NEGTIVELY CHARGED POLYSTYRENE MICROSPHERES TECHNOLOGY EXPERIENCE ABOUT NON-RESPONDING DIABETIC FOOT ULCERS. TWO CASES REPORT

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INTRODUCTION

A new treatment for hard-to-heal Diabetic Foot Ulcers (DFU) has recently been proposed using negatively charged polystyrene microspheres (NCM). Previous studies have demonstrated how NCM can help promote neangiogenesis and granulation tissue formation, even covering noble deep tissues such as ligaments, tendons, joint capsules, or bones1,5,6 and finally healing DFU.

This therapeutic effect is based on the capacity of NCM to provide a supportive microenvironment on the wound surface, serving as an additional surface for the attachment and migration of fibroblasts, endothelial, and inflammatory cells. Furthermore, NCM get control over the excess of proteolytic enzymes that prevent normal healing (mainly matrix metalloproteinases)5. These potential effects give hope to treat non-responding DFU, especially when the patient has high grade of ischemia non revascularizable and deep ulcers.

AIM

To determine the outcome of a new product based on Negatively Charged Polystyrene Microspheres (NCM) technology, in non-responding Diabetic Foot Ulcers (DFU) with Critical Limb Ischemia (CLI) and without possibilities of revascularization.

MATERIAL AND METHODS

Two cases of non-responding DFU were treated with NCM technology, in Specialized Diabetic Foot Unit. Ulcers were treated daily with NCM technology during 4 weeks. Wollina Wound Score1 (granulation, color and consistency tissue), wound surface area (cm²) and percentage area reduction were measured.

CASE 1

Patient characteristics:
Male, 80 years
Diabetes duration: 20 years
Vascular screening:
• Distal pulses: not palpable
• ABI: NC
• TBI: NC
• TcPO2: 19mmHg
Neuropathic screening:
• MSW: affected
• Biotelemeter: affected

Wound characteristics:
Duration: 20 weeks
Location: First metatarsal amputation UF
Classification:
Texas: 3D (PTB) + IDS 2.
Treatment:
PTA peroneal artery unsuccessfully
Antibiotic treatment:
• Linezolid 600mg/12h (MARIA)
• Offloading device: Felted padding and postoperative shoe

Wollina Score (Parameters) Inclusion Day 0 Week 1 Day 7 Week 2 Day 14 Week 3 Day 21 Week 4 Day 28 Changes in the Score
Granulation (max score 4) 2 2 2 2 1 -1 1
Color (max score 2) 0 0 0 0 0 0 0 0
Consistency (max score 1) 0 1 1 1 1 1 1 1 1
Total Score (max score 7) 2 3 3 3 2 2 0 0

Wound size Inclusion Day Size (cm²) 6.72 2.36 1.95 1.2 1.28 80.95%

CASE 2

Patient characteristics:
Male, 64 years
Diabetes duration: 10 years
Vascular screening:
• Distal pulses: not palpable
• ABI: NC
• TBI: NC
• TcPO2: 4mmHg
Neuropathic screening:
• MSW: preserved
• Biotelemeter: affected

Wound characteristics:
Duration: 24 weeks
Location: First toe amputation LF
Classification:
Texas: 3D (PTB) + IDS 2.
Treatment:
PTA AFA (“non option patient”)
Antibiotic treatment:
• Linezolid 600mg/12h (MARIA)
• Ciprofloxacin 500mg/12h (HAR)
• Offloading device: Postoperative shoe

Wollina Score (Parameters) Inclusion Day 0 Week 1 Day 7 Week 2 Day 14 Week 3 Day 21 Week 4 Day 28 Changes in the Score
Granulation (max score 4) 0 1 2 3 3 3 3 3
Color (max score 2) 0 0 1 1 1 1 1 1
Consistency (max score 1) 0 0 1 1 1 1 1 1
Total Score (max score 7) 0 1 4 5 5 5 5 5

Wound size Inclusion Day 0 Size (cm²) 5.2 5 3.36 3.6 3.12 36.07%

CONCLUSION

Experience obtained shows us how a reactivation of non-responding DFU is possible, even in “no-option patient” due to critical limb ischemia. After NCM use, we find a significant improvement in “hard to heal” DFU in patients with high possibilities of major amputation.

REFERENCES