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Original Article

The Use of MEBO Scar Ointment in the Treatment and Prevention of Post-Operative Wound Scars

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ABSTRACT

Background: Scar formation is a natural part of the wound healing process. The aim of this study was to observe the therapeutic effect of MEBO Scar ointment in the prevention and treatment of incisional scars. **Methods:** MEBO Scar ointment was applied 3 times daily after surgical stitches were removed in the test group. Warm saline was used in the control group. Clinical efficacy was based on scar quality assessment measuring – itching relief, skin texture, dystrophy and color. The wound was assessed at pre-determined intervals over 120 days post-surgery for therapeutic effectiveness of the ointment. **Results:** A total of 90 patients, male and female, undergoing elective surgery between February and December, 2013, with mean age of 30 years were included in this study. At 120 days, MEBO Scar was found to be highly effective (scar disappearance, no itching with soft scar, skin colour close to normal tissue) in majority patients (75%); and the overall scar quality was found to be significantly better ($p<0.001$) for all parameters. **Conclusion:** When initiated early, standard use of MEBO Scar Ointment for adequate period of time sufficiently softens the scars to prevent proliferation and appearance disturbances, resulting in a cosmetically acceptable scar. Therefore, it may be recommended for the prevention and treatment of scars post-surgery.

Keywords: Scar formation, wound care, MEBO scar ointment, post-operative wound.

1. INTRODUCTION

The term 'wound' has been defined as the disruption of normal anatomical structure and function. Wound healing is a complex and dynamic tissue repair process that results in the restoration of anatomical continuity and function.[1] This highly orchestrated process involves coordinated interactions between multiple cell types and an array of diverse immunological and biological factors that lead to a cascade of carefully and precisely regulated events.[2] The different, albeit overlapping, phases of wound healing include inflammation,

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proliferation (growth of new tissue), and maturation or remodeling. [3]

Traumatic or surgical injury to the skin leads to initiation of the wound healing process using scar formation rather than by tissue regeneration. Each year, a total of 100 million patients develop scars as a result of 55 million elective operations and 25 million operations after trauma, in the developed world alone. [4] Scars can become raised, reddish, and rigid, accompanied by itching and pain, leading to serious cosmetic, functional, and psychological concerns in susceptible individuals. [4, 5, 6, 7, 8, 9] Such scars are classified as hypertrophic scars and characterized by overproduction of collagen. Hypertrophic scars are observed in upto 64% of surgical incisions and their management remains a critical challenge, with early and late complications presenting a frequent cause of morbidity and mortality[2], and less than optimal outcomes observed with most of the existing therapeutic options. [4, 5, 6, 7]

Existing prophylactic and therapeutic strategies for scars include pressure therapy, silicone gel sheeting, intralesional triamcinalone, cryosurgery, radiation, laser therapy, interferon, 5-fluorouracil, and surgical excision as well as a multitude of extracts and topical agents. Most of these treatments have been shown to be effective based on real-life experience, but few have been supported by well-designed prospective studies with adequate control groups. [4] There is growing evidence of improved healing of full- and partial-thickness cutaneous wounds in wet and moist environments, where in the retention of biologic fluids prevents desiccation of denuded dermis or deeper tissues and allows faster and unimpeded migration of keratinocytes over the wound surface. It also allows the naturally occurring cytokines and growth factors to exert their beneficial effect on wound contracture and re-epithelialization. [10]

MEBO Scar ointment, which provides a moist microenvironment during wound healing, was developed specifically for the treatment of scars, both old and recent. It is made of purely natural components including: cactus, sesame (contains linolinic acid and tyramine) and beeswax. [11]

The aim of this study was to observe the therapeutic effect of using MEBO Scar ointment in the prevention and treatment of post-surgical scars in men and women in Iraq.

2. METHODS

Patient Characteristics

This study was conducted over a period of 1 year, from January to December 2013, in a private clinic in Iraq. Patients undergoing elective surgeries (mini open cholecystectomy, abdominoplasty, mastectomy, breast mass excisional biopsy, thyroidectomy) were included.

