

Schiller Saal

10.30–12.00

V 22

Stem Cells and Precursor Cells I **Stammzellen und Vorläuferzellen I**

V 22-1

Circulating fibrocytes – role in physiologic and pathologic responses

R. Bucala, S. Cowper

Shawn Cowper MD and Richard Bucala MD PhD, Departments of Dermatology, Medicine, and Pathology. Yale University School of Medicine, New Haven, CT 06520. Program Support/Disclosures: American College of Rheumatology, Yale General Clinical Research Center

Since the discovery of the circulating “fibrocyte” in 1994 as a collagen-producing cell of the peripheral blood, the physiologic and pathologic role of this unique cell population has grown steadily. Fibrocytes were initially described in the context of wound repair, but they since have been found to participate in granuloma formation, antigen presentation, and various fibrosing disorders. Fibrocytes produce matrix proteins such as vimentin, collagens I and III, and they participate in the remodeling response by secreting matrix metalloproteinases. Fibrocytes also are a rich source of inflammatory cytokines, growth factors, and chemokines that provide important intercellular signals in the context of the local tissue environment. Fibrocytes can further differentiate, and they may represent a systemic source of the contractile myofibroblast that appears in many fibrotic lesions. Clinically, there is evidence that patients with hypertrophic scars such as keloids and those affected by fibrosing disorders have fibrocytes in their lesions. Recently, a new disease entity called nephrogenic fibrosing dermopathy (NFD) has been described, and the fibrocyte has been proposed to play an important etiopathogenic role in disease development. NFD occurs in patients with renal insufficiency and produces thickening and hardening of the skin, especially of the extremities. Ongoing research is focusing on the molecular signals that influence fibrocyte migration, proliferation, and function in the context of normal physiology and pathology.

V 22-3

Epithelial stem cells

Y. Baradon, M. Brouard

Dr. Michel Brouard, Laboratoire de dynamique des cellules souches, Station n° 15, Ecole polytechnique fédérale de Lausanne, CH-1015 Lausanne.

Adult stem cells are instrumental for tissue renewal, regeneration & repair. We showed by clonal analysis that adult hair follicles contain clonogenic keratinocytes that are multipotent, self-renew for months when expanded in culture & participate when transplanted in long-term hair follicle renewal. Most importantly, these adult stem cells can leave their putative niche while entirely retaining their functionality. Our results are crucial to understand the mechanisms involved in skin renewal & repair.

Hegel Saal

10.30–12.00

V 23

Bridging the Gap: Education Brücken bauen: Ausbildung

V 23-2

The Internet as an Education Tool The case of the Pressure Ulcer Classification Project of the European Pressure Ulcer Advisory Panel (EPUAP)

T. Defloor

Tom Defloor, Nursing Science, Ghent University, Belgium, tom.defloor@ugent.be

Education is the corner stone to improve quality of care. This will be illustrated with the Pressure Ulcer Classification Project (PUCLAS) of the European Pressure Ulcer Advisory Panel (EPUAP).

Pressure ulcer classification is an essential tool for determining which preventative or therapeutic action is needed. The EPUAP classification system is a numeric four-grade system where each grade is defined by the anatomic limit of soft-tissue damage. The classification is based on a correct identification of the different tissue layers and the extent of tissue damage. The use of such a system demands training and experience.

Different studies showed that nurses do not classify pressure ulcers in a reliable way.

The EPUAP developed the PUCLAS CD-Rom to improve the nurses' knowledge of pressure ulcer classification. PUCLAS is an e-based educational program. Different photographs and video clips are incorporated in the software, which gives the user the possibility to study actively the different possible appearances of ulcers. The test, that forms part of the software, allows the user to test his/her classification skills at any time that suits the user the most and to perform the test and get feedback without being judged by others. The EPUAP distributed several hundreds of copies of that CD-Rom and the software is used all over Europe.

In a study of 473 nurses in Belgium, the Netherlands and Finland, it became apparent that, despite a good knowledge of the different pressure ulcer grades, a lot of confusion remained about the differentiation between pressure ulcers and moisture lesions. A working group of the EPUAP developed new guidelines on classification which were approved by the EPUAP.

A new software package, named PUCLAS2, was developed. This educational package consisted of a theoretical part and two tests. The theoretical part of the program describes the EPUAP

classification system and gives detailed descriptions and photographs of pressure ulcer characteristics that are decisive for correct grading. It also addresses misclassification of pressure ulcers and moisture lesions. The two tests both contain a different set of photographs of pressure ulcers and moisture lesions to test the knowledge of the user on the classification. The photographs have been graded and discussed by experts of the EPUAP, whose opinion is considered the golden standard.

The program can be used as an e-learning program that the user can study alone behind his/her computer or as a classroom education program which allows discussion about the classification and clinical descriptors.

New in this software package are the different Powerpoint presentations that are included. Those presentations address the theory about classification and include tests and feedback on those tests. In this way the package can also be used for educational sessions with groups of nurses.

At this moment, the new PUCLAS2 software package is being tested in Belgium, the Netherlands, Portugal and Sweden.

V 23-3

Education – building bridges between research and clinical practice

Ch. Lindholm

Christiana Lindholm SRN Professor, Kristianstad University

Research in wound healing and wound management is intense and presented in many international and national journals as well as via internet-links. Evenso, there is still an unbridged gap between researchers and clinical practitioners, resulting in much ritual rather than evidence-based wound management still being practised. Different educational initiatives on both national and regional as well as local levels have been performed in Sweden. They will be briefly presented.

The national initiative was performed as an academic 2-year course (The Cardiff model) franchised from the Wound Healing Research Institute in Cardiff to Uppsala University. Six-teen students (nurses and MD:s) fulfilled the course and these students afterwards were recognised as "wound specialists" within their respective areas, many set up wound management clinics, resulting in "rings of water"-educational effects in their

respective counties.

Several other academic courses have been arranged over the years and probably resulted in a higher level of clinical practice. One academic 5-point course was recently held for the R&D Department of a wound dressing company.

In Uppsala University hospital we arranged a successful training course for pressure ulcer specialist nurses from the hospital and community. This resulted in substantial reduction of pressure ulcers, and a substantial effect on the prevention and overall care of the elderly in the area, studied and reported in a PhD thesis by Gunningberg.

In Stockholm (urban area) we performed a repeated pressure ulcer prevalence study (EPUAP) involving the four major hospitals and 14 communities resulting in dramatic decrease of the prevalence, especially in the homes of the elderly. The study itself but also the education programme and the care-programme contributed to this success. In South East Sweden (rural area) we recently performed a pressure ulcer prevalence study (EPUAP) accompanied by intense education activities in four major hospitals and four communities. In this study all student nurses in clinical practice were involved. Their evaluation indicated a successful outcome regarding both increase in interest for pressure ulcers and understanding of simple, practical research methodology. The study will be followed up by a structured education programme this fall and a certain number of nurses will participate in a classification study (de Floor et al EPUAP).

A model-network of nurses from communities and hospitals

focused on wound management is another education initiative in this rural/urban area. Case-methodology is practised. The network is being evaluated in a PhD-thesis.

We have also set up a certification-education in leg ulcer care for community nurses based on the "rings on the water" -model. A computer-led algorithm-guided education programme regarding leg ulcer diagnostics, therapy and care has been developed and doctors and nurses will be trained in using this as a supplement. A basis for all education in wound management is a textbook, and such a book has been developed in Sweden and translated into Norwegian and is also used in Denmark.

