

## INTERNATIONAL ABSTRACTS

---

### **FIBRINOGEN FUNCTION AFTER SEVERE BURN INJURY**

In order to test the hypothesis that patients with severe burn injury undergo in time fibrinogen function changes, FIBTEM® and fibrinogen concentration were measured simultaneously early after burn trauma. Blood tests were performed immediately and 12, 24, and 48 h after the patients' admission. Fibrinogen level (Clauss) and four commercially available ROTEM® tests were performed at each time point. In the twenty patients considered, the fibrinogen level and FIBTEM® maximum clot firmness (MCF) were within the reference range until 24 h after burn trauma, but increased significantly after 48 h, and there was a significant correlation between FIBTEM® MCF and fibrinogen level. The results of this prospective observational clinical study therefore show that the fibrinogen function alters soon after burn trauma and that it is possible to visualize this by ROTEM® using the fibrinogen-sensitive FIBTEM® test.

Schaden E, Hoerbuerger D, Hacker S et al.  
Burns, 38: 77-82, 2012

### **THE PROTECTIVE ROLE OF ASCORBIC ACID IN BURN-INDUCED TESTICULAR DAMAGE IN RATS**

The purpose of this experimental Nigerian research was to study the ability of ascorbic acid to protect the testes from damage in severe burns. Third-degree burns were inflicted on 40% of the body surface area of the rats, which were given ascorbic acid (4 mg/kg) for 8 weeks. The weight of the animals' reproductive organs and their epididymal sperm parameters were measured, oxidative status was assayed, and a semi-quantitative assessment of histological changes was performed. It was found that burns caused severe seminiferous tubular damage and also increased oxidative stress. However, ascorbic acid prevented the changes in all sperm parameters. Ascorbic acid also significantly reduced histological damages to seminiferous tubules. It is therefore concluded that young males suffering from severe burns may be usefully treated with the administration of ascorbic acid as an adjunct to treatment.

Jewo PI, Duru FI, Fadeyibi IO et al.  
Burns, 38: 113-9, 2012

### **EPIDEMIOLOGY OF SEVERE BURN AMONG CHILDREN IN NEWFOUNDLAND AND LABRADOR, CANADA**

This Canadian study identifies the epidemiological characteristics of childhood burns in Newfoundland and Labrador. A total number of 157 burns-related hospital admissions were identified. Figures are provided for the person-years ratio, the number of infants (up to 1 yr and 2-4 yr). The figures from Labrador and from Newfoundland are compared. The most frequent type of burn was scalding, followed by flame.

Alaghebandan R, Sikdar KC, Gladney N et al.  
Burns, 38: 136-40, 2012

### **EPIDEMIOLOGY OF BURN INJURIES IN GERIATRIC PATIENTS IN THE PRAGUE BURN CENTRE DURING THE PERIOD 2005-2008**

Thermal injuries are less common than other lesions and their frequency may vary little but their sequelae - mortality, permanent physical damage, and long, painful, and expensive treatment - are among the worst of all. With reference to burns it is therefore very important to bear three factors in mind: treatment, prevention, and effective first aid. This report from the Czech Republic informs us that in the period 2005-08 senior citizens (aged 65 yr plus) accounted for more than 12% of all patients and that the specific causal factors of burns to senior citizens ranged from the physical (immobility, locomotive dyscoordination) and psychological (anxiety, involuntal depression, resignation, dementia) to previous pathologies (co-existing cardiovascular, respiratory, metabolic, and neurological conditions). The commonest therapy was necrectomy followed by autotransplant and the average hospital stay was just under 28 days.

