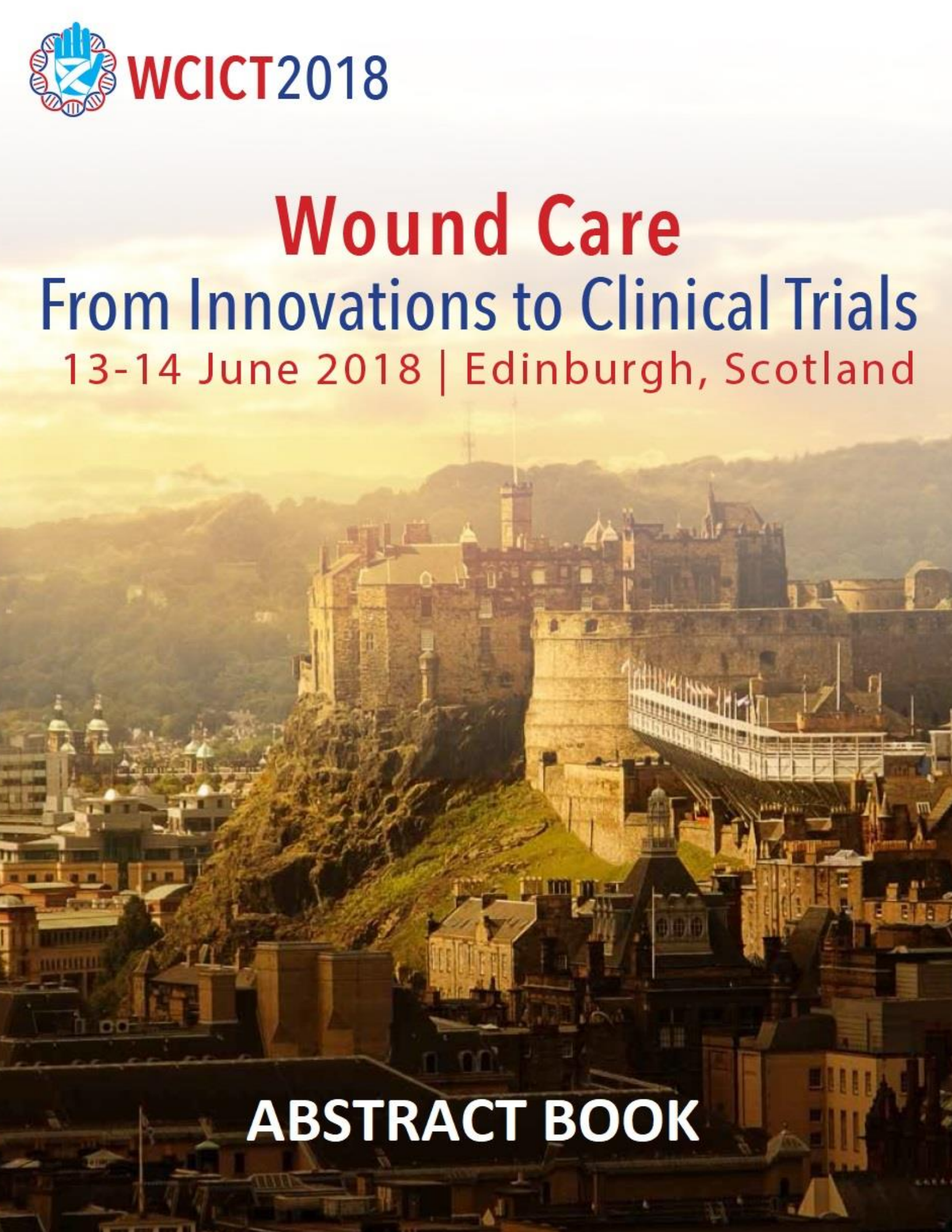
WCICT2018

Wound Care

From Innovations to Clinical Trials

13-14 June 2018 | Edinburgh, Scotland



ABSTRACT BOOK

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Poster Board #1

Multicenter, Randomized Controlled Trial of Portable Ultrasound Surgery System: Experimental and Clinical Study

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Introduction

Debridement can provide oxygen and nutritions to viable cells preventing from bacterial colonization, and debridement and irrigation are the best simple method in wound control by initiating the wound healing process from chronic wound to acute wound. Based on previous reports and preclinical studies, we designed this study to evaluate the efficacy and safety of ULSC-12D by multicenter and randomized controlled trial.

Patients and Methods

The current study was conducted at three medical institutions - Seoul National University Bundang Hospital, Samsung Seoul Hospital, Hanyang University Hospital – from February, 2013 to November, 2013. We have enrolled 30 subjects at three institutions under the inclusion and exclusion criteria. The devices in this study were randomized and total 15 subjects have underwent Experimental Device and other 15 underwent Control device.