The EWMA Education programme will be instituted as soon as possible on different levels of education in Sweden. We have seen dramatic and enduring improvements in clinical practice by involving nurses and nurse students not only in traditional educations but furthermore by combining these education initiatives with research projects. We are now also testing a model for "wound-rounds" involving staff and students. Building bridges between the University and clinical practice has thus become a very important improvement instrument, and the development of a clinical professorate- the first in Sweden will hopefully contribute to an easier implementation of results from research into the daily care of the patients.

Wound management thus became the first model of building bridges between academia and clinic in Sweden. Opening eyes by inspiring to search knowledge about what is best for the patients is a driving force. Reflective carers will continue to develop wound management.

Hall Köln, Bonn, Hamburg

10.30–12.00

V 49

Tissue Engineering

V 49-1

Expression patterns and significance of different genes in developing stage of human fetal skin

G. Zhou, C. Cai

Wound Healing and Cell Biology Laboratory, Burn Institute, 304th Medical Department, The General Hospital of PLA, Beijing, China

Aim: To initiate a comprehensive analysis of the transcriptional changes of genes and their biologic significance that occurred in the development of human fetal skin by using high-density oligonucleotide DNA array.

Methods: Human fetal skins were obtained from abortuses of 10W, 15W, 24W, 32W EGAs (embryonic gestational ages). Total RNAs were isolated from skin of fetuses with different EGAs. Message RNAs were purified and randomly labeled with the incorporations of fluorescent dCTP for preparing the hybridization probes by using reverse transcription polymerase chain reaction (RT-PCR). Approximately 21,329 human genes were spotted on a chemical-material-coated-glass plate in array.

Results: According to the hybridization results from oligonucleotide DNA microarrays, gene expression patterns and functions were analyzed. Gene-chip disclosed large scales of information in developmental human fetal skin, which make it easy for us to investigate how temporal and spatial expression of genes profile in skin cells. Many specific genes expressed differently in each stage of fetal skin suggesting their key roles in development of skins.

Discussion: Microarray or DNA chip technology is revolutionizing biology by empowering researchers in the collection of broad-scope gene information. Microarray-based measurements exhibit a substantial number of genes participating in embryogenesis and development of human skin. These experiments demonstrate a previously unrecognized role of genes expression in the control of human fetal skin growth and structure. A complicated network of skin development process is well characterized.

V 49-2

Gene expression profiling of tissue neogenesis on photo-oxidized bovine pericardium matrix induced by immature foreign body reaction

A. Lebacqz, G. De Visscher, I. Vranken, W. Flameng

CEHA, KULeuven, Leuven, Belgium

Introduction: Non-degradable implant induced foreign body reaction (FBR) is initiated by macrophages, followed by (myo)fibroblast induction. Our group uses the immature FBR for tissue engineering of heart valves and we are investigating the molecular and cellular background of neomatrix formation in order to identify different components which are crucial for a recellularisation stimulating matrix.

Methods: Immature FBR and intraperitoneal (IP) macrophage gene expression was analyzed. Photo-oxidized bovine pericardium matrices were collected from rats after 1.5 (FBR1.5) and 3-day (FBR3) IP-implantation. IP macrophages were induced by 3 % thioglycollate (74.2 % CD68⁺-macrophages) and were collected to distinguish between macrophage and FBR specific signals. RNA is processed for gene expression analysis on an Affymetrix rat genome microarray (28000 genes). Expressed genes are categorized based on Gene Ontology (GO) terms using Onto Express.

Results: Comparing the expression profiles we obtained for FBR and IP, we found 3868 FBR3 and 2957 FBR1.5 specific genes (non-macrophage origin). Genes of primary interest in our work encode extracellular matrix proteins and signaling proteins enabling the attraction and homing of stem cells, which have been shown by our group to be involved in immature FBR. Although we found a significant signal for structural molecules among which different collagens and laminins in both FBR1.5 and FBR3, the general expression of these molecules as grouped according to GO only proved significant in the latter group. This means that, regardless of the expression of some structural molecules in the FBR1.5 group, the significant contribution of those genes was only found in the FBR3 group, that is post cell homing. In FBR3 and FBR1.5 85 and 116 genes respectively were attributed to signal transducer activity GO term among which stromal cell-derived factor-1 (SDF-1), a molecule binding to haematopoietic stem cells and therefore an interesting candidate for integration in a biological matrix.

Conclusions: The molecular unraveling of immature FBR induced tissue neogenesis on photo-oxidized bovine pericardium

leads to the identification of molecules involved in FBR induced neomatrix formation and will allow improved heart valve tissue engineering.

V 49-3

Effects of profound splanchnic ischemia and reperfusion on anastomotic wound strength and gelatinase activity in the rat intestine

A. E. Posma, R. P. Bleichrodt, H. van Goor, T. Hendriks

Radboud University Nijmegen Medical Center,
Department of Surgery, Nijmegen, Netherlands

Introduction: Anastomotic dehiscence is a most serious and relatively frequent complication of bowel surgery. Experimental data suggest that transient ischemia immediately prior to anastomotic construction may compromise wound strength, thereby increasing the risk of wound dehiscence. However, experimental data on this subject are still contradictory as to the size and duration of this effect. The present study aims to comprehensively characterize the effects of profound intestinal ischemia on the development of wound strength during the first postoperative week. Since it has been reported recently that matrix metalloproteinases (MMPs) play an important causal role in reperfusion damage in other tissues, the activities of MMP-2 and MMP-9 have also been examined.

Methods: In three intervention groups (n = 15 each), profound ischemia was induced in male Wistar rats by clamping both the superior mesenteric artery, immediately distal to its origin, and its ileal branches for 30 min. In control groups (n = 10 each), arteries were exposed but not clamped. Immediately after declamping, resection and anastomosis were performed in both terminal ileum and descending colon (the latter not having been ischemic). The animals were killed either 3, 5 or 7 days afterwards. Both anastomotic bursting pressure (BP) and breaking strength (BS) were measured, and gelatinase activity was measured using quantitative zymography.

Results: Both BS and BP increased significantly from day 3 to day 5 to day 7. At all time points, ileal BS was significantly (p < 0.05) lower in the I/R groups: the percentual reduction was 56, 34 and 23 %, respectively. In the colon, BP was significantly lower in the I/R group at day 3. At days 5 and 7, the bursting site was significantly less frequently outside the anastomosis in the I/R groups, also reflecting compromised wound strength. Anastomotic proMMP-2, active MMP-2 and proMMP-9 levels were higher than in uninjured intestine but not different in I/R and control groups.

Conclusions: Profound transient splanchnic ischemia compromises the development of anastomotic strength throughout the entire first week after operation. The effect is systemic since it also involves anastomoses constructed at a distant site. Neither MMP-2 nor MMP-9 appear to be involved in causing the decreased wound strength.

V 49-4

In vivo tissue engineering: how to guide small vessel (2 mm diameter) regeneration

G. Abatangelo¹, S. Lepidi², V. Vindigni¹, R. Cortivo¹

¹ University of Padova, Histology and Medical Biotechnology, Padova, Italy
² University of Padova, Clinic of Vascular Surgery, Padova, Italy

Introduction: The aim of present paper was to answer the lack of a prosthetic graft capable of performing adequately as a small diameter conduit (2 mm diameter) using an in vivo tissue engineering approach. We decided to reproduce and positively guide the remodelling process directly in vivo, using a 2 mm diameter and 1 cm in length hyaluronic acid based tubular scaffold (HYAFF-11) that functioned only as temporary absorbable guide, like an in vivo "artery-bioregeneration assist tube" (ABAT). We chosen this biomaterial for its documented capacity to promote adhesion and proliferation of endothelial and smooth muscle vascular cells. Its biodegradability and biocompatibility were also well documented.

