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CHRONIC OSTEOMYELITIS

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ABSTRACT

Chronic osteomyelitis is a major threat to orthopaedic surgery and is difficult to cure due to biofilm formation of micro-organisms. Staphylococcus aureus is the main causative agent for chronic osteomyelitis. There are different types of osteomyelitis which results after the performance of orthopaedic surgery. However, the long-term delivery of conventional systemic antibiotics causes accumulated toxicity and microbes developed resistance against antibiotics. So, the conventional antibiotics cannot penetrate due to poor blood supply in the sequestrum area, the effective bactericidal concentration cannot be reached, thus the delivery system fails and new methodologies are adapted to overcome the problems. Local drug delivery system plays a promising role in the treatment of osteomyelitis

KEYWORDS: Chronic Osteomyelitis, Local drug delivery system, Calcium sulphate, Polyvinyl Alcohol

INTRODUCTION

Osteomyelitis is major issue in developing and developed countries due to increased post trauma, injury and accidents. Osteomyelitis is the destruction of bone and is an inflammatory process which is caused by micro-organisms. 10% of chronic osteomyelitis resulted due to orthopaedic surgeries. It can occur in single or multiple portions such as cortex, bone marrow, periosteum etc. Osteomyelitis can exist in any bone at any age. Osteomyelitis is accompanied by several contributing factors such as physiological status, obesity, smoking, diabetes mellitus, bone ischaemia and autonomic neuropathy.

LITERATURE REVIEW

Local drug delivery system is biodegradable, biocompatible, which enhance the regeneration of new bone tissues, reduces the level of invasion and have great patient compliance**. (Reem Khaled Wassif.*et.al,* 2021)**

Calcium sulphate (CS) is the primary resorbable material that has been used clinically for local antibiotic delivery and summarized the types of biomaterials used in the local antibiotic drug delivery system. Calcium sulphate as bone void fillers is used as primary resorbable material in local drug delivery. **(Jason A.*et.al,*2015)**

PVA do not possess any antioxidant and antimicrobial properties but when formulated with other materials it enhances and improves the antimicrobial properties. PVA is a thermoplastic polymer which is colorless, water-soluble, odorless, tasteless, translucent, white granular powder, harmless, and nontoxic. PVA dissolves in water but does not dissolve in organic solvents. **(Rigved Nagarkar.*et.al*,2019)**

RELEVANCE

Chronic osteomyelitis is a challenging disease due to its serious mortality and morbidity rates and has limited effective treatment options. Local drug delivery systems are receiving great attention in the recent decades.

PURPOSE OF THE STUDY

To develop a methodology to minimize the invasion of microorganisms and achieve the effective bactericidal concentration to eliminate the chronic Osteomyelitis.

METHODOLOGY

The drug delivery system for treatment of Chronic Osteomyelitis are Particulate systems, Bone grafts, Implants and scaffolds. These are developed by various techniques such as Fusion, Hot melt extrusion, Co precipitation, Electrospinning etc.

RESULT

Local drug delivery system plays a promising role in the treatment of osteomyelitis. Non-biodegradable and biodegradable polymers are mixed with antibiotics and formulated as implants, films, bone grafts, scaffolds, nanospheres, microparticles etc. By combining the antibiotics with polymers as systems, the drugs can be administered to the site of action aids in bone repair by treating the bacterial infection and enhances patient compliance.

CONCLUSION

Local drug delivery system seems to be effective in treating pathogens and aids in bone repair. Calcium sulphate not only delivers the drug to the site of action but also acts as a bone filler material. PVA is a synthetic, degradable, compatible polymer which is used for bone tissue replacements.

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