Results

In the result of our preceding research, the proliferation rate of fibroblast was increased about 1.6 times maximumly in experimental device former model group compared with experimental device. We could observe increased proliferation rate of the fibroblasts pre-treated with the ultrasonic waves. Also, the maximum proliferation rate was appeared at 15 sec after ultrasonic treatment. These ultrasonic operative treatment is considered to be a potential treatment for wound healing by promoting the proliferation of fibroblast cells present in the wound site as well as the cleaning of the wound site.

Discussion

Evaluating the efficacy of experimental device with these experimental data, both experimental device and control device were effective in the wound debridement. But experimental device was more effective in the wound debridement if we consider their contribution to the fibroblast proliferation rate, NO synthesis amount, and collagen synthesis rate.

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Poster Board #2

Hyperspectral Imaging as a New Procedure in Wound Diagnostics

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Background

It has yet not been possible to assess the perfusion status of chronic as well as acute surgical wounds and the effects of perfusion-promoting treatment under clinical conditions non- invasive. The recently available hyperspectral technology principally seems suitable to solve this problem and therefore was focused in the present work.

Objective

To assess and monitor different acute and chronic wounds under therapy with hyperspectral imaging

Methods

Hyperspectral imaging (HSI) combines digital imaging and spectroscopy over 500-1000 nm in the visible to near-infrared range. HSI captures an optical spectrum of each image pixel with a spectral resolution of 5 nm and 100 spectral channels. Three-dimensional datacubes with 2 spatial and one spectral dimension are generated. Based on spectral information, the software uses complex algorithms to calculate oxygen saturation of hemoglobin as well as water distribution in the tissue. We measured acute surgical wounds after surgical intervention (Dupuytren´s disease), breast wounds after surgery and chronic ulcer wounds after cold plasma and infrared treatment.

Results

In all cases HSI enabled near real-time clinical plausible data upon tissue oxygenization correlating with clinical findings. Ulcer perfusion could be increased by infrared and cold plasma treatment, lasting over 20 minutes after treatment. When investigating postoperative healing after Dupuytren`s and breast surgery, macroscopically suspicious foci (i.e. livid skin areas) could be spatially monitored and clinically correlated for critical oxygen supply.

Conclusion

By means of HSI, the acquisition of hemodynamically relevant perfusion parameters including oxygen supply can be measured (parametrically) without time-consuming training and special technical effort in near real time. The software allows visualization of superficial and deeper oxygen supply and allows their quantification at defined points.

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Poster Board #3

Randomized, Multicentre, Comparative Study to Evaluate Efficacy, Safety and Tolerability of Topical Ayurvedic Preparation in Patients with Diabetic Foot Ulcer

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Background

Wound management is continuously evolving with advancement in medicine. Continuous research in Ayurveda, is resulting in the development of newer drugs which are safe and effective.

Objective

To assess the efficacy, safety and tolerability of topical ayurvedic preparation containing Cayene + Cedar wood oil + Burdock oil + Golden seal extract + Haldi Oil + Gandhaka + Tankana Amla (Bucay™) in management of Diabetic Foot Ulcers

Methods

This was a randomized, multicenter, comparative study for 6 weeks. Subjects with diabetic foot ulcers were 1:1 randomized to receive study medication to be applied over the affected area once daily or conventional care dressings. Subjects were followed up every week for 6 weeks. Changes in wound area were confirmed through clinical evaluation and comparison of photographs taken during previous visits.

Results

A total of 100 subjects were included in the study. 61 subjects were men and 39 were women. Mean age was 54.28 ± 6.8 years and mean HbA1c was 8.28 ±1.78 %. Re-epithelialization of wound was observed in all subjects with study medication. The average wound area at baseline was 18.21 ± 7.34 cm^2 and 16.16 ± 5.93 cm^2 in medication arm and conventional dressing arm. After 6 weeks of therapy, the wound area reduced to 11.1± 2.38 cm^2 and 13.83 ± 3.28 cm^2 respectively which was clinically and statistically significant. Overall investigators grading (on the 5 point scale) was very good (46%) and excellent (54%) for study medication. The study medication was well tolerated and no adverse events reported.

Conclusion

Topical ayurvedic preparation (Bucay™) was found to be effective and well tolerated in patients with diabetic foot ulcers.

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Poster Board #4

Design Requirements of a Non-Adherent Silicone Wound Contact Layer

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Background

In order to facilitate their application silicone wound contact layers would ideally be designed to be tacky enough to stay in place unassisted during application and secondary dressing change, and sufficiently extensible to conform to difficult to dress areas such as joints.

Silicone wound contact layers are applied in direct contact with the wound-bed and the peri-wound area. With their soft tack silicone, these products reduce the pain and damage to the fragile peri-wound skin associated with dressing change. In addition, wound contact layers must allow the exudate to reach the secondary dressing by passing through the pores of their mesh. They may also be semi-transparent to help clinicians assess the healing process of the wound when changing secondary dressings.

Objective

The aim of this study is to assess extensibility, tack properties and ease of handling of a non-adherent silicone wound contact layer (Dressing A) compared to a range of commercially available non-adhering silicone wound contact layers.

