

Does using a gas plasma device change bacterial composition of diabetic foot ulcers and reduce the need for antibiotics?

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Background: Gas plasma is reported to be active against fungi, viruses, yeast and bacteria, including those resistant to antibiotics. ¹ It is postulated as an alternative to antibiotics for patients where antibiotic therapy is difficult (due to resistance or adverse effects) or as an adjunct treatment for patients with chronic wounds including those with biofilms. Large national studies are ongoing for diabetic foot ulcer wounds, we had the opportunity to pilot the Adtec[®] SteriPlas in our service for 6 weeks.

Objectives:

To assess whether bacteria grown from three patients in whom gas plasma was used changed during treatment and whether antibiotic use could be reduced.

Research Question:

Does the use of this gas plasma device affect bacteria grown and need for antibiotic therapy in diabetic foot/leg ulcers?

Methods: Three patients (Type 2 diabetes mellitus) with chronic non healing foot and leg ulcers with multiple antibiotic resistance were treated with gas plasma for 5 minutes per head size area of machine (40mm), twice to three times a week (minimum of 8 to maximum of 11 sessions each patient), in addition to standard wound care delivered by the diabetes specialist podiatry team.

Results:

Patient 1:

Had longstanding pseudomonal growth with inconsistent coliform and anaerobe growth. During treatment with gas plasma, growth changed to diptheroid alone and antibiotics were stopped.

Patient 2:

Had longstanding pseudomonal and diptheroid growth that changed to staph aureus during treatment, at the end of gas plasma sessions, only commensal flora was isolated. Antibiotics were not required whilst on gas plasma therapy.

Patient 3:

Grew beta-haemolytic streptococci and pseudomonas before and throughout their 8 treatments, however, never required antibiotics and healed.



Discussion:

Two patients with extensive chronic wounds had 10-11 gas plasma treatments. Pseudomonas was eradicated from their microbiology by the end of treatment. When treatment was stopped, pseudomonas returned suggesting that the gas plasma was responsible for the change in bacteria grown and should be continued until wound healing. All patients were either able to come off or stay off antibiotics during gas plasma therapy.

Conclusions:

Gas plasma treatment has the potential to alter the microbiological flora of diabetic ulcers and reduce the need for antibiotics. More research should be done in this area as a potential antimicrobial stewardship measure.