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Vancomycin loaded chitosan beads as a drug delivery system for local antibiotic delivery in some infections

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Background and Aims: Beads are spherical and porous carriers or scaffolds which are prepared from various materials like chitosan. Chitosan is a biopolymer extracted from the shells of shrimp and crab. Beads are used as controlled release drug delivery carriers for local and systemic delivery of drugs.
Methods: Beads were developed by solubilization and crosslinking method. A 2% w/v solution of medium molecular weight chitosan was prepared in acetic acid, cross linked with glutaraldehyde and dropped into a NaOH solution (1.5 N). Vancomycin (VM) was loaded into chitosan beads through two methods. Morphological characteristics and internal structure of beads were examined by Scanning Electron Microscopy. Loading efficiency was determined by UV spectrophotomertry.
Results: Chitosan beads were spherical with porous structure. Loading efficiency was between 30-80% based on the loading method. Release studies demonstrated a two phase profile with a burst effect of 10 -30% in the first twelve hours of VM dissolution test and continued up to 8 days. The data were analyzed using analysis of variance.
Conclusions: Chitosan beads prepared in the present study illustrated improved loading, chemical activity and release profiles in comparison to other methods and they were able to maintain antibiotic effective up to one month.

Keywords: Bead; Controlled release; Vancomycin; Chitosan; Cross-linking