Methods

The extensibility of wound contact layers was assessed by measuring the force required to elongate the dressings by 20% of their original length during 100 elongation cycles. The tack properties of the dressings were assessed by measuring the force required to remove the sample from a polycarbonate substrate.

A group of 10 clinicians evaluated the ease of use of the wound contact layers and provided feedback via an open discussion and questionnaire.

Results

Dressing A demonstrated it was the easiest to handle as well as having good tack properties and statistically significantly higher extensibility than other commercially available non-adhering silicone dressings tested.

Conclusion

The study demonstrates that the non-adhering silicone wound contact layer meets key design requirements of a silicone wound contact layer. In vitro assessment suggests that the dressing can be easily used on wounds in difficult to dress areas.

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Poster Board #5

Disseminated Herpes Simplex Virus Presenting Multiple Ulcerations on the Left Leg, Inguinal, Gluteal and Scrotal

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Background

A 77 year old patient consults the clinic of Dermatology with multiple Ulcerations for half a year in focus on the legs and the inguinal, gluteal and scrotal region. The patient had been treated prior with multiple antibiotics and steroids. A histology was taken from the border area of a lesion without a focus for a specific genesis. X-ray thorax and an abdominal sonography did not provide any imaging information.

Methods

We took microbiological probes and another histology of a lesion. Further a serology to test for HIV, hepatitis, tuberculosis and syphilis were taken. In the course smear tests and a serology to test for Herpes and Varizella virus were performed.

Results

The patient was treated for 12 days with piperacillin/tazobactam after the detection of pseudomonas in all ulcerations. For further supportive therapy we gave folic acid, zinc, iron, vitamin B12 for improved wound healing. The histology showed no evidence for a lymphoma, pyoderma gangraenosum or vasculitis. The medication with prednisolone was stopped. After insufficient healing under antibiotic therapy we took serological probes to test for Herpes simplex and varicella zoster virus, with positive result for HSV type 2. The patient was treated with acyclovir which showed the beginning healing of the wounds. The wound in the scrotal region was closed by a secondary suture, a deep wound gluteal was closed with a graft.

Conclusion

Considering the medical background with a laryngeal tumor and a prostate carcinoma, both with adjuvant radiation, further a long term immunosuppressive therapy with prednisolone, the disseminated virus infection can be understood. Atypical wounds should always be tested for a lymphoma by histology, further wounds resistant under antibiotics with peripheral erythema and undermining border are suspicious for pyoderma. The typical finding of a herpes simplex with clustered vesicles can be masked by ulceration in rigorous cases.

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Poster Board #6

SGLT2 Inhibitors and Foot Ulcer - Possible Links? Case Report

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Background

Sodium glucose co-transport 2 inhibitors (SGLT2-i) are the new class of anti-diabetic medications witch benefit especially patients with ischemic heart disease. Unfortunately emerging data from post marketing studies indicate their adverse effects such as e.g. critical foot ischemia and higher risk for “small” amputation.

Objective

To show the possible connections between new antidiabetic agent side effects and critical leg ischemia.

Methods

Physical examination, angiography as well as medical records analysis were applicable to show Case Report: Sixty-nine years old lady with 15 years history of diabetes mellitus type 2 (t.2DM) and a few months history of claudication was admitted to Vascular Surgery Department in February because of critical left foot ischemia. In September last year she had percutaneous transluminal angioplasty (PTA) within left superficial femoral artery (SFA) with stent-implantation. After the procedure her claudication distance extended to about 400 meters. After dismissed from hospital her diabetologist encouraged her to start empagliflozin because of failure of the previous treatment of her diabetes. There was no typical antidiabetic treatment side effects after she started the new agent, but at the beginning of January her claudication distance shortened rapidly. After 2-3 weeks rest pain and 2nd toe’s ulceration started.

Results

The physical examination as well as angiography confirmed the presence of thrombosis above the stent, and peripheral (below knee) stenosis responsible for the 2nd toe’s ulcer. The patient declared very good compliance for pharmacotherapy (e.g. dual-antiplatelet therapy) and the new hypoglycemic drug was considered as a possible cause of the described restenosis and ischemia aggravation.

Conclusion

Even if no contraindication to use SGLT2-i for patients with diabetes and disseminated, peripheral atherosclerosis, the new agents-flozins for diabetes treatment should be used with extreme caution in people with such ischemic disease.

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Poster Board #7

The Principle of Wound Bed Preparation Applied to an Extensive and Infected Leg Ulcer, in a Patient with Multiple Comorbidities

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Background

The concept of wound bed preparation was proposed in 2002 by an international group of experts as a practical guide for the management of patients with wounds of various etiologies, which addresses all critical components of local treatment: debridement, bacterial load and exudate management, while taking into account the patient`s general condition and how it can affect the wound healing process.

Objective

The purpose of this approach is providing the formation of good granulation tissue, leading to the closure of the wound, either naturally by marginal epithelization, or by the use of skin grafts or substitutes.