Methods: 30 Male Wistar rats weighing 250–350 g were used. The aorta, from the renal arteries to the aortic trifurcation, was exposed and isolated. A segment of aorta (1 cm) was incised and a HYAFF 11™ tube was anastomized first proximally then distally in an end-to-end fashion with interrupted stitches of 10.0 nylon suture. No anticoagulants were used either before or after the operation. Histological (haematoxylin-eosin and Weighert solution), immunohistochemical (antibodies to von Willebrand factor, CD34, vascular endothelial growth factor receptor-2 and to Myosin Light Chain Kinase) and ultra-structural analysis were used to evaluate the results at 5, 15, 30, 60, 120, and 180 days after surgery.

Results: Three novel findings stood out from result evaluation: endothelialization of the tube luminal surface within 5 days; sequential regeneration of the other vascular components that leads to a complete vascular walls regeneration after 15 days from surgery; temporariness of the tube: biomaterial was entirely degraded after 4 months from implantation, and after that, a new artery remained to connect artery stumps.

Discussion: This study assesses the feasibility to create a completely biodegradable vascular regeneration guide in vivo. The most important novel finding is represented by the ability of proposed vascular prostheses to sequentially orchestrate vascular regeneration events needed for very small artery reconstruction that up to now, given the great difficulty to obtain their in vivo significant long term patency and good wall mechanical strength, is defined as the holy grail of vascular biology.

V 49-5

Autologous mucosa equivalents implanted in the dog palate*J. von den Hoff*

Radboud University Nijmegen, Orthodontics and Oral Biology, Nijmegen, Netherlands

Introduction: Tissue shortage complicates the surgery of cleft lip and palate anomalies. The healing of defects on the palate impairs growth of the dento-maxillary complex due to contraction and scar tissue formation. The implantation of suitable grafts into the wound area might reduce this adverse effect of surgery. Skin or mucosa grafts do not yield satisfactory results. The aim of this study was to evaluate cultured mucosal equivalents for the use as a graft material.

Methods: Autologous keratinocytes were cultured from a palatal biopsy of each dog using the Green method. Two different types of cultured mucosal equivalents were composed of a skin-derived substrates (de-epidermized dog dermis or AlloDerm), and autologous oral keratinocytes were implanted in palatal wounds in six dogs. Two additional wounds in each dog were left untreated or filled with autologous tissue. Two animals were sacrificed respectively 1, 3, and 12 weeks after surgery. We have evaluated the inflammatory response, ingrowth of (myo-)fibroblasts, and the formation of a basal membrane on H&E-stained sections, and by immunohistochemistry.

Results: Prior to implantation, all cultured substitutes possessed a multilayered parakeratinized epithelium, closely resembling palatal epithelium. After implantation, however, the epithelium was lost and an inflammatory response was observed in the first week. Already after 3 weeks, the implants had completely disappeared and reepithelialization had occurred. Starting from 3 weeks, all wounds had a similar histological appearance. Only after 12 weeks, heparan sulphate was detected in the basal membrane region.

Conclusions: Mucosal equivalents composed of a skin-derived substrate and autologous keratinocytes do not improve the healing of palatal wounds. Instead, they are quickly degraded. We suggested that the revascularisation of the wound area is too slow to allow survival and integration of the equivalents. Revascularization might be stimulated by growth factors such as VEGF or FGF2.

V 49-6

The wound milieu in venous ulcers – further observations*G. Roberts, A. Chumley, R. Mani*

Southampton University Hospitals Trust NHS, Southampton, United Kingdom

Introduction: An aim of this study was to examine the significance of wound surface pH and temperature in venous ulcers.

Materials and methods: In a randomised controlled study of a new dressing, we measured wound surface pH and temperature as well as conventional parameters of healing. pH was measured as previously described by this Group. Surface temperature was measured using a hand held infrared device (Derma-temp, Exergen, MA, USA). Temperature was measured at wound centre, wound edge at the poles and a control site proximal to the wound. pH was measured at wound centre and proximally on all visits. 25 patients with chronic venous ulcers were screened with Ethics Approval and prior informed written consent. 16 patients (8M, 8F, age range 52–85 years) were recruited to the study. Surface pH and temperature were measured on all visits with patients lying supine in a temperature controlled room after wound dressings were removed. As the treatment codes have not been broken, the data presented is with references to change in wound area.

Results: 7/16 patients healed over 16 weeks. The coefficient of variations were 5.5 % and 3.6 % for wound pH and temperature respectively. Mean wound pH and temperature were significantly different from controls. Mean wound pH was significantly lower in the healing group compared to non healers (6.9 v 7.42, $p = 0.01$). Mean wound temperature was higher in healers compared to non healers (31.1 degrees C v 30.67 degrees C, $p > 0.05$, NS). In 5/7 healers, wound pH was negatively correlated with wound temperature.

Discussion: We have merely examined changes in wound milieu in respect of pH and temperature against wound area. pH and temperature are simple to measure and reliable. Wound surface pH decreases in healing wounds which is in accord with our previous observations. The increase in temperature may be caused by increased activity though this is speculative. These data permit the observation that a lowering wound pH and increasing wound temperature are conducive to healing.

Silcher Saal

10.30–12.00

V 50

The interesting case I

Der interessante Fall I

V 50-1

**Behandlung von oberflächlichen
dermalen Verbrennungen bei Kindern
mittels Silikonwundauflagen (Mepitel®)
und Lavasept®-Gel**

B. Hartmann

Unfallkrankenhaus Berlin, Zentrum für Schwerbrandverletzte, Berlin,

Einleitung: Läsionen durch Verbrühen zählen bei Kleinkindern zu den häufigsten Unfallfolgen. Meist handelt es sich um oberflächlich dermale Wunden (IIa°), die unter korrekter konservativer Therapie eine gute Ausheilungsprognose besitzen. Die gültigen Behandlungsprotokolle reichen von täglich zu wechselnden antimikrobiellen Verbänden bis hin zur Transplantation von temporären alloplastischen und allogenen Hautersatzmaterialien.

Ziel ist die rasche, ungestörte Reepithelisation unter Vermeidung von Wundinfektionen. Dabei gibt es jedoch erhebliche Unterschiede in der Zahl der notwendigen Verbandswchsel, der Zytotoxizität der antimikrobiellen Substanzen, des Patientenkomforts und letztendlich auch der Gesamttherapiekosten. Das vorgestellte Behandlungsprotokoll zeichnet sich einerseits durch die deutlich reduzierte Zahl der Verbandswchsel und damit einer hohen Patientenzufriedenheit, andererseits durch die verbesserten Regenerationsbedingungen durch die geringe Toxizität des Lavasept®-Gels und die nicht anhaftende Silikonauflage (Mepitel®) im Feuchtverband aus.

Material und Methoden: Im Unfallkrankenhaus Berlin verwenden wir seit 2000 eine Kombination von einer anergen, nicht mit der Wunde verklebenden und durch Lochung sekretdurchlässigen Silikonfolie (Mepitel®) in Verbindung mit einem Lavasept®-Gel Feuchtverband. Nach primärem sorgfältigem Debridement wird das Mepitel® direkt auf die Wunde gelegt und mit Lavasept®-Gels bedeckt. Es folgt ein Umverband mit Kompressen, synthetischer Watte und elastischem Verband. Der erste Verbandswchsel erfolgt nach 4–5 Tagen. Die inzwischen abgetrockneten äußeren Verbandsschichten werden mit Lavasept®-Lösung angefeuchtet und abgeweicht, wobei das Mepitel® auf der Wunde verbleibt. Analog zur Primärversorgung wird ein neuer Verband angelegt, der nun in 2–3 tägigen Intervallen bis zur Ausheilung gewechselt wird.

