Special Report

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Already proven in practice

“Using MRI tomography, we can outstandingly document as well as objectify” the effect of physical vessel therapy on microcirculation, according to the radiologist Dr. Richard Westhaus from Munich.

A patient with activated knee joint arthritis was free of pain within five days; within eight weeks the arthritis had already receded clearly in the MRT as well. In the case of CRPS of the tarsus, physical vessel therapy brought about a marked reduction in soft tissue swelling and bone marrow edema. Pain disappeared after just four days of treatment in a hobby football player with idiopathic bone marrow edema on the medial femoral condyle. The urologist Dr. Michael Blessing, Bad Wörishofen, has reported on a 54-year old patient with chronic pelvic pain syndrome, who after unsuccessful attempts with other therapy forms, was freed from pain for six months after the first eight sessions with physical vessel therapy.

Effects with shock/sepsis or diabetes?

Shock and sepsis are dreaded complications. Impaired microcirculation contributes to high mortality. This is due to the formation of a multi-organ dysfunction syndrome (MODS) as a result of a drop in blood pressure and a sharp reduction in organ circulation, explained Professor Karl Werdan from Halle. The risk increased with age. Even in healthy people, microcirculation, “the bottleneck of organ circulation,” deteriorates with age. A pilot study is currently investigating whether physical vessel therapy* in patients with MODS can prevent the collapse of the microcirculation and in this way improve survival chances.

Morbidity and mortality in patients with type 2 diabetes or pre-diabetes is also associated with microvascular endothelial dysfunction. As Professor Alfons Houben, Maastricht, President of the European Society for Microcirculation reported, laser Doppler flow measurement and light-based vessel analysis in over 2200 participants in an epidemiological study – 300 with pre-diabetes, 600 with type 2 diabetes – revealed impaired microcirculation in retina and skin, associated exclusively with hyperglycemia, not with blood pressure, inflammation or blood fats.

Houben also regards the results as confirmation that the evaluation of microvascular function is possible at epidemiological level.

Prevention: Microcirculation is essential here

Microcirculation is an important factor in many health problems. In the interests of rational health economy management, special attention should be devoted to the impaired regulation of microvessels.

Microcirculation is “an interface between cure and secondary prevention for many indication areas,” emphasized Eitel J. Vida, Executive Director of the International Prevention Organization (IPO). However, if one considers what the World Health Organization (WHO) up to now has regarded as important for prevention, then this interface has been inadequately represented.

Primary prevention could do more!

According to Vida, the task assigned to primary prevention by the WHO, i.e. health-promoting measures to avoid risk factors that have not yet arisen, has merely an alibi function. It is politically attractive because it was inexpensive, but is seldom aimed at serious problems. Secondary prevention has been of greater relevance to health policy, but already characterized by a tendency to avoid excessive expenditure. Only when it comes to tertiary prevention, which is intended to ameliorate pre-existing, usually chronic, health damage or prevent its deterioration, are clinical healing and rehabilitation measures effective, but then often expensive.

The reason that physical vessel therapy*, for example, has not been optimally integrated into existing political structures, Vida pointed out, has been that “one simply did not pay or did not want to pay for many diagnostic measures in determining indications.” However, this has blocked the further development of preventive measures. If useful measures are excluded as individual treatment not covered by insurance, they would continue to be denied to many people. Only once it proves possible to combine the diagnosis and therapy of disrupted microcirculation sensibly with other measures for prevention, “will we have a good approach for sensible therapy,” concluded Vida.

Progress through cooperation

This the task to which the International Microvascular Net (IMIN) has devoted itself. The network, consisting of a governing body with scientific and business advisory board, network management and executive board, in cooperation with scientific partners from university medical faculties, scientific associations, institutes and trade organizations such as the IPO and with scientific partners from the medical technology and pharmaceutical industry (e.g. Bemer, LEA medical technology), wants to focus the knowledge distributed throughout the world on various aspects of microcirculation.“ “The aim is to plan projects so that they can also be designed viably with a high degree of core competence,” Vida stressed.