Methods

We present the case of a 45 years old female patient, with extensive and infected left leg ulcers and with multiple associated diseases: diabetes, decompensated liver cirrhosis, hepatitis C virus, anemia, thrombocytopenia and chronic venous insufficiency. The patient underwent multiple surgical procedures, debridement of the wound and then split skin grafting. The general treatment and the wound bed preparation prior to skin grafting required a special attention, given the fragility of the patient condition and the obstacles to wound healing due to local and general deleterious factors: the extent and the suppuration of the lesions, leg phlegmon, fibrous and sclerotic wound tissue, hepatic insufficiency, diabetes, chronic venous insufficiency, immunosuppression also caused by previous corticotherapy. The proper wound bed preparation consisted in serial debridement and application of topical agents with anti-infective, anti-inflammatory and nutritive activities, like medicinal honey dressings.

Results

The local and general evolution has been gradually favorable, with the remission of the leg phlegmon and the stage integration of split skin grafts.

Conclusion

The concept of wound bed preparation represents a very useful instrument in the armamentarium of plastic surgery, especially in the case of challenging and extensive chronic wounds, in patients with local deleterious complications and serious associated diseases.

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Poster Board #8

Wound Healing with Autologous Composites: PlasmaGlu

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Autologous composites consisting of patient derived plasma and synthetic biomaterials (PlasmaGlu) has been developed for application as wound healing bandages, biological tissue adhesives, and drug eluting coatings on soft, wet tissue surfaces. PlasmaGlu is a major advance in wound healing and bioadhesive technology: it is the only wound healing liquid glue that incorporates patient derived plasma and synthetic additives to accelerate wound healing, prevent bacteria biofilm formation, and adapt to any wound geometry through a liquid to solid photo-curing application.

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Poster Board #9

Experimental Research of an Innovative Ointment with Increased Wound Healing Activity (Dermaplant)

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Background

Wound healing engages interactions of extracellular matrix mediators and different cells like fibroblasts and keratinocytes. The pharmaceutical products may have different side effects. An alternative is offered by the medicinal plants and the natural remedies, used with confidence from ancient times to treat various skin diseases including burns or wounds.

Objective

The objective of this research is the preclinical study of an original complex formula, made solely from medicinal plants and natural ingredients. The ointment formula comprises olive oil extract from a mixture of nine medicinal plants with well known wound healing activity, together with sea buckthorn oil, lavender essential oil, coconut oil, beeswax and conifer resin.

Methods

The safety and efficacy of the ointment were assessed through pharmacodynamic and toxicological studies. The research has been carried out by applying a number of experimental models.

Results

The obtained results were as follows:
- There are no toxic or irritant effects of the product on the experimental models
- It does not contain pyrogenic impurities. Safety tests have revealed that the product is free of endotoxin contaminants.
- Microbial load is within the pharmacopoeial range, without pathogenic microorganisms
- The test in vitro on 3T3 fibroblasts has demonstrated a remarkable proliferation-stimulating capacity (+ 18% increase in proliferation rate)
- The evaluation of the "in vivo" repair effect has revealed stimulation of repair of dermal injured tissue on a model of unilateral thermal injury in rat, the 6-day repair process being accelerated by 69%.

Conclusion

The pharmacodynamic and toxicological studies highlighted noteworthy proliferation-stimulating and wound healing activities of the product DERMAPLANT, without toxic, adverse or irritant effects. The ointment proposes a topical composition for burns and wounds, which is effective and well tolerated. Subsequent clinical studies are needed to assess the entire range of ointment effects, indications and modalities of administration.

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Poster Board #10

Topical Medical Cannabis (TMC): A NEW Epigenetic Paradigm for Wound Healing

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Background

The endocannabinoid system is ubiquitous throughout the human body and has recently been found to have a significant representation throughout the integumentary system, both cutaneous membranes and mucous membranes. Topical Medical Cannabis (TMC) based medicines are intrinsically lipophilic and contain both delta-9-tetrahydrocannabinol and Cannabidiol in varying proportions.

Objective

To introduce TMC based medicines as new Epigenetic paradigm for Wound Management.

Methods

A series of n=1 trials were initiated on a cohort of stalled recalcitrant wounds. Composed of cases of greater than 12 months duration, these wounds were treated with TMC based medicines. All cases were previously afforded with all available Evidence-Based treatments that conformed with local best practices and wound-bed preparation principles. Ten cases were studied. Etiologies represented within the cohort under study included: Pyoderma Gangrenosum, Leukocytoclastic Vasculitis, Cryoglobulinemia, Antiphospholipid syndrome, Sickle Cell Disease, and Lichen Simplex Chronicus.

Results

Clinically significant wound healing, and disease modulation was noted in all cases. The TMC medicines were applied directly applied to wound beds and was very well tolerated. No adverse reactions were observed. The positive results observed in a cohort of the most challenging recalcitrant cases provokes realistic interpolation that TMC based Medicines may be effective for a broader context within Wound Management.

