in the treatment of hypertrophic scars with no significant side effects.

KEYWORDS: Hypertrophic scars, triamcinolone acetonide, silicone sheet

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Dedication

To my family, especially my parents, for their encouragement, patience, and assistance over the years. And to my brothers, my sisters, my beloved wife and my daughters.

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List of Abbreviations

5-FU	5-Fluorouracil
ATP	Adenosine triphosphate
BTXA	Botulinum toxin type A
HTS	Hypertrophic scars
IFN α-2b	Interferon alpha-2b
MSS	Manchester Scar Scale
Nd:YAG	Neodymium-doped yttrium aluminium garnet
NO	Nitric oxide
PCNA	Proliferating cell nuclear antigen
PDL	Pulsed-dye laser
POSAS	Patient and Observer Scar Assessment Scale
SBSES	The Stony Brook Scar Evaluation Scale
TAC	Triamcinolone acetonide
TGF-β1	Transforming growth factor β1
VAS	Visual Analog Scale
VSS	Vancouver Scar Scale
α-SMA	α-Smooth muscle actin

Introduction

Hypertrophic scars and Keloids that develop as a result of an exaggerated proliferation of dermal fibroblasts after skin injury are characterized by excess accumulation of collagen in the wound. **(Singer & Clark, 1999).**

Hypertrophic scars and Keloids may lead to significant morbidity as well as pruritus, pain, restriction of motion, or cosmetic disfigurement. **(Alster&Tanzi, 2003).**

Hypertrophic scars and Keloids mostly affect persons between 10 and 30 years of age, sex distribution is 1:1, and the incidence ranges from 4.5% to 16% of general population. **(Shejbal *et al*., 2004).**

Hypertrophic scars usually develop within one to three months after injury, in contrast with keloids that may appear up to 12 months after injury. **(Brissett & Sherris, 2001).**

Although many articles have been published on the management of keloid and hypertrophic scars, there is no universally accepted treatment protocol. Hypertrophic scars may be more responsive to treatment than keloids, which are often resistant to treatment and have a higher rate of recurrence. Laser surgery, surgical removal, radiotherapy, silicone gel sheeting and other dressings, cryotherapy, interferon, bleomycin, 5 fluorouracil, and intralesional corticosteroids have all been used alone or in various combinations, with variable success. **(Koc *et al*., 2008).**

The most commonly used corticosteroid is triamcinolone acetonide (TAC) at a concentration of 10-40mg/ ml, 1ml of which is administered intralesionally. Corticosteroids act by suppressing inflammatory cell migration, and inhibition of fibroblast proliferation at high dose. **(shanthi *et al*.,2008) .**

Silicone, a soft, semiocclusive scar cover, is composed of cross-linked polydimethylsiloxone polymer that has extensibility similar to that of skin. Since its introduction in 1982, topical silicone gel sheeting and ointment have been used widely to minimize the size, induration, erythema, pruritus, and extensibility of pre-existing hypertrophic scars and to prevent the formation of new ones. **(Zurada *et al*., 2006).**

Aim of the work

The aim of this work was to compare the efficacy of using intralesionl steroid injection and silicone sheet versus silicone sheet alone in the treatment of pathologic scars.

Anatomy of the skin

The skin is the largest organ system of the body. It provides many functions: temperature regulation, immunologic surveillance, sensory perception, serves as a barrier between a person and the environment, and control of insensible fluid loss. The skin consists of two layers the epidermis and dermis, which are derived from surface ectoderm and its underlying mesenchyme. **(Moor, 2007).**

The epidermis is derived primarily from surface ectoderm. During the first 3 months of development, the epidermis is invaded by cells arising from the neural crest. These cells synthesize melanin pigment, which can be transferred to other cells of the epidermis by way of dendritic processes. After birth, these melanocytes cause pigmentation of the skin. **(Salder, 2009).**

The dermis develops from mesenchyme, which is derived from the mesoderm underlying the surface ectoderm and contains collagen, elastic fibers, blood vessels, sensory structures, and fibroblasts. During the fourth week of embryologic development, the single cell thick ectoderm and underlying mesoderm begin to proliferate and differentiate. The specialized structures formed by the skin, including teeth, hair, hair follicles, fingernails, toenails, sebaceous glands, sweat glands and mammary glands also begin to appear during this period in development. Teeth, hair, and hair follicles are formed by the epidermis and dermis, while fingernails and toenails are formed by the epidermis alone. Hair follicles, sebaceous glands, sweat glands and mammary glands are considered epidermal glands or epidermal appendages, because they develop as downgrowths or diverticula of the epidermis into the dermis. **(Moore et al., 2007).**

Epidermis

The epidermis consists mainly of a stratified squamous keratinized epithelium, but it also contains three less abundant cell types: Melanocytes, Langerhans cells, and Merkel's cells. The keratinizing epidermal cells are called keratinocytes. It is customary to distinguish between the thick skin found on the palms and soles and the thin skin found elsewhere on the body. The designations "thick" and "thin" refer to the thickness of the epidermal layer, which varies between 75 and 150µm for thin skin and 400 and 600µm for thick skin. Total skin thickness (epidermis plus dermis) also varies according to site. For example, skin on the back is about 4 mm thick, whereas that of the scalp is about 1.5 mm thick (Fig.1). **(Junqueira & Carneiro, 2005).**