Im Zeitraum vom 01.01.2000–31.12.2004 wurden insgesamt 356 Kinder bei IIa° Verbrennung mit diesem Verbandprotokoll

stationär behandelt und hinsichtlich ihres Heilungsverlaufes dokumentiert. Es fand sich eine durchschnittlich betroffene Körperoberfläche von 9,24 % (mind. 4,5 %; max. 28 %). Nach durchschnittlich 10,3 Tagen war die Reepithelisierung abgeschlossen. Die Zahl der Verbandswchsel betrug im Mittel 4,1 pro Patient. In keinem der Fälle musste das Therapieregime in Folge schwerer Infektionen gewechselt werden. Allergien und Unverträglichkeiten wurden keine beobachtet. Die Patienten äußerten sich durchweg positiv hinsichtlich der geringeren Anzahl von Verbandswchseln, welche im Vergleich zu anderen Methoden weniger schmerzhaft waren.

Schlussfolgerungen: Lavasept®-Gel eignet sich als Antiseptikum zur lokalen Behandlung von IIa° Verbrennungen durch sein breites Wirkungsspektrum, gute Gewebeverträglichkeit, geringe toxische Wirkung und geringe Allergisierungsquote. In Verbindung mit der Silikonwundaufgabe Mepitel® kann ein geschlossenes Behandlungsregime mit deutlich reduzierter Zahl von Verbandswchseln realisiert werden. Dadurch und durch die schmerzarme Anwendung beider Komponenten kann eine hohe Patientenzufriedenheit bei gleichzeitig günstigen Ausheilungsergebnissen erzielt werden.

V 50-2

**Reduction of ulcer sizes and pain
in the treatment of lymphoedema
and phlebolympoedema with
short-stretch bandages**

**Ulcusverkleinerung und Schmerzreduktion
in der Behandlung von ulzerierenden
Lymphödemen und Phleblymphödemen
mit Kurzzugbinden**

F. Hahn¹, C. Jager², M. Spengler³¹ Praxis für Physikalische Praxis, Saarbrücken, Germany² Schwerpunktpraxis Lymphologie, Saarbrücken, Germany³ Lohmann & Rauscher GmbH & Co KG, Rengsdorf, Germany

Introduction: Short stretch bandages (Rosidal® Lymphsets Lohmann & Rauscher GmbH & Co KG) are an integral part in the treatment of lymphoedema and phlebolympoedema in the Com-

plex Physical Therapy. A phase-oriented adaptation of the dressing to the wound status supports the healing of existing ulcers. Efficacy should be illustrated by the degree of probably reduced oedema, ulcer sizes, pain and an enhanced activity of the patients were investigated in a pilot study.

Methods: 9 patients (7 f, 2 m, average 67 years) with ulcerated lymphoedema (predominantly stadium II), 7 with phlebolymphoedema, were treated with short stretch bandages (Rosidal® Lymphsets) and individual wound care (Suprasorb®). Moreover, patients were treated with manual lymphatic drainage, skin care products and moderate analgetics or antibiotics. The reduction of oedema and the well-being of patients were measured in intervals of 14 days up to day 56.

Results: The oedema, shown by the average circumference of the leg -B-measurement-, in the beginning 26.2 cm, was already reduced after 14 days (24.27 cm) and after 56 days up to 23,72 cm. All patients showed a reduction of ulcer sizes (17,47 cm² (day 0) up to 37 % of the initial value (day 56)). Severe pain (1,2) in the beginning has changed to mild pain after 56 days (8,7). The level of activity of the patients increased from 40 % in the beginning up to 60 % (day 56).

Conclusions: The high working pressure reduced the swelling of the extremities which was yet visible in the measurement after 14 d. This can be maintained over a period of 56 days and supported by the phase-oriented wound care. The imbalance between capillary filtration and lymph drainage will be reorganized by this therapy regime shown by the reduced swellings and minimized ulcer sizes. Quality of life can be improved as shown by less pain and a higher degree of activity. This supports the principle of short stretch bandaging because of its "massage effect" (natural dynamic compression) while moving. Short stretch bandaging combined with modern wound care is an effective intervention in improving the quality of life of patients with lymphoedema.

Einleitung: Kurzzug-Kompressionsbinden sind bei der Behandlung von Lymphoedemen bzw. Phleblymphoedem mit Ulzera ein fester Bestandteil der komplexen physikalischen Entstauungstherapie. Eine phasengerechte Wundversorgung unterstützt zusätzlich die schnelle Abheilung der vorhandenen Ulcera. Die Effizienz dieses Therapiesystems sollte in dieser Pilotstudie anhand möglicher reduzierter Ödeme, verkleinerter bzw. abgeheilte Ulcera, verminderter Schmerzen und gesteigerter Aktivität des Patienten untersucht werden.

Methoden: 9 Patienten (7 w, 2 m, Durchschnittsalter 67 Jahre) mit ulzerierenden Lymphödemen (überwiegend Stadium II), darunter 7 mit Phleblymphödemen, wurden mit Kurzzugverbänden (Rosidal®-Lymphset) und phasengerechter Wundtherapie (Suprasorb®-Range) behandelt. Parallel wurden die Patienten mit manueller Lymphdrainage, Hautpflegeprodukten und ggf. moderat analgetisch (z. B. Ibuprofen 400 mg/d) oder antibiotisch therapiert. Die Ödemreduktion, die Verkleinerung des Ulcus sowie die Lebensqualität (Schmerzen/Arbeitsfähigkeit) wurden vierzehntägig bis zum Tag 56 dokumentiert.

Ergebnisse: Die Ödemumfänge reduzierten sich z.B. in der B-Position von durchschnittlich 26,2 cm bereits nach 14 d auf 24,27 cm und nach 56 d auf 23,72 cm. Bei allen Patienten konnte die Größe des Ulcus minimiert werden (von durchschnittlich 17,47 cm² (Tag 0) auf 37 % der Ausgangsgröße am Ende), eine vollständige Ulkusabheilung wurde trotz kurzer Beobachtungsdauer (56 d) bei 3 Patienten erzielt. Die Schmerzen wurden zu

Beginn mit dem Ausgangswert 1,2 (sehr starke Schmerzen), bei Behandlungsende hingegen mit 8,7 (geringe Schmerzen) bewertet. Während zu Behandlungsbeginn die durchschnittliche Arbeits- und Freizeitaktivität mit nur knapp 40 % angegeben wurde, steigerte sich diese zum Ende auf knapp unter 60 %.

Schlussfolgerung: Die durch den hohen Arbeitsdruck des Kurzzugverbands erzielte Entstauung war deutlich bereits nach 14 Tagen messbar und setzte sich bis zum Tag 56 fort, wobei eine phasenadaptierte Wundversorgung den Heilungsprozess unterstützte. Die normalisierte interstitielle und intravasale Balance manifestiert sich unter diesem Therapieregime in der Ödemreduktion und verkleinerten bzw. geheilten Ulcera. Die höhere Lebensqualität zeigt sich in deutlich weniger Schmerzen und einem höheren Aktivitätsniveau. Letztes unterstützt das Prinzip der Kurzzugbinde, seine Wirkung bei Bewegung des Patienten aufgrund der Widerlagerfunktion (natural dynamic compression; „Massage-Effekt“) zu entfalten. Kurzzugverbandssysteme gemeinsam mit einer phasengerechten Wundversorgung stellen für die Behandlung von ulzerierenden Lymphoedemen bzw. Phleblymphoedemen ein effizientes Therapiesystem dar.