Conclusion

The endocannabinoid system is a viable Epigenetic target and platform for exploring therapeutic options for skin and wound conditions. Therapies based on TMC, that interact at the level of the endocannabinoid system, have significant potential to promote wound healing. Furthermore, TMC is safe, inexpensive, self-titrated, and non-invasive.

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Poster Board #11

Topical Medical Cannabis (TMC): A New Treatment for Wound Pain

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Background

Wound Pain generates significant suffering, reduced quality of life, and reduced productivity for patients. At present, opioids are the commonest modality. Systemic opioids have recently come under scrutiny given the world wide epidemic of accidental overdoses. Topical opioids have demonstrated only marginal analgesia in 3 of 8 randomized controlled studies, and their onset of action occurs 60 minutes of their application. Furthermore, recent studies are demonstrating that opioids also inhibit wound healing. The discovery of the endocannabinoid system throughout the integumentary provides a valid and logical scientific platform to consider the use of TMC based medicines in wound management.

Objective

To introduce Topical Medical Cannabis (TMC) based medicines as a new analgesic option for wound pain, both baseline pain and breakthrough pain.

Methods

A series of n=1 trials of patients with painful wounds reporting greater than 5/10 pain were offered treatment with TMC based medicines that were applied directly to their wound beds. More than 20 patients were treated and their wound etiology's included Pyoderma Gangrenosum, Venous leg ulcers, ischemic ulcers, vasculitis, and skin cancers.

Results

All patients experienced more than 50% pain relief within 5-10 minutes of topical instillation onto their wound beds. The duration of analgesia ranged between 4-6 hours. An opioid sparing effect was noted in the majority of cases. No adverse reactions, neither systemic nor local, were observed or reported by patients.

Conclusion

As a safe, inexpensive, self-titrated, and non-invasive treatment modality, TMC holds great potential in wound management and may help to curb the current world-wide opioid crisis. TMC may be useful in all wound classes. TMC has the potential to deal with both baseline wound pain and wound-related breakthrough pain such as procedural pain.

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Poster Board #12

Common Pathophysiological Mechanisms Underlying Dementia and Pressure Ulcers

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Increased longevity, especially in frail elderly patients, there is a higher rate of dementia resulting in functional and cognitive impairment leading to disabilities, immobility and pressure ulcers (PU), representing a final pathological pathway. Our research goal was to elucidate common pathophysiological mechanisms underlying dementia and PU.

Apparently, it looks as these are two separate conditions. Dementia is typically viewed as a neurodegenerative disease without peripheral implications. Pressure ulcers are manifested as a local skin problem particularly in frail, immobile elderly patient.

Finding common etiological paths between pressure ulcers and dementia will produce new treatment strategies that could lead to the prevention of pressure ulcers, sensitized clinician awareness to PU in mild to moderate dementia could lead to the suppression of PU onset, ultimately decreasing suffering during the advanced stages of dementia.

Studies consistently demonstrate a significant association between various comorbidities especially dementia and pressure ulcers in frail elderly patients. The precise physiological mechanisms that lead to dementia and pressure ulcers comorbidity versus other comorbidities are not clear. The potential hypothesized pathophysiological mechanism causing "peripheral" impact of dementia, particular in Alzheimer disease, is related to changes in fibroblast aggregation rates in the skin tissue, in conjunction with continuous deterioration of the neurophysiological subsystems associated with: motor, sensory, autonomic, cognitive, and behavioral pathways linking pressure ulcers with dementia progression.

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Poster Board #13

Sciatic Neuropathy after Pressure Ulcer: A Case Report

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Background

In the pressure ulcer patients, the main observation and treatment targets are the extent and depth of the necrotic and inflammatory tissues. However, it should be carefully assessed whether sciatic nerve damage in pressure ulcer of a paralyzed patient is caused by pressure or inflammation.

Objective

The most common causes of sciatic neuropathy are hip surgery, trauma, external compression, direct nerve injury, ischemia and so on. However, the case of sciatic neuropathy due to pressure ulcer has not been reported yet. We report a case of a 33-year-old woman with sciatic neuropathy caused by pressure ulcer.

Methods

A 33-year-old woman was admitted to our hospital with a 25 × 10 cm pressure ulcer in the right buttock. Physical examination, MRI, and nerve conduction studies revealed sensory deterioration in a great toe, a significant weakness in the right foot dorsiflexion, inflammatory soft tissue swelling around the sciatic nerve, and the peroneal branch injury of the sciatic nerve. Debridement and decompression under general anesthesia were performed to resolve necrotic tissue and inflammatory soft tissue swelling. Frequent dressing was applied to the remaining soft tissue defects. She was followed by psychiatric treatment and exercise therapy.

Results

Pressure ulcer improved with steady therapy, and mobility was somewhat restored. However, toxic hepatitis was caused by valproic acid medication used for psychiatric treatment during hospitalization.