Tokarik M, Jančusková E, Broz Le  
Acta Chirurgiae Plasticae, 1-4: 25-8, 2011

### **PREDICTING SURVIVAL IN THERMAL INJURY: A SYSTEMATIC REVIEW OF METHODOLOGY OF COMPOSITE PREDICTION MODELS**

This paper from the United Kingdom is a systematic review of the methodology of published mortality prediction models against methodological standards, with the aim of identifying methodologically superior models for further evaluation and research into outcome prediction in burn injuries. Electronic searches were performed on MEDLINE, CINHALL, EMBASE, Web of Science®, the Cochrane collection and a general web search was performed using Google®. The searches were complemented by a manual search of the contents of leading burns journals. Methodology of the studies included in the review was evaluated against published standards for composite prediction models. 45 studies reporting composite models specifically for predicting mortality in patients sustaining thermal injury between 1949 and 2010 were included in the review. Only 8 models fulfilled the published methodological standards for composite model construction and validation. These include Modified Baux Score, Abbreviated Burn Severity Index, Total Burn Surface Index and prediction models described by Coste et al., Ryan et al., McGwin et al., Galeiras et al. and Belgian Outcome of Burn Injury (BOBI) study group. These models warrant further evaluation in independent patient populations and data sets to identify the ones best suited for outcome prediction and performance monitoring.

Amer Hussain A, Fouzia Choukairi F, Ken Dunn, K  
Burns, 39: 835-850, 2013

### **USE OF THERAPEUTIC PLASMA EXCHANGE IN THE BURN UNIT: A REVIEW OF THE LITERATURE**

The purpose of this paper from the USA is to review the literature describing the use of therapeutic plasma exchange (TPE) in toxic epidermal necrolysis (TEN), burn shock, and sepsis over the past 30 years. Burn centers routinely treat a complex mix of patients with soft tissue injuries, including burn injuries, necrotizing soft tissue infections, and dermatologic conditions such as TEN. In each of these conditions, fluid resuscitation, surgical interventions, and advances in critical care have improved survival significantly but, according to the reviewers, there remains a subset of patients who do not respond to conventional means. The review also states that TPE is an uncommon and underutilized treatment modality that has been used for such patients, and that it can be demonstrated to have provided persistent clinical benefits and reduced morbidity and mortality.

Mosier MJ, DeChristopher, PJ, Gamelli RL  
Journal of Burn Care & Research, 34:289-98, 2013

### **PREHOSPITAL TREATMENT OF BURNS: A QUALITATIVE STUDY OF EXPERIENCES, PERCEPTIONS AND REACTIONS OF VICTIMS**

The aim of this study from Iran was to understand people's experiences, perceptions and reactions towards the initial management of burns and fire accidents in Ardabil Province. The manner in which burns are initially managed, at an incident scene, can affect the extent and depth of burn wounds and their final prognosis. 48 burn victims accompanied by their caregivers were enrolled. Focus group discussion (FGD) was used to collect data. All the interviews were recorded, transcribed and analysed using content analysis method. Four categories of information were retrieved in this study, including fire control, scald and burn wound management, seeking medical consultation and severity indicators. Uncertainty regarding what to do when someone catches fire was an evident finding that was explored through the discussions. The results revealed that transferring the patient to the hospital most often takes place after initial treatments administered at home. People believed that cooling a burn wound for a time longer than a few seconds may harm the wound. A strong belief in the efficacy of traditional remedies was disclosed when the statements of participants revealed that traditional or home-made remedies were widely used either to control pain immediately after burn and later during the wound repair process to accelerate the repair or to control the infection and prevent oedema and scar. Among these remedies, pennyroyal and grated potatoes seemed to be the most popular ones. Pennyroyal was thought to prevent infection and potatoes were used to relieve pain. People doubted the capability of health-care workers who work in rural health houses. People considered electrical burns and burns on the chest to be the most severe types of burns. Inappropriate perceptions regarding initial management of burns existed among the participants that should be addressed in future quantitative research or through developing programmes on secondary prevention of burns.

Sadeghi Bazargani H, Fouladic N, Alimohammadi H, Sadeghieh Ahari S, Agamohammadi M, Mohamadi R  
Burns, 39: 860-5, 2013