V 50-3

Verwendung von Folienverbänden für die Vakuumversiegelung chronischer Wunden mit irritierter umgebender Haut

N. Mittler, S. Grabbe, J. Dissemond

Klinik für Dermatologie und Venerologie, Universität, Essen, Germany

Die Wundgrundkonditionierung chronischer Wunden erfolgt in den letzten Jahren zunehmend mit Einsatz einer Vakuumversiegelung (V.A.C.). Da der verwendete Schwamm mit einer adhäsiven Folie fixiert werden muss resultieren bei einer zunehmenden Anzahl von Patienten Probleme insbesondere durch die Entfernung dieser Folie. Neben einem sogenannten tape-stripping effect durch mechanische Ablösung des Stratum corneum und Entstehung von Erosionen kann der Verband bei wiederholter Durchführung nicht mehr suffizient fixiert werden und die V.A.C. meldet einen Verlust des Vakuums. Darüber hinaus bestehen bei zahlreichen Patienten bereits zu Beginn der Behandlung Hautveränderungen wie beispielsweise Ekzeme im Rahmen einer Stauungsdermatitis oder eines Kontaktekzems auf denen eine adhäsive Folie ebenfalls nicht fixiert werden kann. Besonders problematisch gestaltete sich die Applikation der VAC, wenn die umgebende Haut gleichzeitig topisch beispielsweise mit einem Glukokortikoid therapiert werden soll. Wir haben bei diesen Patienten begonnen die V.A.C. mit mehreren Lagen von Frischhaltefolie zu fixieren. Auch bei Applikation für mehrere Tage konnten wir feststellen, dass diese Modifikation nicht nur von der Handhabung einfach und schnell durchzuführen ist, sondern auch dass die zuvor irritierte und oft gleichzeitig topisch therapierte Umgebung der chronischen Wunden durch die V.A.C. keine weitere Exazerbation erfährt. Diese einfach durchzuführende und preiswerte Modifikation ermöglicht es auch Patienten mit irritierter Haut in der Umgebung einer chronischen Wunde mit einer V.A.C. zu therapieren.

V 50-4

Wundbeläge (Debris) – Nutzen oder Schaden für die Wunde

T. Eberlein

Nürnberg, Germany

Einführung: Als allgemeines wundbehandlerisches Gedanken-gut gilt der Grundsatz der „Sauberkeit“ (Belagsarmut; Fehlen von Detritus) als positiver, vorteilhafter Ansatz für eine möglichst problemlose sekundäre Wundheilung. Dabei wird diese Sichtweise für akute und chronische Wunden vertreten. Untersucht man jedoch die Evidenz dieser Aussage, finden sich schnell nennenswerte Defizite. Die aktuelle Leitlinie zu Diagnostik und Therapie des Ulcus cruris venosum der Deutschen Gesellschaft für Phlebologie ordnet der Entfernung nekrotischen Gewebes als lokale Behandlungsmaßnahme den Evidenzgrad T3b zu. Damit erscheint es vordergründig notwendig, die Frage zu klären, ob das formulierte Ziel der Belagsfreiheit einem wundbehandlerischen Ritual oder doch einer objektivierbaren Notwendigkeit entspricht.

Methoden: Durch eine umfassende Würdigung der aktuellen Literatur und unter Berücksichtigung von nationalen und internationalen medizinischen Ausbildungs- und Handlungsstandards entsteht eine Übersicht über die vorhandenen Daten zur Wundreinigung unter besonderer Berücksichtigung der mikrobiellen Situation. Dabei wird der Zusammenhang zwischen Infektrisiko und Belagssituation dargestellt.

Ergebnisse und Diskussion: Tatsächlich entspricht der geübte Standard der Wundreinigung dem national wie international anerkannten, von unterschiedlichen Fachgesellschaften und Vereinigungen empfohlenen Weg zur Schaffung günstiger Bedingungen für die Wundheilung. Insbesondere ist die Minimierung des Infektrisikos (Durchbrechung des Circulus vitiosus von Kolonisation, Infektion und resultierender mikrobieller Wundheilungsstörung) durch eine konsequent auf Nekrosebeseitigung gerichtete Vorbereitung des Wundbettes herauszustellen (vergleiche z. B. TIME-Modell nach Falanga). Der angestrebte nekrose- und belagsfreie Wundzustand soll dabei unter Schonung überlebensfähiger, insbesondere natürlich funktionell bedeutender Strukturen erreicht werden. Die Umsetzung dieses Zieles muß die Maßgaben der patientenorientierten (insbesondere lebensqualitätsorientierten) Versorgung erfüllen.

V 50-5

Wundheilungsstörungen nach Sternotomie – modernes Wundmangement

E. Gudewer, L. Li

Universitätsklinikum Hamburg- Eppendorf, Klinik und Poliklinik für Mund-, Kiefer- und Gesichtschirurgie, Plastische Operationen, Hamburg, Germany

Einleitung: Wundheilungsstörungen nach Herzoperationen sind schwerwiegende Komplikationen. Die multimorbiden Patienten

haben ausgedehnte und unterminierende Defektwunden mit Beteiligung knorpeliger und knöcherner Sternum- und Rippenanteile.

Patienten: Uns wurden 2003 bis 2005 neun Patienten mit schwersten Wundheilungsstörungen nach Herzoperationen zur Weiterbehandlung zugewiesen.

Behandlungsverlauf: Die Behandlung erfolgte entsprechend der Therapiestufen: 1. Debridement 2. Wundkonditionierung 3. Plastische Defektdeckung 4. Stationäre postoperative Behandlung 5. Ambulante Behandlung bis zum kompletten Wundverschluss. Nach Abstrichnahme, Gewebeprobe und Wunddokumentation erfolgten ein chirurgisches Debridement und Ultraschall- Wundreinigung. Die Wundkonditionierung gelang unter Aantibiose entsprechend der Resistenzprüfung mit Vakuumverbänden. Der Wundverschluss wurde mit M.-Pectoralis-Mobilisierung oder M.-Latissimus-dorsi-Lappen erreicht.

Komplikationen: Dehiszenz mit Serombildung (3), Wundrandnekrosen (2), korrekturbedürftige Narbe (1), revisionsbedürftige Nachblutung (1). In der postoperativen Phase wurden bei Komplikationen erforderliche Revisionsoperationen, Vakuumverbände und schließlich moderene Okklusivverbände eingesetzt.

Schlussfolgerung: Die Behandlung dieser komplexen Wunden erfordert eine interdisziplinäre Betreuung der Patienten mit Minimierung der Risikofaktoren für Wundheilungsstörungen und persönliche Einbindung der psychisch stark belasteten Patienten in den Behandlungsablauf. Ein konsquentes Wundmanagement führt über die Therapiestufen: Debridement, Wundkonditionierung, Defektverschluss, stationäre Weiterbehandlung und ambulante Nachbehandlung schließlich zum Erfolg mit definitivem Wundverschluss.