Conclusion

Because pressure ulcers generally occur in patients with paraplegia or quadriplegia, physicians are less interested in sensory and motor disorders of lower extremity due to pressure ulcers. It is important to note that sciatic neuropathy may occur due to pressure ulcers. In addition, if neurologic symptoms occur, physical examination, nerve conduction studies and imaging studies should be performed to accurately diagnose sciatic neuropathy and appropriate treatment accordingly.

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Poster Board #14

Examining the Use of a Silver Impregnated Activated Charcoal Dressing in the Management of Chronic Wounds

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Background

Silver-containing antimicrobial dressings have played an important role in wound management for decades. One of the biggest challenges to the healthcare system are infected chronic wounds. These are difficult to heal and therefore lead to increased cost[1].
A silver impregnated activated charcoal (SIAC) dressing is comprised of activated charcoal cloth impregnated with silver within a nylon sleeve. The dressing is designed to help reduce infection, wound odour and pain in patients with critically infected wounds[2].

Objective

The objective is to review the evidence for the efficacy of a SIAC dressing in the management of a wide range of wounds.

Method

A literature review was undertaken and the Hierarchy of Evidence was utilised to summarise the evidence based studies, articles and educational material published. The review also focuses on the management of infections in chronic wounds.

Results

From the literature reviewed, the appropriate use of an activated charcoal dressing with silver was shown to have efficacy in reducing wound malodour and bioburden in a range of wounds (chronic and surgical) including overgranulated tissues, percutaneous endoscopic gastronomy tubes (PEG sites), intertrigo and necrotic digits[2,3]. Clinicians have previously reported the dressing was easy to apply with reduction in pain, malodour and signs of infections seen at 7-14 days[2].

Conclusion

The evidence presented, which is consistent with previously reported data, demonstrates the ability of SIAC dressings to help reduce bioburden, wound malodour and progress a range of difficult to heal wounds.
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Poster Board #15

Central Sensitization is a Risk Factor for Wound Complication after Primary Total Knee Arthroplasty

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Background

Postoperative wound complication is a significant risk factor for subsequent deep periprosthetic joint infection after total knee arthroplasty (TKA). Central sensitization (CS) is an abnormal enhancement of pain mechanism involving the central nervous system. Although psychologic disease is widely considered as one risk factor, the relationship between CS and wound complication is currently unclear.

Objective

The purpose of this study was to investigate whether CS was associated with high wound complication rate after primary TKA.

Methods

Between December 2015 and June 2016, 161 patients undergoing unilateral TKA were prospectively divided into two groups based on Central Sensitization Inventory (CSI) score of 40 points after excluding cases with known risk factors such as physical co-morbidities, health-related behaviors, and psychologic disease. Group 1 consisted of 112 patients (112 knees) whose CSI score was < 40 points and group 2 consisted of 49 patients (49 knees) whose CSI score was ≥ 40 points. Wound complications were defined as wound dehiscence, suture granuloma, prolonged wound oozing occurring after postoperative day 5, significant hematoma formation, or surgical site infection recorded during the initial 90-day postoperative period. Demographic data, visual analogue scale (VAS), CSI score, and wound complications were compared between the two groups.

Results

Wound complications developed in 3 (2.7%) knees in Group 1 and 14 (28.6%) knees in Group 2 ($p < 0.001$). Multivariate logistic regression analysis showed that odds of having a postoperative wound complication were increased 15.749 times in patients with CSI score ≥ 40 (95% CI: 4.131 - 60.033, $P < 0.001$).

Conclusion

CS is a risk factor for the development of postoperative wound complication after primary TKA

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Poster Board #16

Acceleration of Wound Healing Using Hydrophilic Chitosan-Silica Hybrid Dressing Material

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Background

The wound healing process is complex and the maintenance of homeostasis is critical for treatment of problematic non-healing wound. Most current commercialized dressing materials have played a passive role in wound healing.

Objective

We hybridized chitosan and silica for organic material and inorganic nanomaterial, respectively and expected this dressing material to accelerate the healing process of the problematic wound in the clinical setting.

Methods

Chitosan-silica dressing material was synthesized using a room-temperature sol–gel process which allows homogeneous and nanoscale mixing. The morphological observation (FE-SEM, TS), D) Chitosan-Silica (CTS-Si). The wound size, amount of exudate and wound bed appearance score were measured and histologic analyses were performed.

Results

Chitosan–silica dressing foam revealed a uniform and nano-sized microstructure and showed high water absorption rate and tensile strength. Chitosan-silica dressing foam showed the high cell affinity and proliferation level. In the in vivo rat/pig wound healing model, chitosan-silica dressing foam actively interacted with the wound surface, resulting great wound healing efficiency, as compared with other dressing materials including pure Chitosan. Chitosan-silica treated groups showed higher density of collagen deposition, angiogenesis, along with accelerated wound closure rate.

Conclusion

In this research, we fabricated a Chitosan-Silica hybrid material and confirmed the good biocompatibility and bioactivity such as the high porosity, water adsorption, and low cytotoxicity. Chitosan-Silica hybrid foam could be multi-functioning dressing material which has great potential for accelerating wound healing in the problematic clinical wound.

