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## Osteonecrosis of the jaw in cancer after treatment with bisphosphonates: incidence and risk factors.

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**PURPOSE:** Osteonecrosis of the jaw (ONJ) has been associated recently with the use of pamidronate and zoledronic acid. We studied the incidence, characteristics, and risk factors for the development of ONJ among patients treated with bisphosphonates for bone metastases. **PATIENTS AND METHODS:** ONJ was assessed prospectively since July 2003. The first bisphosphonate treatment among patients with ONJ was administered in 1997. Two hundred fifty-two patients who received bisphosphonates since January 1997 were included in this analysis. **RESULTS:** Seventeen patients (6.7%) developed ONJ: 11 of 111 (9.9%) with multiple myeloma, two of 70 (2.9%) with breast cancer, three of 46 (6.5%) with prostate cancer, and one of 25 (4%) with other neoplasms ( $P = .289$ ). The median number of treatment cycles and time of exposure to bisphosphonates were 35 infusions and 39.3 months for patients with ONJ compared with 15 infusions ( $P < .001$ ) and 19 months ( $P = .001$ ), respectively, for patients with no ONJ. The incidence of ONJ increased with time to exposure from 1.5% among patients treated for 4 to 12 months to 7.7% for treatment of 37 to 48 months. The cumulative hazard was significantly higher with zoledronic acid compared with pamidronate alone or pamidronate and zoledronic acid sequentially ( $P < .001$ ). All but two patients with ONJ had a history of dental procedures within the last year or use of dentures. **CONCLUSION:** The use of bisphosphonates seems to be associated with the development of ONJ. Length of exposure seems to be the most important risk factor for this complication. The type of bisphosphonate may play a role and previous dental procedures may be a precipitating factor.

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