V 50-6

Surgical approach to extensive wounds induced by physical trauma

Z. Machynska-Bucko, K. Slowiński, P. Grala

University of Medical Sciences, Division of Trauma, Burns and Plastic Surgery, Poznan, Poland

Aim: The clinical problem of the treatment of the severe soft tissue loss caused by trauma specially combined with bone fracture can be resolved using reconstructive techniques as acute, early or delayed surgery. The authors present their experience of the surgical strategy for the extensive wounds induced by trauma.

Methods: Twenty five patients, aged from 23 to 60 (mean: 42) with extensive trauma wounds were operated at accident day or 1–5 days after the injury (no later). In five patients with the large damage of full-thickness skin, early total necrotic tissues excision and wound closure by mesh split-thickness skin grafts was performed. In 20 patients severe soft tissue injuries (damage of skin, muscles, tendons) were associated with bone fractures. Surgical debridement and the proper fixation of bone fragments using external fixators or axial traction was performed at the same stage. After 2–3 days later soft tissue defects was covered using mesh split-thickness skin grafts in 9 patients, local

flaps in 11 patients. In postoperative period the antibiotic therapy and antithrombotic prevention was applied. The mean follow-up after definitive treatment was 24 months.

Results: Partial loss of skin grafts was observed in two patients with large skin defects and skin graft closure was repeated. All flaps survived. Total wound healing and bone union were achieved in all patients. The average full weight-bearing time for lower leg fractures was 9,5 months.

Conclusions: Early, aggressive surgery included total debridement of extensive soft-tissue wounds and the wound closure using the appropriate reconstruction techniques allow to successful healing. Specially, in severe damage associated with bone fractures, early restoration of bone and soft-tissue defects enable to avoid the infection complications.

V 51

Ulceration of the lower limb II

V 51-1

Air-plethysmographic features of calf muscle pump insufficiency can predict delayed healing of venous leg ulcers

M. Simka

Private Healthcare Institution 'Sana', Department of Angiology, Pszczyna, Poland

Objective: There is the urgent need of reliable diagnostic tool to recognize ulcers with poor prognosis of healing. Such ulcers should be managed with advanced technologies instead of standard treatments. A prognosis based on clinical data only does not appear to be satisfactory. This leads to poor clinical results, as well as increased financial and social costs of management.

Aim of study: A comparison of air-plethysmographic findings with clinical data and time of healing of venous leg ulcers. Patients and method. There were assessed 112 legs with venous leg ulcers, and final results of treatment were available in 93 patients. Air-plethysmographic detector Smartdop-20EX (Hadeco, Japan) with probe PV-20 was used, calf muscle pump was revealed in supine and upright position. The calf muscle pump was regarded as abnormal if the drop of pressure in cuffs was lower than 1 mmHg, which corresponded to approximately 20 ml of ejected blood.

Results: Patients with insufficient pump were older, and their ulcers were larger. Failure of pump was found more often in patients who began the specialized care after long unsuccessful home treatment. Presence of pathological pump correlated with worse results of treatment. If the subgroups with good clinical prognosis were regarded (patients with small ulcers, or with short history of ulceration), it had been also found that insufficiency of calf muscle pump correlated with delayed healing.

Conclusions: Impaired muscle pump function in the air-ple-

thysmographic examination can be a prognostic factor of delayed healing of venous leg ulcer. This test can help to make the proper clinical decision in these patients.

V 51-2

Perception of the "at risk foot" in a long term rehabilitation setting

H. Vuagnat¹, F. Herrmann², P. Conne¹, N. Donnat³, R. Granjean², D. Regat¹, Z. Pataky¹

1 Loex Hospital, Department of Rehabilitation & Geriatrics, University Hospitals of Geneva, Bernex, Geneva, Switzerland

2 Department of Rehabilitation & Geriatrics, University Hospitals of Geneva, Thonex, Geneva, Switzerland

3 Nursing Directorate, Loex Hospital, University Hospitals of Geneva, Bernex, Geneva, Switzerland

The "at-risk foot" concept has been widely developed by diabetologists. It encloses feet presenting with high risk of lesions, and therefore lower extremity amputation, due to neuropathic lesions including loss of sensitivity, motricity and autonomic control. However, not only diabetic patients present such kind of foot lesions but also those having various neurological diseases such as stroke (CVA), spinal cord injuries (SCI), multiples sclerosis (MS), etc. In our 300 beds long-term rehabilitation and care facility population, up to 50 % could be concerned. In order to assess our staff theoretical knowledge and to build an educational program in this field, an 11 items questionnaire aimed at risk factors (RF) both in term of etiologies and handling was designed. 236 were distributed anonymously and analysed in respect of four professional categories (doctors, nurses, nursing-aids, other health care professionals). Overhaul response rate was 75.9 %. Correct ans-

wers ranged from 3 to 11 (maximum = 11), median being 7.

Main findings were:

- everyone considered diabetes as a RF (> 99 %), whereas CVA, SCI, MS were considered as RF by fewer (10 to 60 %),
- neuropathy is considered the major RF by 80 % of doctors but only 30 % of nursing aids ($p < 0.001$)
- between 15 and 45 % thought that patients could walk freely on existing plantar ulcers
- out of a list of 8 RF which could worsen an existing lesion, more than 80 % sorted out neuropathy, artheriopathy, unstable diabetes, bad shoes and low hygiene.

Fewer thought of bare-foot walking, low sight and age as RF. We must be aware that most of the questions addressed theoretical data and not practical ones and that if doctors performed better than nurses or nursing aids, they are not those who will care for the patient's feet. Conclusion: the "at risk foot" concept must be widened to include not only diabetic patients but also various neurological conditions. This concept must not remain a theoretical one and has to be developed as a practical clinical tool for daily use by all health care professionals. In order to achieve these goals, an educational program is being designed.

V 51-3

The selective anti-inflammatory activity of prolonged release nanocrystalline Silver[®] dressing (Acticoat 7[®]) in the treatment of chronic venous leg ulcers

**R. G. Sibbald¹, S. Raphael¹, J. Contreras-Ruiz²,
A. Rothman³, P. Coutts², M. Fierheller², D. Queen²**

¹ University of Toronto, Toronto, Canada

² Toronto Wound Healing Centres, Toronto, Canada

³ University of Toronto, Continuing Medical Education, Toronto, Canada

Background: The treatment of venous ulcers must start with compression to control venous edema and promote ulcer healing. Despite edema control, there are a number of venous ulcers that do not heal at the expected rate.

Objectives & Methods: Patients with venous ulcers of greater than 4 weeks duration were treated with a prolonged release absorptive nanocrystalline silver dressing (Acticoat 7) under the 4 layer bandage, Profore for 12 weeks, or until healing. Biopsies were obtained from the ulcer base at week 0 for histology and bacterial burden. Duplicate biopsies for quantitative bacteriology were performed with one submitted whole and the second bisected into superficial and deep components. The paired biopsies were then repeated after a median of 6.5 weeks (range 2 to 12 weeks). The histological specimens were examined in a coded format by the histopathologist (SR). Inflammatory infiltrates were identified in the superficial, middle and deep segments of the biopsies. Each biopsy and each segment was graded for acute and chronic inflammatory infiltrates on a four point semi quantitative score from 0 to 3 where 0 represented no lymphocytes or neutrophils and 1 to 3 a light to moderate or heavy infiltrate respectively.