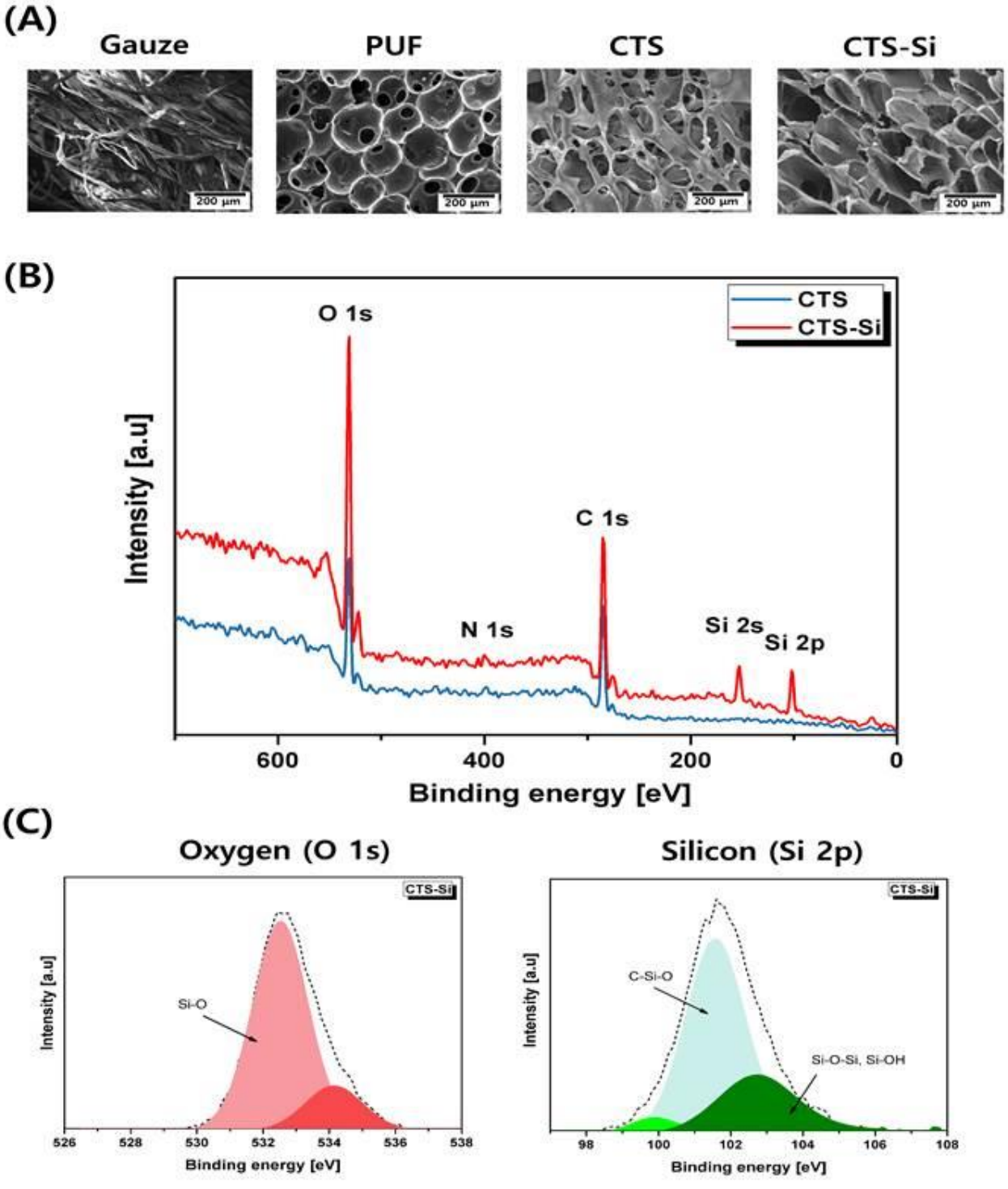

Figure 1. Cross-sectional images of four types of wound dressing materials (A), XPS spectra (B) and the deconvoluted spectra (C).

