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Photodynamic therapy for 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 65 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 the sickness 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 has completed his PhD from Faculdade de Medicina do ABC. He is the Director of Diabetic Foot Institute. He has published more than 13 papers in reputed journals about photodynamic therapy and its application in diabetic foot.

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