The study was conducted in accordance with the principles mentioned in the Declaration of Helsinki and the ICH GCP guidelines. Prior to study commencement, the protocol was approved by a local Ethics Committee. Participants had to sign an informed consent form prior to recruitment and were free to withdraw from the study without jeopardizing medical care anytime during the study.

Post-surgical management

MEBO wound ointment (Gulf Pharmaceutical Industries [Julphar], Ras Al Khaimah, United Arab Emirates) was applied immediately after surgery in both groups. In the test group, MEBO Scar Ointment was applied after surgical stitches were removed. Prior to application of the MEBO Scar Ointment a photograph of the wound was taken and the measurements of the incision (length, width and thickness in cm) were recorded in the patient file. Patients were educated about the anticipated effects of the ointment (including reduction in the itching sensation, softening of the scar) and trained in the steps

involved in postoperative wound care. In both the test and control group, the affected area was washed with warm water.

MEBO Scar ointment was directly applied to the post-operative healing skin. The ointment was spread evenly, massaged gently for 5-10 minutes, covered with a sterile gauze and bandage (optional). Dressing was changed 3 times daily. MEBO Scar ointment was applied for 3-4 months.

In the control group, the wound was washed with warm saline 3 times daily, covered with a sterile gauze and bandage (optional) after surgical stitches were removed. Dressing was changed 3 times daily and this procedure was repeated for 3-4 months.

Evaluation ofclinical efficacy :

Clinical efficacy was observed by the time needed for color changes in a form of pigmentation , lightening ,or close to the normal skin by taking a high resolution pictures with each visit, measuring rate of scar shrinkage (length and width by ruler or tape measure in mm units) ,palpation of the rate of softening of the scar compared with surrounding skin either feeling hard like a bone or soft like a cartilage of the ear or normal like adjacent skin, finally asking with each visit about itching relieves .

Scar quality was assessed based on the following criteria: (1) itching relief: the extent to which surface irregularities are present (preferably compared with adjacent normal skin); (2) texture: the suppleness of the scar was tested; (3) scar dystrophy: the surface area of the scar in relation to the original wound area was assessed; (4) skin colour: skin pigmentation (brownish discolouration) and vascularity (redness indicating presence of vessels in scar tissue) were assessed.

Those patients advised to well control their blood pressure, their sugar level restrictedly control , correct usage of prophylactic antibiotics if needed ,and any other drugs already taken before surgery.

Evaluation of Therapeutic effectiveness

Wound was assessed 0, 7, 14, 30, 60, 90 and 120 days post-operatively. Pictures were taken during wound assessment for reference purposes.

Therapeutic effectiveness was classified as highly effective (disappearance of scar, no itching with a soft scar, skin color close to the normal tissue); moderately effective (itching almost disappears, with relief from other factors like softening of scar, partial dystrophy of scar tissue, and slight discoloration); slightly effective(only relief from itching, with no relief from others factors); or not effective(no apparent alleviation of itching, hard texture, the same extension of scar or even aggravation into hypertrophic scar). Also asking for any adverse effect or allergy from using this ointment with each visit.

Statistical analysis

Analysis of data was carried out using the available statistical package of SPSS-20 (Statistical Packages for Social Sciences- version 20).

Data were presented in simple measures of frequency and percentage. The significance of difference between qualitative data (measured in percentage) was tested using chi-square test (X^2-test) with application of Yate's correction or Fisher Exact test whenever applicable.

Statistical significance was considered whenever the P value was equal or less than 0.05.

A demographic characteristics for the gender, age ,comorbidities and medications like (antihypertensive drugs) was assessed for both groups.