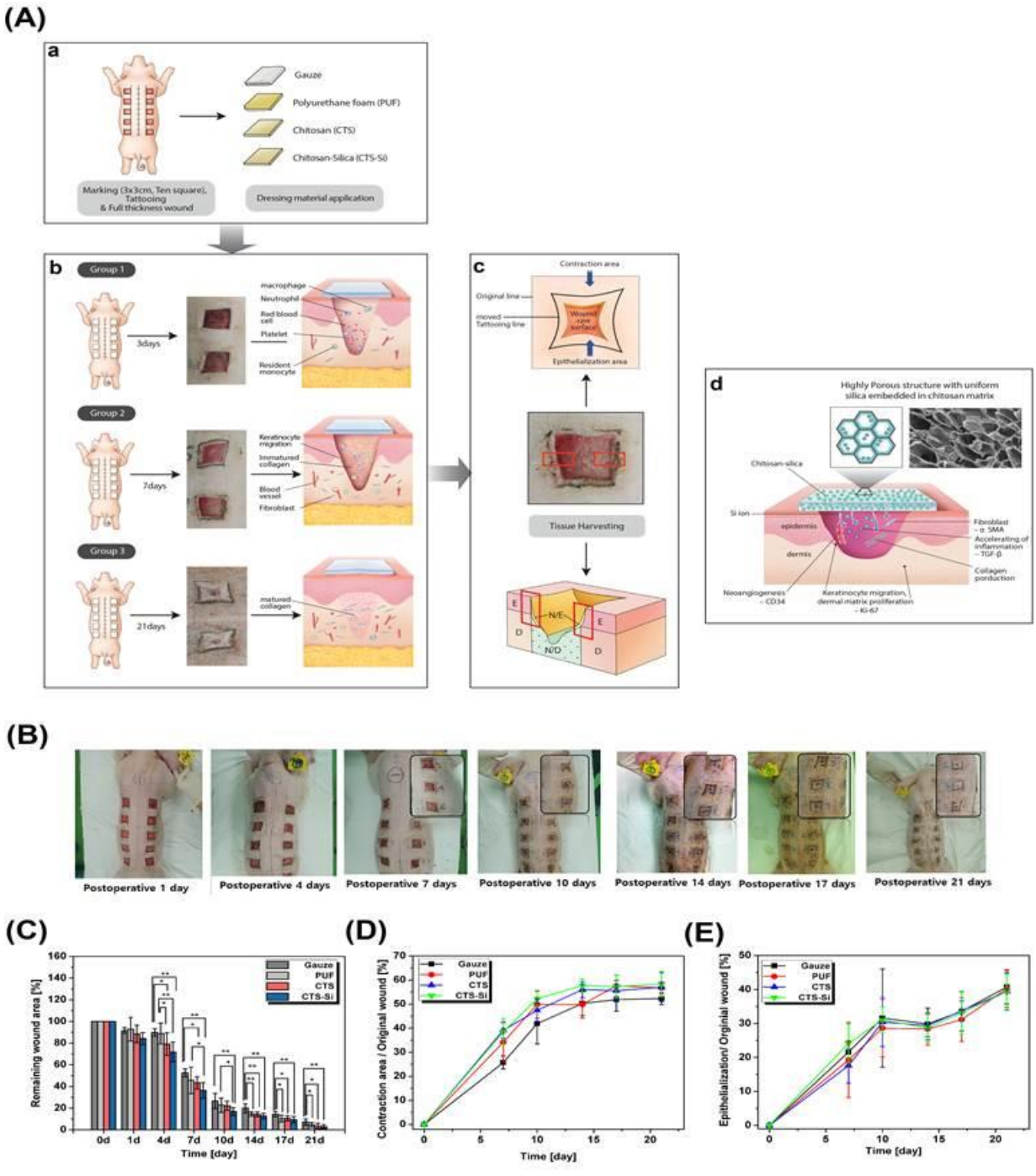

Figure 2. Schematic process of *in vivo* wound healing assay using porcine model.

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Poster Board #17

The Effects of Blocking Inflammation and Cell Necrosis by Ischemic Preconditioning and Human Adipose-Derived Mesenchymal Stem Cells in Skin Flap Models

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Aim

Skin flap is necessary in plastic and reconstructive surgery for removal skin cancer, wounds and ulcers. We aimed to improve the ischemia-reperfusion injury of skin flap area using ischemic preconditioning (IPC) and human adipose-derived mesenchymal stem cells (ADSCs) in skin flap rat models.

Method

Twenty Sprague-Dawley rats were divided into 4 groups; control (skin flap), skin flap-IPC, skin flap-ADSC, skin flap-IPC-ADSC (n=5 each). IPC was performed 3 cycles of 5 min occlusion and reperfusion using a tightened tourniquet in hind limb. A rectangular skin flap models is a 27 cm^2 (3 × 9 cm) dorsal skin flap. The ADSCs were labeled with fluorescent cell tracer PKH26 to detect the MSCs migration. The skin flap survival was evaluated by skin color measure, histopathologic assessment and immunohistochemistry.

Results / Discussion

The skiAn necrotic area was improved in skin flap-IPC-hADSCs group compared with control. The PKH26-labeled ADSCs (red fluorescence) were observed in the subcutaneous tissue and muscle layer of the flaps. The epidermal regeneration was significantly increased in skin flap-IPC-hADSCs group. In masson's trichrome staining, the skeletal muscle layer was protected in skin flap-IPC-hADSCs group. The apoptotic cells of epidermis were decreased in ADSCs injection groups.

Conclusion

The ADSCs and IPC are a good therapeutic strategy to prevent cell necrosis of the skin flap. In particular, it is necessary to establish the safest and accurate method for clinical trials. We demonstrated that the ADSCs therapy combined with IPC improves survival of skin flap.