Results: A total of 15 patients (9 male, and 6 female) were enrolled into the study. There were 12 sets of paired biopsies for histology and bacteriology that were analyzed for histological and comparative quantitative bacteriological parameters. There was a statistically significant reduction ($p = 0.0114$) in the log₁₀ (total bacterial count) between the baseline and final biopsies (median 4.48 and 3.00, respectively). Analysis of the histology and bacteriology data demonstrated that the presence of a high neutrophilic infiltrate in skin biopsies was associated with high bacterial counts (superficial compartment of the quantitative biopsies) at week 4 and delayed healing ($p = 0.037$). In the week 0 biopsy, increased lymphocytic infiltrates within the superficial and middle segments were associated with accelerated healing in the first 4 weeks ($p = 0.26$ and 0.09). The nanocrystalline silver dressing has demonstrated an anti-bacterial and permissive but selective anti-inflammatory action allowing lymphocytic infiltrates to increase associated with an accelerated reduction in ulcer size.

V 51-4

Cost-effectiveness in venous leg ulcer management

C. M. Mateus

Centro Saúde Pero Pinheiro, Sintra, Portugal

Introduction: In Portugal there are few economic studies in wound management, and none in compression therapy. The most common way to treat leg ulcers in Portugal still is the conventional treatment with normal saline, non-adhesive dressings or gauze padding. The aim of this study was to evaluate the cost-effectiveness in leg ulcer management, comparing compression therapy with conventional treatment.

Methods: Case series study with repeated evaluation. A sample of 20 patients of a community health center, with non-healing venous leg ulcer longer than 8 weeks, treated with conventional therapy (no compression), was selected. The costs were calculated based on different material costs, number of treatments and nurse time spent in wound care. A retrospective analysis was made since the beginning of treatment till the intervention (compression therapy), and a prospective analysis from that point till wound healing.

Results: A statistical significance ($p = 0,013$) was achieved between the material mean costs of the 2 methods. The unitary cost per treatment with conventional therapy was 30,8 % less than with compression therapy. Inversely, the final mean costs were 582,9 e ($\pm 326,8 e$) for conventional treatment, and 122,7 e ($\pm 54,3 e$) for compression therapy. This results reveals a significant ($p = 0,000$) cost saving using compression therapy. These results are mostly due to the greater frequency of dressing changes with conventional treatment (without consisting results) compared to the lower number of dressing changes with compression therapy. This larger number emphasizes the total mean material costs and the total nursing time costs, improving the total final costs.

Conclusions: Compression therapy, in venous leg ulcer management, could contribute to cost reduction and to improved

results, revealing a good cost-effectiveness procedure. Larger randomised controlled trials are needed in Portugal, and other countries, as well other type of studies like cost-utility studies.

V 51-5

Why does pressure decrease with short stretch bandages?

E. R. Brouwer¹, R. J. Damstra¹, H. Partsch²

¹ Nij Smellinghe hospital, Drachten, Netherlands

² Wilhelminenspital, Vienna, Austria

Aim: To investigate whether this pressure drop can be explained by a decrease in limb volume.

Material and methods: 10 healthy and 10 lymphedema (LE) legs (stage I or II). Volumetry of the lower legs using water displacement was performed in the healthy group before and 2 hrs after application of bandages with Rosidal sys (short stretch) and/or with Perfekta strong (long stretch). The interface pressure of the bandages was measured on the medial lower leg in the region of B1 using the Kikuhime device (large probe) or the MST tester. The LE legs were bandaged with L & R lymphkits (short stretch). LE patients were also measured after 24 hrs.

Results: So far 9 healthy and 5 LE legs were measured. After 2 hrs the healthy controls showed a volume reduction between 60 ml and 77 ml. Initial pressures in the supine position at B1 measured by the MST tester were 62.3 + 8.0 mmHg for the Rosidalsys and 55.3 + 7.3 for the Perfekta, the corresponding values during standing were 78.2 + 9.0 and 61.8 + 8.7 mmHg. The pressure loss after 2 hrs in supine and standing respectively was 37 % and 21 % for the Rosidal, 17 % and 14 % for the Perfekta. The patients with leg LE showed significant reduction of edema, 53 ml after two hrs and 298 ml after 24 hrs. The initial pressures in the supine position at B1 were 67.8 mmHg. The corresponding values during standing were 88.8 mmHg. The pressure loss after 2 hrs in supine and standing position was on average between 44 % and 33 % and after 24 hrs between 64 % and 55 %.

Conclusions: After application of a firm compression bandage there is an immediate reduction of leg volume even in the healthy subject. This volume reduction of the leg seems to be responsible for the drop of the interface pressure being more pronounced with short stretch than with long stretch material. One practical consequence is the recommendation to apply a short stretch bandage with a higher pressure in order to compensate for the immediate pressure fall, which, however, may be taken as proof for the beneficial effect of immediate edema reduction.

TR 4.4 25–27

10.30–12.00

V 53

The interesting case II

Der interessante Fall II

V 53-1

Ulcus cruris bei AV-Fisteln: Therapie der Arterien oder Venen?*J. Klode¹, K. Kröger², S. Grabbe¹, J. Dissemond¹*¹ University, Department of Dermatology, Essen, Germany.² University, Department of Angiology, Essen, Germany.

Wir berichten über eine 46-jährige Patientin mit nachgewiesenen einer komplexen AV-Fistel im Bereich des rechten Fußes. Vor 15 Jahren war bereits eine Coil-Embolisation durchgeführt worden, die eine Verringerung des Shunt-Volumens, nicht jedoch eine vollständige Okklusion der AV-Fistel erbrachte. Aktuell kam es zum Auftreten einer schmerzhaften Ulceration am distalen Fußrücken. Klinisch imponierte um das Ulcus eine großengradigste Hyperpigmentierung bedingt durch Hämosiderineinlagerungen im Sinne einer Purpura jaune d'ocre sowie ein diskretes Vorfußödem. Eine CVI, eine pAVK, eine Vaskulitis oder Neoplasie konnte nicht festgestellt werden, so dass wir die Diagnose eines Ulcus cruris bei AV-Fistel stellten. Nach Durchführung einer konservativen Therapie mit Kompression und Lymphdrainagen unter Fortführung einer indifferenten topischen Therapie konnte eine vollständige Abheilung des Ulcus erzielt werden. Dieser Fallbericht demonstriert, dass nicht die Therapie der arteriellen aber die Therapie der venösen Komponente der AV-Fistel zur Abheilung des Ulcus führte. Somit können unterschiedliche Aspekte in der Genese eines Ulcus bei AV-Fistel relevant sein. Bei der von uns vorgestellten Patientin sehen wir die lokale venöse Stauung als Ursache für die Ausbildung und Aufrechterhaltung des Ulcus an. Die arteriovenöse Shuntverbindung führt zu einer venösen ambulatorischen Hypertonie, die konsekutiv zu einer Verminderung des Perfusionsdrucks sowie zu einer verminderten Fließgeschwindigkeit in den Kapillaren führt. Über Leukozytenadhäsionsphänomene wird die Ausbildung einer perikapillären Fibrinmanschette induziert, die zu einer lokalen Hypoxie führt. Klinisch und somit für die Therapie richtungweisend waren die Hämosiderinablagerungen in der Umgebung des Ulcus. Somit kann neben der Therapie der Arterien bei einzelnen Patienten mit AV-Fistel auch die Therapie der venösen Komponenten sinnvoll sein.