3. RESULTS

A total of 90 patients (test [MEBO Scar ointment], n=40; control, n=50) were recruited in the study. All patients underwent elective surgery between February 01, 2013 and December 30, 2013. The majority of patients in the test group were female (n=30, 75%) with female to male ratio of 3:1; however, all

participants in the control group were female. The mean age of the patients was 30 years (range: 10–60 years) **(Table 1)**. There were no statistically significant differences between the test and control group with respect to type of surgery **(Table 2)** and type of incision **(Table 3)**. Thyroidectomy was the most frequently performed surgery in the test group (30%), while breast mass excision biopsy was the most common in the control group. Revisional scar surgery was conducted on 3 patients in the test group, with established hypertrophic scars post blast injuries.

During the study, the surgical wound was assessed 0,7,14,30,60,90,120 days postoperatively these were scheduled in regular visit and would start at 0 day at theatre room by applied MEBO wound ointment before dressing, then next visit at the end of firstweek (the time of removal breast excisional biopsy surgeries stiches,14th the time of removal remaining operations stiches ,MEBO scar ointment would start usage with full instruction to the patient about the correct way of application . Scar quality was found to be significantly better in the test group, especially after 120 days of MEBO Scar usage, which was found to be highly effective in 75% of the test group. However, in the control group, saline was found to be slightly effective in 50% and not effective in 48% **(Figure 1)** after 120 days.

Clinical efficacy was based on scar quality assessment that measured the time needed for color changes in a form of pigmentation or lightening, the texture of scar, and extent of dystrophy (length, width and thickness) of scaring, and itching relief. MEBO Scar ointment was found to produce significantly better outcomes from the perspective of aestheticsin comparison to the control group. Overall, itching relief was observed in 97.5% patients; texture was normal in 50% and soft in 47.5%; scar shrinkage in 97.5%; skin color was close to normal in 75% and light in 22.5% ($p<0.001$, for all parameters) **(Table 4)**. In this study, there was no adverse effect or allergy were recorded in test group.

Table 1: Demographic characteristics of the studied sample

Demographics	MEBO Scar Group (n=40)	Control Group (n=50)	p-value
	n (%)	n (%)	
Gender			
Male	10 (25.0)	0	-
Female	30 (75.0)	50 (100)	
Age (mean±SD)	35±10	36±9	> 0.05
Comorbidities			> 0.05
Hypertension	5 (12.5)	10 (20.0)	
Diabetes	10 (25.0)	15 (30.0)	
Dyslipidemia	15 (37.5)	5 (10.0)	
CVD	1 (2.5)	-	
Other	-	-	
None	9 (22.5)	20 (40.0)	
Medications			> 0.05
Anti-hypertensive	5 (12.5)	5 (10.0)	
Anti-hyperglycemic	10 (25.0)	15 (30.0)	
Anti-hyperlipidemic	15 (37.5)	5 (10.0)	
Antibiotics	-	-	
Other	-	-	
None	10 (25.0)	25 (50.0)	

Table 2: Patients categorized by Type of Surgery

Type of Surgery	MEBO Scar Group (n=40)	Control Group (n=50)
Open cholecystectomy	2 (5.0)	10 (20.0)
Abdominoplasty	8 (20.0)	12 (24.0)
Mastectomy	5 (12.5)	8 (16.0)
Breast mass excision biopsy	10 (25.0)	15 (30.0)
Thyroidectomy	12 (30.0)	5 (10.0)
Cosmetic revision of scar of previous incision	3 (7.5)	-

Table 3: Patients categorized by Type of Incision

Type of Incision	MEBO Scar Group (n=40)	Control Group (n=50)
Open mini cholecystectomy (Right subcostal)	2 (5.0)	10 (20.0)
Lower abdominal semicircular	8 (20.0)	12 (24.0)
Elliptical incision include whole breast	5 (12.5)	8 (16.0)
Radial breast incision	5 (12.5)	5 (10.0)
Circumareolar breast incision	5 (12.5)	10 (20.0)
Transverse collar incision	12 (30.0)	5 (10.0)
Elliptical incision include midline scar	3 (7.5)	-

