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Case Report

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Clinical Efficacy in the Reduction of Infections of the Surgical Site with the Use of Biodegradable Membrane Containing Gentamicine

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Introduction

The animal collagen membrane (equine or bovine) containing implantable and completely resorbable gentamicin sulphate is used in the treatment and prevention of surgical site infections, in contaminated skin lesions, in support of systemic administration of antibiotics. The biodegradable membrane containing gentamicin has haemostatic action and promotes tissue repair, consists of two components: renineal equine / bovine collagen type 1 (equal to 2.8mg/cm^2) and gentamicin sulphate with an active dosage locally (equal at 2mg/cm^2) which has bactericidal activity towards a broad spectrum of pathogens:

- Escherichia coli
- Proteus species
- Klebsiella pneumoniae
- Enterobacter species
- Serratia marcensens
- Citrobacter species
- Providentia
- Acinetobacter
- Pseudomonas aeruginosa and other
- Streptococcus pyogenes and faecalis
- Bacterioids
- Staphylococcus species (including penicillin & methicillin resistant families).

The effectiveness of gentamicin is concentration-dependent: the higher the concentration compared to the MIC (Minimal Inhibition Concentration), the greater the bactericidal effect. Collagen accelerates blood hemostasis by promoting the adhesion of platelets along its fibers, which are activated and initiate the so-called platelet aggregation.It is used for local haemostasis of capillary, parenchymatous and seeping haemorrhages in areas with a high risk of infection. This product contains gentamicin sulphate at a locally effective dose. It's a fully resorbable gentamicin-collagen haemostat, used as a surgical implant for haemostasis and local delivery of high doses of gentamicin. It is fully resorbed within 7-14 days, depending on perfusion of the implant site, negating the need for an additional removal procedure. It is available in 3 sizes for convenience and can be cut to size to fit the area to be treated. Generally, up to 3 membrane (10 cm x 10 cm) can be used.

Biodegradable Membrane Containing Gentamicine Is Particularly Suitable For:

- Cardiothoracic surgery
- Orthopedic surgery
- Gastrointestinal surgery
- Pilonidal Sinus surgery
- Dehiscences of infected surgical wounds
- Complicated wounds
- Difficult endocavitated wounds
- No-healing wounds
- Necrotizing fasciitis

Case Report

Limb Salvage In A Dibetic Patient Affected By A Necrotizing Fasciitis Due To Anaphylactic Reaction To Mosquitos Bites.

Female 50years - The patient was referred to E.R. in a Madagascar hospital, during her holidays, because of a severe pain at the right lower limb. Physical examination revealed the presence of cutaneous plaques, edema and erythema at right lower limb. BP was 80/40 mmHg, HR 125 beats, breath rate 18/min, temperature was 35.6°C. The patient underwent a rheumatologic visit but her clinical conditions suddenly precipitate in renal failure with a neutrophilic hyperleucocytosis. After oxygen and norepinephrine administration, the patient was referred to I.C.U. in order to achieve clinical stabilization. Multiple insect-bites, cutaneous dry rounded plaques with inflammatory halo and erythema and extensive cellulitis were noted at the right knee extended to the Tibia; skin swab culture was positive for Streptococcus. The patient underwent antibiotic therapy by Tazocilline. Four day later the diagnosis of "necrotizing fasciitis due to anaphylactic reaction to bites of mosquitos" was made. A surgical debridement was performed and an advanced hydrofibra silver dressing and polyurethane foam was applied. After 15 days the patient was transferred in Italy at our Institution for a wound-specialist care. Physical examination at the entry reveals a temperature of 39.8 °C, HR was 120 beats, BP 80/50 mmHg and breath rate 25/min. The right lower limb presented a 40x 13 cm necrotic lesion, 9 cm deep, with an huge bad-smelling purulent exudate. Major amputation was indicated but, prior to this demolitive surgical intervention.

Method

After cleansing the cutaneous lesions examined with Lactated Ringer's Solution, the animal collagen membrane (equine or bovine) containing gentamicin sulfate was applied. The same was cut to size of the lesions and was compressed in situ for about three minutes to promote complete adhesion, therefore used as a primary dressing, then using a breathable porous absorbent polyurethane foam as a secondary dressing.

Cell migration has been reactivated by facilitating the activity of growth factors, reducing the local bacterial load in order to eliminate the inflammatory phase which hindered the progression towards healing.

Thanks to **BIODEGRADABLE MEMBRANE CONTAINING GENTAMICINE**, the healing process was reactivated.

Results

The biodegradable membrane was decisive in the most important phase of healing, its application has reduced wound infection, reducing the percentage of SSI. Diabetes is considered an important risk factor for SSI after general surgery procedures and the patient did not develop SSI, thanks to the use of this device, which was fundamental for the healing of her difficult wound, ensuring limb salvage . In the treated case, a regression of inflammation was found 3 days after its application, with reactivation and consequent acceleration of the reparative process.

Conclusion

It is a lyophilised collagen implant impregnated with the aminoglycoside antibiotic gentamicin used to help prevent surgical site infection. Combining both gentamicin and collagen, creates a barrier against surgical site infections. It is implanted at the surgical site at time of operation and is then completely resorbed by the body. The biocompatibility of the device used has demonstrated interaction with the sites of the treated wounds, stimulating a synergistic and specific reaction. It was also efficient in managing the bacterial load, the nature and volume of the product exudate, maintaining optimal hydration of the periwound skin.The high release of Gentamicin by diffusion has demonstrated effective biocidal activity on most of the bacterial population, with the following metabolic degradation of the collagen membrane by macrophages (physiological action) and subsequent healing of wounds in treated patients. Systemically effective therapeutic blood or plasma levels are not generally achieved [1-7].

BIODEGRADABLE MEMBRANE CONTAINING GENTAMICINE should not be used if a protein allergy is known or intolerability towards gentamicin has been observed. No experience has been gained in use during pregnancy and breast-feeding. For this reason, the indication should be strictly established during pregnancy and breast-feeding. The indication for it should also be strictly established in patients with impaired renal function.

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