

Research Article

Modern Approaches to Surgical Treatment of Patients with Generalized Periodontitis and Osteopenia

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Abstract

The issue of surgical treatment of patients with generalized periodontitis and osteopenia is particularly topical. Numerous studies have confirmed the benefits of surgical treatment procedures using osteoplastic material to stimulate repair process of periodontal tissues.

The objective of the research was to improve the effectiveness of surgical treatment of patients with generalized periodontitis and osteopenia through the combined use of osteoplastic material and antiresorptive drugs in the preoperative and postoperative periods.

93 patients underwent treatment and clinical observation. The patients were divided into three groups. Group I included 20 patients who underwent surgical treatment according to conventional procedure. Group II included 25 patients who underwent surgical treatment with local application of osteoplastic material "Easy Graft". Surgical treatment in Group III (26 patients) was conducted using osteoplastic material "Easy Graft" and antiresorptive drug "Bonviva". Experimental group consisted of 22 apparently healthy individuals. The obtained results indicated that surgical treatment using osteoplastic material and antiresorptive drug contributes to the most significant positive effect determined according to the dynamics of densitometric values.

Combined use of osteoplastic material "Easy Graft" and antiresorptive drug "Bonviva" leads to stable process stabilization being confirmed by densitometric study indices both in early and in remote postoperative period.

Keywords

generalized periodontitis; osteopenia; osteoplastic material; antiresorptive drug

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Problem statement and analysis of the recent research

Periodontal tissues disease is one of the most topical issues of modern dentistry. Generalized periodontitis (GP) among the population of Ukraine is the problem of modern medicine due to nearly 100% prevalence and constantly increasing affection of young people [1, 2]. The interrelation between structural and functional condition of periodontal tissues and the skeletal system in people of all ages and sexes in different regions of Ukraine has been established [3]. Jaw bony tissue performs supporting function of periodontal tissues. As part of the skeletal system of the body it is also a reserve repository of minerals [4]. Surgical treatment is an integral part of GP comprehensive treatment. Surgical treatment of periodontal disease is the most effective method of obtaining stable positive results [5-7].

Today, many researchers have noted the important role of jaw bony tissue changes in GP pathogenesis. However, it should be noted that osteotropic drugs aimed at reparative osseogenesis processes activation are insufficiently used for

GP treatment [8, 9]. Numerous studies have confirmed the benefits of surgical treatment using osteoplastic material to stimulate repair processes of periodontal tissues [10, 11].

The objective of the research was to improve the effectiveness of surgical treatment of patients with generalized periodontitis and osteopenia through the combined use of osteoplastic material and antiresorptive drugs in the preoperative and postoperative periods.

1. Materials and methods of the research

93 patients at the age of 24 to 65 were examined, treated and underwent clinical observation during the research. Patient selection for the research occurred in accordance with the inclusion criteria: patient's consent to participate in the research and his signing of the provided informed consent form to participate in the research and undergo the proposed treatment. Patients with somatic diseases at decompensation stage, malignant neoplasms, decompensated forms of diabetes, infectious diseases were not included into the research. Patients were divided into three groups. Group I included 20 patients with GP and osteopenia who underwent surgical treatment according

to conventional procedure. Group II included 25 patients with GP and osteopenia who underwent surgical treatment with local application of osteoplastic material “Easy Graft”. Surgical treatment in Group III (26 patients with GP and osteopenia) was conducted using osteoplastic material “Easy Graft” and antiresorptive drug “Bonviva”. Experimental group consisted of 22 apparently healthy individuals.

All patients with GP and osteopenia underwent classical Cieszyński-Widmann-Neumann surgery for the periodontium of the appropriate jaw. Mouth cavity was irrigated with antiseptic solutions and anesthesia was performed with Sol. Ubistesini 4%. Two vertical incisions from the gingival margin to transitory fold of the pathological process and horizontal incisions along the gingival margin from labial and lingual (palatal) sides were performed. Modified gingival margins with the width of about 2mm were cut with scissors. Granulation tissue, dental plaque was removed. Bone edge was treated and tooth root was polished. Bone cavities were filled with “Easy Graft” material. “Easy Graft” hardened and acquired a shape of monolithic implant, but a porous one when combined with oral fluids. Mucoperiosteal flap was mobilized, cast in place, and stitched in the interdental spaces. Antiresorptive drug “Bonviva” and background drug therapy, namely Azithromycin-Astrapharm 500 mg in a dose of 1 capsule during 3 days (course dose of 1.5 g), Loratadine in a dose of 1 tablet (10 mg) once a day during 10 days and Laktovit Forte in a dose of 1 capsule 2 times a day during 10 days were prescribed.

All patients of Group I who were treated with background drug therapy underwent classical Cieszyński-Widmann-Neumann surgery for the periodontium of the appropriate jaw, namely 18 surgeries on the lower jaw and 2 surgeries on the upper jaw. One surgery was performed in 16 (80.0%) patients, two surgeries were performed in 2 (10.0%) patients.