Such structures are becoming increasingly important in a changing health industry, noted Professor Dr. Dr. Ralf Uwe Peter from Blaustein near Ulm. He points to an analysis of the Swedish health group Capio, according to which there are trends in the health industry that are gravely affecting patients’ treatment. For example, increasing life expectancy is causing both higher costs as well as an

increasing demand for health care. But the public funds to meet these needs are limited. As a result, the provision of high quality health services with high productivity is increasingly shifting to private providers.

A move to out-patient care

New treatment methods and medical procedures are having a positive effect: they are reducing the need for in-patient treatment and permitting shorter stays of high quality. In particular, the move from in-patient to out-patient measures was clearly gaining in momentum, according to Peter. Other trends he mentioned were the shift of greater numbers of benefits “to the lowest efficient care level” to avoid bottlenecks in health care and the concentration of medical benefits to competence centers.

[***Image***]

"There are micro fibers all over the body, "the bottleneck of blood circulation in organs", as Professor Karl Werdan from Halle so precisely put it. @IOM 123/STOCKADOBE.COM

[***Diagram***]

Microcirculation in the system of prevention

Symptoms/anamnesis

Diagnosis/determination of the indication

Specific therapy

Care Secondary prevention

Interface Microcirculation

Controlling/diagnosis

Graphic: ÄrzteZeitung

Established: Research on microcirculation

Only half-a-century ago, the endothelium was regarded as a mere “cell carpet.” Things have changed.

Research into physiology and pathology of the flow phenomena, periodicities and biorhythms prevalent in microvessels has now become an established field of research, emphasized Professor Rainer-Christian Klopp, Head of the Institute for Microcirculation in the L.H.-Campus Berlin-Buch. He has been working in this field for 45 years, using primarily highly specialized methods, such as intravital microscopy, reflection spectrometry and laser Doppler methods. The flow behavior of the plasma blood cell mixture and initial lymph flow, the periodicities of this complex system and its disruptions are at the heart of his research into the function and ability to influence the microvessels, which make up three-quarters of all blood vessels.

The aim of the therapy is “to enable natural regulatory mechanisms to once again cope with disruptions on their own to a large extent.” It has already been possible to achieve significant therapeutic successes here by stimulating spontaneous arteriolar vasomotion, as Klopp has shown in the case of severe impairments of microcirculation in chronic stress patients and impaired wound healing in type 2 diabetics. The decisive factor is to influence impaired microcirculation as early as possible, because “once spontaneous vasomotion has come to a complete standstill, we won’t be able to restimulate it.”

Thomas Derfuss from the firm LEA Medizintechnik explained that there were very effective ways of proving the therapeutic effects on microcirculation in tissue through optical diagnosis. To do so, O2C technology is used – a combination of white light spectrometry (TPS) and laser Doppler (LDA), which permits quantifying the blood flow in microvessels. As a result, the functional condition and changes in microcirculation can be demonstrated following targeted stimulation. Derfuss has proved this in the case of diabetic foot ulcers and transplanted tissue in plastic surgery.

OC2 technology to diagnose the smallest microvessels could be deployed very efficiently in vessel surgery, reported Dr. Christian Klaproth from the Interdisciplinary Vessel Center North in Husum. The scale of arterial vessel disease and amputations of extremities due to this were increasing worldwide.

However, the usual procedures, such as transcutaneous partial pressure of oxygen measurement (TcPO2) hardly revealed anything regarding the actual relationships between oxygen demand and oxygen supply and the flow circumstances in the tissue areas – the “final field” of perfusion – supplied by the microvessels. By contrast, O2C technology covered microvessels with a diameter of less than 100 µ.m in a tissue depth up to 15 mm in particular. In this way, as Klapproth illustrated with case examples, the oxygen consumption could be determined while it was penetrating the tissue.

*Bemer physical vessel therapy means electromagnetic fields with low flow density with biorhythmically-defined impulse configuration

EVENT

Microvascular High-Tech Solutions,
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