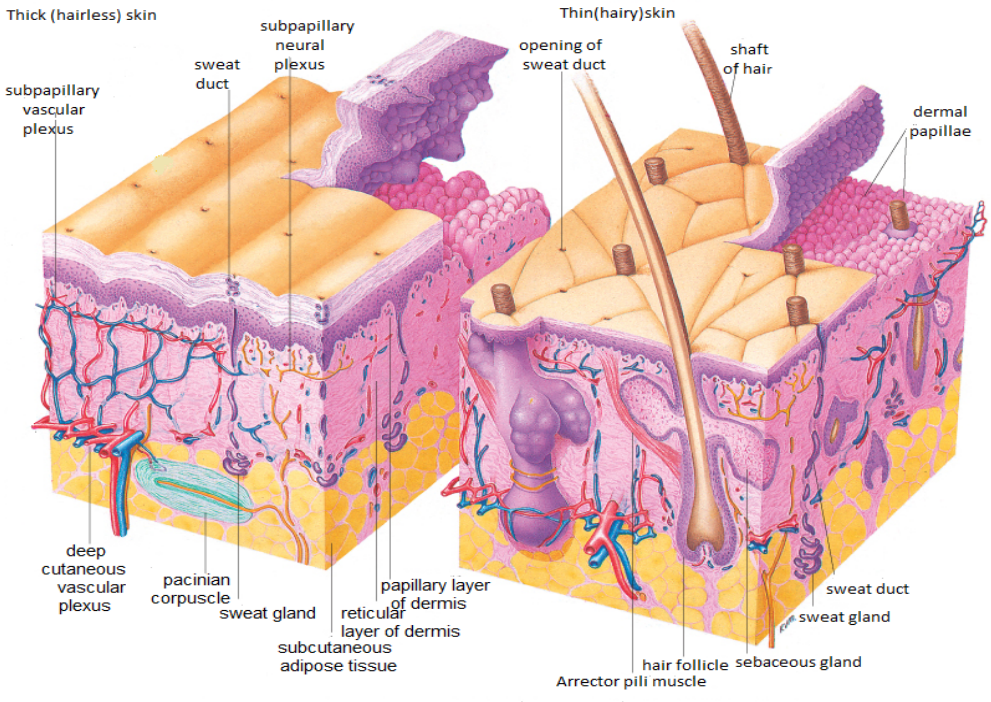

Fig.(1) The organization of skin, comparing the structures found in thick, hairless (plantar and palmar) skin with thin, hairy skin.**(Standring *et al*, 2005).**

From the dermis outward, the epidermis consists of four layers of keratinocytes, five layers in thick skin (fig.2): The basal layer (stratum basale) is a single layer of basophilic columnar or cuboidal cells on the basement membrane at the dermal-epidermal junction. The human epidermis is renewed about every15–30 days, depending on age, the region of the body, and other factors. **(Mescher, 2009).**

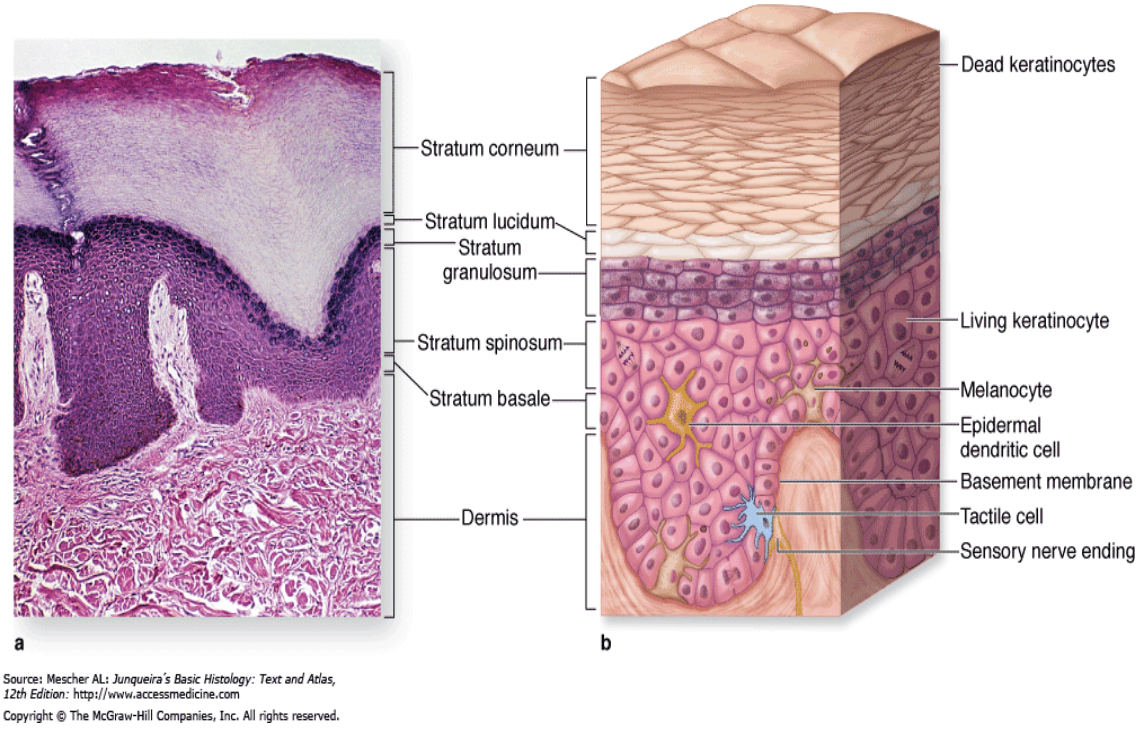

Fig. (2) Layers of epidermis in thick skin**. (Mescher, 2009).**

The spinous layer (stratum spinosum), normally the thickest epidermal layer consists of polyhedral or slightly flattened cells having central nuclei with nucleoli and cytoplasm actively synthesizing keratin filaments. Just above the basal layer some cells may still divide and this combined zone is sometimes called the stratum germinativum. The epidermis of areas subjected to continuous friction and pressure (such as the soles of the feet) has a thicker stratum spinosum. **(Mescher, 2009).**