Table 4: Scar quality assessment at 120 days post-surgery

Parameters	MEBO Scar Group (n=40)	Control Group (n=50)	p value
Itching			
Relieved	39 (97.6)	1 (2.0)	<0.001*
Not	1 (2.5)	49 (98.0)	
Textures			
Normal	20 (50.0)	1 (2.0)	<0.001*

Soft	19 (47.5)	25 (50.0)	
Hard	1 (2.5)	24 (48.0)	
Scar dystrophy			
Shrinkage	39 (97.5)	1 (2.0)	<0.001*
Slight shrinkage	-	37 (74.0)	
Hypertrophied scar	1 (2.5)	12 (24.0)	
Skin color			
Close to normal	30 (75.0)	1 (2.0)	<0.001*
Light in color	9 (22.5)	25 (50.0)	
Dark pink in color	1 (2.5)	24 (48.0)	

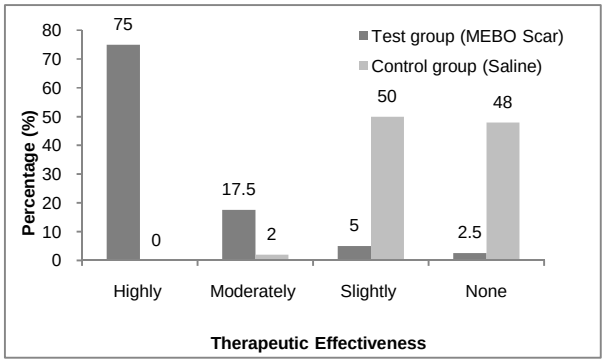

Fig 1: Therapeutic Effectiveness at 120 days post-surgery

4. DISCUSSION

The use of MEBO Scar ointment was found to significantly improve scar quality at 120 days post-surgery, with reduction in the extent of dystrophy and itching, and improvement in the scar texture and pigmentation observed in over 95% of the patients. [12]

The effectiveness of MEBO Scar ointment in promoting scar healing may be attributed to its multipronged effect on the healing skin tissue. It regulates the ratio between epithelial cells and collagen fibers as well as changes in their morphology. The imbalance of collagen metabolism and its arrangement is attributed to many factors which result in increased synthesis of collagen by fibroblasts and myofibroblasts, which in turn inhibit the activity of collagenase, leading to extensive scar hyperplasia. Matrix changes, mainly changes in fibronectin and mucopolysaccharides, result in scar stiffness. MEBO Scar Ointment can accelerate the re-arrangement of twisted collagen andreduce proliferation of fibroblasts, thus restricting scar hyperplasia. [11,13,14,15,21] The accumulation and synthesis of mucopolysaccharide can also be reduced once local tissues are compressed, thus reducing generation of collagen and the corresponding scar tissue. [11] Moreover, massaging the MEBO Scar ointment onto old scars can potentially reduce blood supply within scars, decrease synthesis of collagenous fiber, and, reduce α2-M (alpha 2-macroglobulin) globulin of collagenase in serum which facilitates collagenase activity and speeds up disintegration of collagen in old scars, this facility by applying MEBO scar ointment . [11]

The MEBO Scar ointment has also been shown to increase the partial pressure of carbon dioxide and decrease partial pressure of oxygen in the blood, and decrease vessel edema. [11,13,14] The improvement in capillary wallpromotes blood circulation, thereby removing blood stasis and preventing itching. [11] It has also been shown to maintain moisture thereby protecting the new epidermis and restoring skin's normal architecture and physiological function to attain a cosmetically acceptable scar post wound healing. [11,13,14] These data are in line with the observations in our study wherein improvement in scar itching and overall improvement in scar aesthetics was observed in patients treated with MEBO Scar ointment.

