BIODEGRADABLE CERAMIC IMPLANTS IN TRAUMATOLOGY AND ORTHOPEDICS

Yarovaya A. M.

Scientific supervisors: Z. M. Sarkisyan (1), N. A. Nudelman (2)
(1) Department of General and Medical Chemistry named after prof. V. V. Khorunzhiy, (2) Department of Foreign Languages with courses of Russian and Latin languages
Saint-Petersburg State Pediatric Medical University" Ministry of Health of Russia

Contact information: Anastasia Yarovaya — 1st year student, Faculty of Pediatrics. Email: am.yarovaya@yandex.ru

Keywords: biocompatible materials, biodegradable implant, bioceramics, bone grafting

Relevance: A modern trend in medicine is the use of synthetic materials to replace defects in tissues and organs. The use of biodegradable ceramic implants in traumatology and orthopedics is promising. When embedded in the bone tissue they first perform a supporting function, and then resorb in the body's fluids, as the native bone replaces the implant.

Objectives: To consider several of the most commonly used in practice biodegradable ceramic implants, to compare their physical and chemical properties, to consummate the features of the use of each material.

Materials and methods: Analysis of published in scientific journals and other sources data on the research topic, clinical cases which reflect the possibilities of using biodegradable ceramic implants; selection of information on the most commonly used bioresorbable ceramic materials for implantation, comparison of physical and chemical properties of the actual bioceramic materials and the mineral substance of a bone, as well as methods for their production [1,2] and determination of bioresorbable ceramic implants effective application opportunities in traumatology and orthopedics [3].

Results: The following materials were considered: Hydroxyapatite (HAP) [2], β-Tricalcium Phosphate (TCP) [1,3], Glass-ceramic-Biositall, Collagen-apatite composite "LitAr". These materials have all the properties necessary for an implant, such as: osteoinductivity, osteoconductivity, optimal porosity [1-3]. Methods for obtaining bioresorbable ceramic materials allow them to be produced on an industrial scale. The possibilities of using such implants in various areas of traumatology and orthopedics are very wide: from the plastic surgery of small bone defects that occur for various reasons to the use of biodegradable ceramics for the fusion of false joints and the fixation of soft tissue structures. There are many application prospects of bioresorbable ceramic implants, such as development of new materials with adjustable properties and addition new properties to existing materials.

Conclusions: Biodegradable ceramic implants have both advantages and disadvantages. Among advantages there is the ability to replace relatively large defects of bones and soft tissues with material similar to allograft, the ability of complete biodegradation, X-ray negative characteristics and the physical and mechanical characteristics of bioceramic implants, which contribute to the stimulation of osteogenesis. Among disadvantages there is the high speed of biodegradation and insufficient supplies of implants in trauma and orthopedic departments of the country. No such implant today can be an equivalent replacement for an autoplastic graft, but researchers have a variety of prospects that allow not only to bring the physical and chemical properties of biodegradable ceramic implants closer to the properties of the patient's autobone, but also to create materials with regulated properties.

References

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