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Photodynamic therapy to treat diabetic foot infection

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Antibiotic therapy and debridement are the most used practices to manage infectious diabetic foot and usually culminate with some amputation. When infection is associated with vascular disease, the clinical pictures are more serious. The chance of healing without surgical intervention is quite remote. Antibiotics are necessary but diabetic nephropathy is usually present and antibiotics can worsen the clinical condition. It is clearly necessary to develop novel treatment strategies for this health problem. Photodynamic therapy (PDT) is a treatment modality that uses light to generate *in situ* reactive oxygen species and to cause death in any type of cell including bacteria. Therefore, foot infections can be treated with PDT. Several characteristics of PDT favor it uses to treat diabetic feet: It is a very efficient antimicrobial agent, even against resistant microorganisms avoiding development of resistance; it is applied locally avoiding systemic drug toxicity; it can be applied in outpatient regimens. We performed a clinical study to verify if PDT is an effective method to avoid amputation of infected diabetic feet. An inexpensive PDT protocol was developed and applied to 18 patients with osteomyelitis, classified as Grade 3 on the Wagner scale. Only one of these patients suffered amputation. In the control group, of 16 patients, all of them ended up suffering amputation. The rate of amputation in the PDT group was 0.029 times the rate in the control group and the difference is clearly statistically significant (p=0.002). Another study group with 62 diabetic patients with foot infections allowed the development of the Tardivo algorithm to access amputation risk. Three parameters were more important: Tissue oxygenation, location of infection in the foot and progression of osteomyelitis accessed by Wagner classification. We showed that the combined use of the algorithm and of the low-cost PDT protocol can decrease substantially the amputation frequency in diabetic patients.

Biography

João Paulo Tardivo is assistant professor of angiology and vascular surgery and director of the Center for the Treatment of Diabetic Foot in the Faculdade de Medicina do ABC, Brazil. He graduated in medicine from the Medical School of ABC in 1976 and obtained his Master in Health Sciences in 2004 and PhD in 2013 in the same institution. Expert in vascular surgery since 1979, began his studies with medical lasers in 1987. In mid- 1999 began to be interested in Photodynamic Therapy in Dermatology and superficial tumors and since 2009 has been doing research with the use of Photodynamic Therapy to treat Diabetic Foot. He has published 14 papers in reputed journals and developed an Algorithm to treat Diabetic Foot with Photodynamic Therapy.

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