The management of incisional scars is intimately related to stages of wound healing; therefore, the care of an incisional wound is considered to be a continual process, and minimization of scar formation is often a long-term goal. It has been recommended that the management of a surgical incision should be continued for 1 year; [3] however, our study found that the use of MEBO Scar ointment improved scar parameters within 4 months of application in 75% of the patients. Hypertrophic scars that do not improve by 6 months are keloids and need to be managed aggressively with intralesional steroid injections and alternate modalities. Only 1 patient developed hypertrophic scar after 4 months of treatment with MEBO Scar ointment, which

indicates that the treatment was effective in preventing keloid formation. Moreover, the fact that the ointment was applied immediately after surgical stitches were removed, could have been a vital factor in the improved response observed since early intervention is a known key factor in controlling hyperplastic response in scar healing. [3]

Wet or moist treatment of wounds has been shown to promote re-epithelialization and result in reduced scar formation, as compared to treatment in a dry environment. The inflammatory reaction is reduced in the wet environment, thereby limiting injury progression. A wet or moist incubator-like microenvironment provides the fastest healing with fewest aberrations and least scar formation. The MEBO Scar ointment provides such a microenvironment, allowing accelerated wound healing as observed in our study.[10]

Prevention of pathologic scarring is undoubtedly more effective than treatment; therefore, ensuring prophylactic wound healing is an active area of research. Pressure therapy, silicone gel sheeting, and flavonoids are the most frequently used methods of scar prophylaxis. [4] , compression or pressure therapy, is indicated for the prophylaxis of hypertrophic scars and keloidsas it has been shown to restore the extracellular matrix organization in hypertrophic scars similar to normal scar tissue. [4, 16] However, for optimal outcomes, pressure therapy needs to be started immediately after re-epithelialization of the wound, and patients are required to wear pressure devices continuously for 8 to 24 hours a day for the first 6 months of scar healing [16], and approximately up to 1 year till the scar matures. [17] Therefore, patient compliance is the key factor in ensuring the success of compression therapy. [16] Moreover, compression therapy is unsuitable for anatomic depressions, flexures, or areas of high movement, and is associated with patient discomfort and occasional skin ulceration from uneven pressure distribution. For these reasons, patient compliance can be a major problem, with reports of noncompliance ranging from 8.5% to 59%. [17] Topical silicone gel sheeting and gel,first introduced in the early 1980s,have been shown to improve the appearance of scars; [4,16,17] , however, there is poor quality evidence to support its use in in hypertrophic scars and keloids. [4, 18] Flavonoids like quercetin and kaempferol are found in well-known topical scar creams, like Mederma skin care gel (Merz Pharmaceuticals, Greensboro, NC, USA) and Contractubex gel (MerzPharma, Frankfurt, Germany). However, so far, efficacy studies testing the ultimate benefit of these flavonoid-containing topical scar creams have provided controversial data. [4, 19]

The average incidence rates of hypertrophic scarring have been found to vary from 40% to 70% following surgical incision, depending on the depth of the wound.[3] We observed only 2.5% cases of hypertrophied scars in the MEBO Scar group, while 24% were observed in the control group. Apart from the efficacy of the MEBO Scar ointment in ensuring lower incidence of hypertrophic scar formation, the low incidence of such scars, even in the control group of the study, may be a function of surgeons' expertise, incision design, and patient characteristics at baseline. [3] The fact that there only female patients were included in the control group could reduce the generalizability of the observations as there are known differences in the wound healing process in men and women, with estrogens have been shown to accelerate wound healing and androgens to inhibit wound repair. [20] Therefore, the difference observed between the test and control groups could have been underestimated due to a potentially accelerated rate of wound healing in the control group due to inclusion of female patients only.

5. CONLUSION

Overall, it can be concluded that when properly initiated (as soon as surgical stitches are removed), the standard use of MEBO Scar Ointment for an adequate period of time sufficiently softens the scars to prevent proliferation and appearance disturbances, resulting in a cosmetically acceptable scar. Also, MEBO Scar Ointment is easy to use, safe, reliable, and effective. Therefore, it is may be recommended for the prevention and management of scars after surgery to achieve optimal scar quality in the least possible time. Future applications could include use after elective surgery, treatment of diabetic scars, and care for diabetics after amputation.

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