### **PREVALENCE AND CORRELATES OF POSTTRAUMATIC STRESS IN PARENTS OF YOUNG CHILDREN POSTBURN**

This paper from the USA examines the prevalence and correlates of posttraumatic stress symptoms (PTSS) in the parents of very young children who sustained a minor to moderate size burn injury. Although prior research has explored this relationship in families of children with major burns, only minimal research has focused on children with minor to moderate injuries. For this study, forty-five parents of young children (<6 years) with a burn injury (mean TBSA = 2.67%, SD = 2.40) completed questionnaires regarding PTSS and demographics at an outpatient burn clinic. Injury-related information was collected from medical records. Parents reported clinically significant levels of PTSS, although in most cases, full diagnostic criteria for posttraumatic stress disorder were not met. The amount of distress was related to the age of the child at burn, child PTSS, and the source of burn. Variables such as size of burn, days spent as inpatient, or parental presence at the time of burn were not found to be related to parental distress. The study concludes that PTSS assessment should be made mandatory for all parents of young children experiencing a burn injury, regardless of size and severity of burn or parental presence at the time of burn.

Odar C, Kirschman KJ, et al.  
Journal of Burn Care & Research, 34:299-306, 2013

### **IMPACT OF EARLY METHADONE INITIATION IN CRITICALLY INJURED BURN PATIENTS: A PILOT STUDY**

The aim of this paper from the USA is to evaluate the effect of early methadone initiation in critically injured burn patients requiring mechanical ventilation. Numerous studies have identified strategies to reduce mechanical ventilation duration by targeting appropriate sedation levels. However, applicability of these strategies to critically injured patients with burn injury has not been established. Methadone is commonly used early in the care of burn patients to treat background pain and limit the development of opioid tolerance at the burn center where this retrospective study was carried out. Patients who received early methadone were compared with patients who did not while mechanically ventilated with the primary outcome of ventilator-free days in a 28-day period. Those who received methadone within 4 days of intubation and remained ventilated for 2 days after the first dose were included in the methadone group. Propensity scores were used to match up to three control patients to each methadone patient. Seventy patients (18 methadone and 52 matched control patients) were included in the final evaluation. Patients in the methadone group averaged 16.5 ventilator-free days compared with 11.5 in the control group ( $P = .03$ ). There was no statistical difference in the duration of intensive care unit or hospital length of stay between groups. The results suggest that early methadone initiation may have a significant effect on ventilator outcomes in critically injured patients with burn injury, although, further research is required.

Jones G, Porter K, et al.  
Journal of Burn Care & Research, 34:342-8, 2013

## **SEVERE BURN INJURIES INDUCED BY PUVA CHEMOTHERAPY**

Psoralen-ultraviolet A (PUVA) chemotherapy is an established treatment for certain skin diseases. Burn injury is a serious complication of PUVA therapy. Reports regarding this complication are limited. The aim of this study from Germany was to determine the management and outcome of severe PUVA burns. A retrospective review of the medical records of PUVA burns treated at our burn center from 2000 to 2010 was conducted. Data collected included age, sex, condition, mode of PUVA, site, surface area involved, depth of burns, onset of reactions, treatment, and inpatient stay. To evaluate the incidence of this severe complication, a survey of all listed burn care units in Germany, Austria, and Switzerland as well as the legal advisory boards of the medical associations of the federal states of Germany was conducted. The conditions leading to photochemotherapy were three cases of psoriasis vulgaris and one case of severe chronic graft vs host disease. All patients received oral psoralen. Incorrect handling of the radiation system was the reason for all burns. The mean affected TBSA was 73±18%. All patients were treated conservatively and healed without surgical intervention. Burn injury is a serious and preventable complication of PUVA photochemotherapy. Patients should be advised regarding the potential risk of major burns. Care should be given to not exceed the safe dose of psoralen. Burn care specialists must restrain surgical intervention as even deep partial thickness PUVA burns have the potential to heal spontaneously.

Tilkorn DJ, Schaffran A et al.  
Journal of Burn Care & Research, 34: 195–200, 2013

## **THE BROAD LANDSCAPE OF IMMUNE INTERACTIONS WITH STAPHYLOCOCCUS AUREUS: FROM COMMENSALISM TO LETHAL INFECTIONS**

This paper from Canada explores *Staphylococcus aureus*. It is a gram-positive bacterium that is present in the nostrils of a quarter of the general population without causing any apparent disease. However, *S. aureus* can also act as a pathogen to cause severe infections. The factors determining the balance between its commensal and pathogenic states are not understood. Emerging evidence suggests that *S. aureus*, in addition to inducing a pro-inflammatory response, may have the capacity to modulate the host immune system. The latter is in part the result of recognition of specific molecules embedded in the peptidoglycan layer of the staphylococcal cell wall that bind to TLR2 on host antigen-presenting cells and induce a strong IL-10 response that down regulates the adaptive T cell response. This mechanism can partially explain the duality of interactions between *S. aureus* and the human immune system by favoring nasal colonization instead of staphylococcal diseases. In this review, the molecular and cellular basis of this mechanism is discussed to explore its clinical implications.

