OC064

Glycerol-preserved skin allograft (GPA) in the management of burn injuries and as an adjunct in free flap surgery: Seven years experience

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Rationale: Skin allograft has been recognised as a biological dressing and temporary skin substitute for more than a century. Glycerol-preserved skin allograft (GPA) since its introduction in the early 80s has gained popularity due to its ease of storage and availability, low antigenicity, promotion of neovascularisation and lower risk of transmissible disease.
Methods: A retrospective study was conducted from October 2001 to February 2008 on all cases which had the GPA used in their management and the patients' medical records and clinical photograph were obtained to collect the relevant information. The data were tabulated and analysed.
Results: There were 90 patients included, 50 were male and 40 were female with the mean age of 28.8 years. In 38 patients (42.2%), the GPA was used for the management of severe burns injury; as wound bed preparation in 29 cases and as sandwich technique for Modified Meek Micrograft in 9 cases. The GPA was used as a permanent dressing in partial thickness burns in 5 cases. The mean length of stay for the survivors was 42.5 days with the complete healing achieved in average of 38.7 days. In the other half of the patients, the GPA was used as an adjunctive treatment for free flap surgery. The main indications for this group of patient were as temporary wound cover to allow surgically associated oedema to settle, to protect the flap pedicle from compression and exposure, for temporary cover of donor site wound, for the management of flap complication/failure and for flap monitoring purpose.
Conclusion: The GPA remains the gold standard as temporary and definitive dressing in the treatment of burns injuries and the use of GPA in conjunction with free flap surgery allows the swelling to subside and reduces the need for autografting, which allow the wound be closed secondarily giving better aesthetic outcomes and more importantly the survival of the flap.
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OC065

Mechanical versus pharmacological modulation of myofibroblast function: A new perspective to improve wound healing☆

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Rationale: Several chemical and mechanical events are responsible for the activation of fibroblasts in myofibroblasts during tissue repair. Myofibroblasts are responsible for extracellular matrix deposition and contraction. Excessive activation of these cells leads to hypertrophic scars, while inhibition delays contraction and closure. We studied mechanical and biochemical ways to modulate fibroblast activation during wound repair.
Methods: Dermal fibroblasts were stimulated biochemically (by TGF-beta and with inhibitors of alpha-SMA formation), and physically (with direct load and by seeding on substrates with different mechanical properties) in culture. Development of alpha-SMA, proliferation and contractility were measured in all groups. The same conditions were reproduced in vivo, on 1 cm^2, full-thickness wounds on db/db mice ($n = 10$/group) and healing and contraction were staged microscopically and macroscopically.
Results: In vitro, mechanical challenge appeared to stimulate the development of contractile fibers more effectively than pharmacological triggers (up to 4-fold increase). When cells were seeded on substrates unable to physically resist cell contraction, fibroblasts, even if challenged biochemically, did not exhibit any contraction. Biochemically inhibited myofibroblasts when exposed to mechanical load returned to normal levels contraction. In vivo, soluble growth factors only partially stimulated alpha-SMA expression, while mechanical load increased levels of myofibroblasts and contraction (3-fold increase). Reduced contraction (2-fold compared to controls) was seen in wounds grafted with matrices shielding the mechanical load sensed by fibroblasts.
Conclusion: The outcome of healing may highly profit from the negative and positive modulation of contraction. Results show that mechanical control is stronger than biochemical on fibroblasts suggesting a relationship between cytoskeleton shape and function in these cells. Understanding the key mechanisms regulating myofibroblast function is crucial for the treatment of large non-healing or hypertrophic wounds.
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OC066

Safety & efficacy of bromelain extract in debriding deep burns: Recent summary of all available data

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Rationale: "Debrase®" Gel Dressing (DGD) is a Bromelain derived enzymatic debriding agent in an advanced stage of clinical trials for several years. DGD dissolves deep burn eschar in a 4-h application preparing the wound bed for grafting or spontaneous healing. Partial, preliminary reports were presented in the past.
Methods: Investigators participating: P. Brychta, Czech Republic; M. Butz, B. Hartmann, Germany; H. Carsin, L. Bargues, D. Wasserman, France; R.B. Ahuja, S. Chamania, M. Gore, V. Obed, India; M.M. Ferrara, Palermo, Italy; A. Barazowski, Y. Krieger, R. Gurfinkel, E. Silverstein, Israel; J. Koller, J. Babik K. Sopko, Slovak Republic; P. Gilbert, K. Judkins, UK; J.L. Hunt, Dallas; A. Luterman, D. Mozingo, R.F. Mullins, P. Silverstein, US; R. Koren, L. Gerstl, Yavne, Israel. We present here the summary of four studies of patients with deep burns: the first, single site, single arm, 154 patients, the second, a randomized, dose range finding study with 30 patients, the third, phase II prospective, randomized, controlled, multicenter, multinational study with 140 patients and forth, additional, randomized, controlled phase II study with 30 patients. Additional, phase III, randomized, controlled multinational clinical study is in progress.
Results: Recent data compilation and analysis indicates changes in the safety and efficacy patterns between the first and the following studies. DGD treatment achieved approximately 90% debridement in a single 4-h application. The three last studies corroborate these findings showing that DGD significantly shorten the time to complete initial debridement procedure compared to the SOC treatment (1.6 days vs. 14.3 days, $p < 0.001$), allowing accurate early diagnosis and decreasing excisional surgery compared to Standard of Care. Positive correlation was noted with the reported Adverse Events and the burn's wound size.
Conclusion: DGD appears to be an effective, selective, fast, safe and useful enzymatic debridement agent in all four studies.
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OC067

Cultured epithelial autografts (CEA) for coverage of large burn wounds in 88 patients: The Indiana University experience☆

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Rationale: Over the last decade, there has been a major decrease in mortality rates of burn patients due to advancements in burn resuscitation, intensive care, trauma care and nutritional support and early excision and coverage of the burn wound. Patients with burns >50% TBSA pose specific challenges to the burn surgeon with regards to autologus coverage (lack of donor sites). We present our 18 year experience (1990-Present) using cultured epithelial autografts (CEA) in 88 patients (20 children, 68 adults) with age ranges of 6 months to 73 years.
Methods: A retrospective review was conducted on adult and pediatric patients grafted with CEA at the Indiana University Medical Center for definitive wound coverage (TBSA 28–98%). These patients were followed throughout their inpatient and outpatient course (3–90 months). Complications, take rates and outpatient follow-ups were noted.
Results: Our series of 88 patients requiring CEA for definitive wound coverage is the largest series to date. The overall survival rate was 91% (80 of 88). Complications were classified as early and late, they included: (early) hypopigmentation (13%), blistering & shearing (31%), pruritis & itching (4.7%), (late) CEA loss (2 patients) and wound contractures (66%). Contracture releases were performed on 32 patients (36%) of which 18 were children (56%). Our final take rate for CEA placement in our population was 72.7%. 30% of the CEA patients were sent home on discharge, the remaining (70%) were admitted to rehabilitation units for further care.
Conclusion: Cultured keratinocytes provide an excellent adjunct to conventional STSG in dealing with large burn wounds. A dedicated team of physicians, nurses and therapists well rehearsed in CEA care is vital for success in keratinocyte grafting. Our final graft take of 72.7% with a 91% overall survival rate gives us much optimism for using CEA in not only burns but also for other wounds as well. Future research should be focused on expediting the culturing of keratinocytes, improving surgical techniques of wound bed preparation and optimizing infection control to maximize the engraftment of CEA.
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