V 53-2

Erhaltung eines Amputationsstumpfes nach Syme durch Maden*D. Wasmuth, M. Schneider, G. Riepe*

Stiftungsklinikum Mittelrhein, Koblenz-Boppard, Germany

Wir berichten über einen 75-jährigen Mann mit einer fortgeschrittenen pAVK links. Wegen Nekrosen an den Zehen war eine Angiografie durchgeführt worden. Ein Verschluss der proximalen Unterschenkelgefäße ohne periphere Darstellung wurde diagnostiziert. Als ultima ratio wurde die A. fibularis am mittleren Unterschenkel freigelegt und intraoperativ angiografiert. So konnte bis zum Sprunggelenk eine arterielle Versorgung nachgewiesen werden, der Fuß blieb ohne Darstellung. Ein Venenbypass von der A. poplitea unterhalb des Kniegelenkes auf die A. fibularis im mittleren Unterschenkeldrittel wurde angelegt und die nekrotischen Zehen offen im Grundgelenk amputiert. Wegen erneuter Nekrosen am Wundrand und sichtbarer Durchblutungsstörung des Vorfusses wurde wenig später eine offene Amputation in Fußwurzelmitte vorgenommen. Diese Wunde begann zu granulieren. Der freiliegende Talusknochen beunruhigte den weiterbehandelnden, niedergelassenen Chirurgen, der aus Sorge vor der hohen Infektionsgefahr um einen Wundverschluss bat. Durch die anschließende Amputation nach Syme, der Exartikulation im Sprunggelenk, konnte nach Resektion einer Nekrose über der Ferse, der Stumpf gedeckt werden. Die, wenn auch geringe, Spannung führte erneut zu Nekrosen der gesamten Wundränder und nach 10 Tagen zur weiten Wunddehiszenz mit freiliegender Tibia. Die Wunde war stark belegt. Eine Oberschenkelamputation erschien den meisten an der Behandlung Beteiligten unumgänglich. Durch beharrliches, regelmäßiges scharfes Debridement der Wundränder und die Einlage von Maden (BioBags à 100 Stück) konnte die Wunde dennoch gesäubert, zur Granulation und Wundrandschrumpfung geführt werden. Insgesamt waren 6 BioBags in Folge erforderlich. Der Fall soll zeigen, dass trotz pAVK in Einzelfällen der Kampf um eine möglichst geringe Amputation gewonnen werden kann. Der spannungsreiche Hautverschluss ist zu vermeiden, die Kombination aus mehrmaligem, scharfem Debridement und der Madentherapie findet die Grenze zwischen gerade noch durchblutetem und nekrotischem Gewebe. Wegen des Risikos der rasch generalisierenden und lebensbedrohlichen Infektion muss diese Therapie durch oder in enger Absprache mit Gefäßchirurgen durchgeführt werden.

V 53-3

Impact of (rh)VEGF165 on rodent random flap survival continuously released from a fibrin sealant biomatrix

R. Mittermayr, H. Redl

Ludwig Boltzmann Institute for Experimental and Clinical Traumatology, Vienna, Austria.

Introduction: Therapeutic support of angiogenesis in ischemic tissues is a potent strategy in avoiding ischemia induced necrosis. Several substances, in different application modes were tested in respect to their efficacy. In this context, vascular endothelial growth factor (VEGF) is discussed to be a key factor in endothelial cell biology and blood vessel formation, hence a candidate for the stimulation of angiogenesis dependent flap regeneration.

Study objective: Our study focus was to investigate the influence of recombinant VEGF165 (200 ng/ml) formulated in a fibrin sealant (FS) biomatrix on random flap survival in a rodent model. Material and

Methods: After elevation of a caudally based random flap (10 × 3 cm²) on the dorsum of rats (n = 10), the VEGF incorporated FS was sprayed onto the recipient bed. Flap survival (% of total flap area) was assessed on the 14th postoperative day, and was compared to a solely sealed group (FS group) and to control group.

Results: The planimetric analyzes revealed significantly extended viable flap area in the growth factor "loaded" group whereas the suture group had the worst results. VEGF increased vessel density as seen in the total number of counted vessels in immunohistochemistry. Also flap shrinkage was less pronounced in the VEGF treated group. FS did not cause any adverse events, whether in the VEGF/FS group nor in the FS group. The usage of FS per se exhibited as a feasible tool in sheet-like nature fixation of the entire flap with good immediately flap adherence to the recipient site.

Conclusions: In summary we can point out that FS by means of spray delivery is a good functional tool in flap fixation. Furthermore, we were able to show, that local VEGF, then formulated in the FS biomatrix is able to decrease necroses in hypoxic/ischemic fasciomyocutaneous flaps.

V 53-4

Local treatment of leg ulcers by Ligasano[®] pur foam

P. A. A. Botan¹, A. B. Cozma²

¹ Burn Centre & Plastic Surgery Dept, County Emergency Hospital, Targu Mures, Romania.

² Maxillo-Facial Dept., Emergency County Hospital, Targu Mures, Romania.

We began to use PUR foam since 1999 for a great number of patients with "difficult wounds", leg ulcers representing about 60 % among all these cases. LIGASANO is made from PUR foam with a "honey comb" special structure which gives a remarkable "vascular mechanical stimulus effect" combined with a singular "suction power", cleaning ALL WOUNDS by a "passive debridement" and thus facilitating the healing process. LIGASANO WHITE is supplied in 0,5, 1 and 2 cm thick sheets, all three thickness being reliable for the local treatment of leg ulcers in a single layer or better multilayered in different combinations. The first layer has to outline the shape of the wound and may be covered by other 1–2 layers which usually overlap by 1–2 cm the previous layer; this foam dressing is then tightened by a regular crepe and elastic bandage. There are 2 categories of patients with leg ulcers treated by this method: a) patients treated in the office, with leg ulcers under 7–8 cm diameter and average healing in about 12 weeks (there are patients with leg ulcers larger than 7–8 cm refusing to go to the hospital; b) patients with very large leg ulcers, first treated in the office for about 6–8 weeks (during this period all lesions clean, decrease in size and obtain a good granulation tissue), who are then admitted in the hospital in order to be split skin grafted.

Advantages: the office treatment is very reliable for the most part of patients who can maintain in this way all their social and professional connections; there is a real decrease of the hospitalization period, because the most part of the local pre-operative treatment to obtain a good recipient bed for the graft, is done in the office, and thus the healing process is shorter and less expensive. For all these reasons we consider that this dressing has a very good cost/efficiency ratio, due to the rare dressing changes allowing the patients to keep a good social and even professional connection, which has a great benefit for the active people especially. THAT IS WHY WE RECOMMEND THIS DRESSING TO ALL SURGEONS DEALING WITH LEG ULCERS.

TR 4.3.11-13

10.30–12.00

W 5

Getting Published/Veröffentlichen

Getting Published/

Veröffentlichen

C. Dealey¹, B. Springer²

¹Research Fellow, Research Development Team, University Hospital
Birmingham NHS Foundation Trust

²Redaktion/Editorial Staff ZfW, mhp-Verlag GmbH, Marktplatz 13,
D-65183 Wiesbaden

Publishing the findings of research or discussing different aspects of patient care delivery is important for the progress of knowledge in any field. Both workshop presenters have considerable experience in writing and preparing papers for publication and aim to provide practical guidance and advice for those who are new to the process.

The workshop will cover the steps necessary to prepare a manuscript and the publication process. The different types of paper that may be written will be discussed and the format for writing up a research study will be described in detail. Common pitfalls and mistakes will be described and solutions suggested. Information will be provided on selecting a suitable journal and then what happens after a paper is submitted to a journal. The issue of authorship will be considered. Examples of journal instructions to authors will also be available.

Deutsche Übersetzung folgt