All patients of Group II who were treated with background drug therapy using osteoplastic material “Easy Graft” in the comprehensive treatment underwent classical Cieszyński-Widmann-Neumann surgery for the periodontium of the appropriate jaw, namely 20 surgeries on the lower jaw and 5 surgeries on the upper jaw. One surgery was performed in 19 (76.00%) patients, two surgeries were performed in 3 (12.00%) patients.

All patients of Group III who were treated with background drug therapy using osteoplastic material and antiresorptive drug in comprehensive treatment underwent classical Cieszyński-Widmann-Neumann surgery for the periodontium of the appropriate jaw, namely 21 surgeries on the lower jaw and 5 surgeries on the upper jaw. One surgery was performed in 22 (84.62%) patients, two surgeries were performed in 3 (7.70%) patients.

The structural and functional state of bony tissue was determined by densitometric research with the use of X-ray dual photon densitometer (technology – DEXA) provided by CHALLENGER (France) in order to assess the course of the disease and treatment effectiveness. Time measurement constituted 2-10 minutes, accuracy was 0.5-2% or 0.012-0.3g/cm².

The dose of radiation load during scanning of the vertebral column constituted 3 mRem and was 5 times lower than the dose of radiation exposure during usual radiography.

Decrease in bone mineral density (BMD) was studied according to densitogram of lumbar spine (L2-L4) in antero-posterior projection. The method is based on the principle of comparison of data on bone mineral density of the patient and the created model of bone mineral density condition in certain ethnic situation taking into account indicators of sex, age and weight (the presence of menstrual cycle in women) [12].

Analysis of densitometric studies was performed before the surgery and 1 year after the surgery.

During the statistical analysis of the results all the calculations were performed according to variation statistics method with the use of STATISTICA-8, the application package of computer program of medical and statistical calculations. The data were given as the mean ± standard deviation (Mean ± SD). Comparison of the results was performed using Student’s t-test, the difference was considered reliable at $p < 0.05$.

2. Results of the research and their discussion

Obtained results of densitometry before the treatment in patients with GP of II degree indicated decrease in mandibular bones density in patients with GP. T-test constituted 2.5 ± 0.21 ($p < 0.05$) in the examined patients and 1 ± 0.23 ($p < 0.05$) in healthy individuals.

After the surgery, densitometric research in Group I patients with GP and osteopenia detected a positive trend of indices.

During densitometric research t-test constituted 1.6 ± 1.79 ($p > 0.05$) in the patients of Group I one year after the surgery. T-test in the patients of Group I changed by 36.00% ($p < 0.05$) on average in one year indicating a stabilization of the disease process.

Surgical treatment based on the background therapy insufficiently affected lowered bone mineralization in a remote postoperative period.

According to densitometry results, t-test constituted 1.2 ± 1.36 ($p < 0.05$) in the patients of Group II one year after the surgery in comparison with the initial state before the surgery. T-test in the patients of Group II changed by 52.00% ($p < 0.05$) on average in one year indicating a stabilization of the pathological process.

Surgical treatment using osteoplastic material “Easy Graft” contributed to the positive dynamics of densitometric values. However, despite the positive dynamics of the values after the surgical treatment using osteoplastic material “Easy Graft”, they still did not reach the level of healthy individuals.

According to densitometry results, t-test changed in the patients of Group III one year after the surgery compared with the initial state before the surgery and constituted 0.9 ($p < 0.05$). Thus, densitometric values in the patients of Group III changed by 64.00% ($p < 0.05$) in one year indicating a significant improvement in bone mineralization followed by

further stabilization process. The most significant dynamics of densitometric values was observed in the patients of Group III in comparison with the patients of Groups I and II both in early and remote postoperative periods.

The obtained results of the research substantiate the feasibility of surgical treatment with the use of osteoplastic material “Easy Graft” and antiresorptive drug “Bonviva” in patients with GP and osteopenia contributing to the stabilization process and thereby improving the patients’ quality of life.

3. Conclusions

1. Positive dynamics of densitometric values was observed in the early postoperative period in patients with GP and osteopenia after the surgery based on the background therapy. Surgical treatment based on the background therapy insufficiently stabilized GP densitometric manifestations in the remote postoperative period.
2. The use of osteoplastic material “Easy Graft” in the surgical treatment of patients with GP and osteopenia promoted positive dynamics of densitometric values.
3. The combined use of osteoplastic material “Easy Graft” and antiresorptive drug “Bonviva” led to sustainable stabilization process as evidenced by the dynamics of densitometric values both in early and remote postoperative periods.
4. The surgical treatment regimen for patients with chronic GP of II and III degree with osteopenia in combination with pharmacological therapy was developed thereby increasing the efficiency of surgical treatment and process stabilization, being safe and accessible in the dentist’s practice.

4. Prospects for further research

Taking into account high GP prevalence, the question of further study of osteoplastic material “Easy Graft” and antiresorptive drug “Bonviva” impact both in early and remote postoperative periods has to be answered.

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