IMPLANTS

Implant survival in bisphosphonate-treated patients

BACKGROUND

Bisphosphonates (BPs) are potent osteoclast inhibitors that are the first choice of treatment for diseases affecting bone metabolism, which includes osteoporosis, multiple myeloma, Paget's disease, hypercalcemia of malignancy, and cancer metastasis to bone. Non-nitrogen-containing BPs are metabolized rapidly, but the more potent nitrogen-containing BPs are not metabolized but are gradually released into the circulation during bone turnover. Osteoclast inhibition and alteration of the bone microenvironment may prove indirectly harmful for implant dentistry if bone metabolism is blocked, resulting in impaired osseointegration. Local delivery of BPs, however, has been shown to promote peri-implant bone formation in animal studies and improves the fixation of osseointegrated implants in humans. BP-related osteonecrosis of the jaw (BRONJ) is a painful exposure of bone in the maxillofacial region that can significantly complicate BP treatment. The outcomes of systematic reviews on the impact of BPs on dental implants and the risk of developing BRONJ after dental implant surgery were reviewed.

METHODS

The PubMed/MEDLINE, Cochrane CENTRAL, Web of Science, and LILACS databases were searched to January 2018 for systematic reviews evaluating the impact of BPs on implant outcomes. Seven reviews published between 2009 and 2017 were identified and analyzed.

RESULTS

The BP treatments were delivered via oral, intravenous (IV), or local routes. Duration of BP therapy before implant placement ranged from 3 to 192 months. BP treatment was most commonly instituted for osteoporosis and malignant neoplasms.

The implant survival rates ranged from 89.2% to 100% (cumulative average 94.8%) for patients who used systemic BPs and from 96.1% to 99.22% (cumulative average 97.6%) for patients who did not use systemic BPs. One review of locally delivered BPs reported a survival rate of 100% for implants when BPs were used and 91.3% when no BPs were used. Meta-analysis in 1 review showed no significant influence of BPs on implant survival, but meta-analysis in another review showed a significant influence on implant survival.

Two reviews showed more dental implant failures in patients who used BPs. In 2 systematic reviews that assessed oral and IV routes of BP administration, more implant failures occurred with IV therapy.

BRONJ was more common in patients who used BPs before implant placement than in patients who did not use BPs in 3 reviews. In addition, patients with a history of BP use who experience surgical trauma during the implant placement may be more susceptible to BRONJ compared to patients without any history of BP use.

Marginal bone loss was analyzed in 2 reviews. One found no increased loss in patients who had locally applied BPs during implant installation compared to patients without BPs, and the other reported no significant difference between patients who used BPs and those who did not.

DISCUSSION

No significant difference in the survival of implants was found between patients who are receiving BP therapy and those who are not. It appears that the successful osseointegration of implants can proceed even if the patient is being treated or has been treated with BPs. However, BRONJ may be more common in patients with a history of BP use, especially if the patient experiences surgical trauma during implant placement.

Clinical Significance

Patients who are receiving BPs for the treatment of a bone metabolism disorder can be considered for implant placement. Each clinical situation should be evaluated individually, with consideration of the route of administration of the BP, the duration of treatment, the time since the treatment concluded, and the expectation of surgical trauma. Every effort should be made to avoid surgical trauma during implant delivery to minimize the risk of developing BRONJ in these patients.

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