Adam G, Peres AG, Madrenas J  
Burns, 39: 380-8, 2013

## **BILAYER HYDROGEL WITH AUTOLOGOUS STEM CELLS DERIVED FROM DEBRIDED HUMAN BURN SKIN FOR IMPROVED SKIN REGENERATION**

The objective of this study from the USA was to demonstrate that stem cells isolated from discarded skin obtained after debride-

ment can be used with collagen and fibrin-based scaffolds to develop a tissue-engineered vascularized dermal equivalent. Discarded tissue samples were collected from severely burned patients undergoing wound debridement. Stem cells were isolated from the adipose tissue layer and their growth and immunophenotype characterized. To develop a skin equivalent, debrided skin adipose stem cells (dsASCs) were added to a collagen-polyethylene glycol (PEG) fibrin-based bilayer hydrogel and analyzed in vitro. The effect of the bilayered hydrogels on wound healing was demonstrated using an excision wound model in athymic rats. The dsASCs isolated from all samples were CD90, CD105, and stromal cell surface protein-1 positive, similar to adipose stem cells isolated from normal human liposyrates. Within the bilayer hydrogels, dsASCs proliferated and differentiated, maintained a spindle-shaped morphology in collagen, and developed a tubular microvascular network in the PEGylated fibrin. Rat excision wounds treated with bilayer hydrogels showed less wound contraction and exhibited better dermal matrix deposition and epithelial margin progression than controls. Stem cells can be isolated from the adipose layer of burned skin obtained during debridement. When dsASCs are incorporated within collagen-PEGylated fibrin bilayer hydrogels, they develop stromal and vascular phenotypes through matrix-directed differentiation without use of growth factors. Preliminary in vivo studies indicate that dsASC-bilayer hydrogels contribute significantly to wound healing and provide support for their use as a vascularized dermal substitute for skin regeneration to treat large surface area burns

Natesan S, Zamora DO, Wrice NL, Baer DG, Christy RJ  
Journal of Burn Care & Research, 34: 18-30, 2013

## **MULTICENTER TESTING OF A BURN PREVENTION TEACHING TOOL FOR AMISH CHILDREN**

Burn prevention is not taught in Amish schools despite significant cultural risks for burn injuries related to scalds, ignition of clothing, and ignition of highly flammable materials. A culturally appropriate and acceptable burn prevention teaching tool was previously developed and pilot-tested in one Amish school. The purpose of this study was to perform further evaluation of this burn prevention teaching tool for Amish children. Following institutional review board approval, private schools were recruited via invitation in Amish newsletters. A teaching tool, which includes a magnetic story board, burn safety curriculum, and test questions, was provided to each school. Teachers obtained parental permission and informed assent for the children to participate. Teaching was guided by the curriculum and involved arranging magnetic pieces to illustrate and tell stories about burn hazards. The children were challenged to rearrange the magnets for a safer situation. Pretests and posttests were used to capture baseline knowledge and measure improvement. Scores were expressed as a percentage of the 33 test items answered correctly. Teachers provided recommendations and a written evaluation of the tool's usefulness. The participants were 294 students from 15 private Amish schools across eight states. Test scores were significantly improved by the lessons, without regard to gender or grade groups. Teachers valued the tool and recommended no changes. This multicenter study demonstrated that a culturally appropriate burn prevention teaching tool was highly effective for improving burn prevention knowledge among Amish school children. These results support expansion of burn prevention education to other Amish communities.

Rieman MT, Kagan RJ  
Journal of Burn Care & Research, 34: 58-64, 2013