normalities were found in this study.

DISCUSSION

Bisphosphonates are structural analogues of pyrophosphate, a naturally occurring component of crystalline bone. Regarding bones, bisphosphonate alters both the structure and function of osteoclasts, so it may inhibit the phenomenon of osteolysis.[8] Pamidronate, the second generation bisphosphonate, has emerged as an effective agent for the treatment of cancer-associated hypercalcemia in recent years.[3,9] It not only acts directly on osteoclasts by its poisoning effects but also inhibits their activity. There is evidence that it may have the ability to impair the recruitment of monocyte precursors and maturation of osteoclasts.[6,8] Initially, cancer-associated hypercalcemia was treated by ways other than through an intravenous route.[10] However, it is now available for an intravenous infusion drug which is much more rapid and more effective in the active remodeling of bones,[8] by comparing to the poor intestinal absorption of bisphosphonates.[10]

We divided the patients into 3 groups with different dosages (30, 45, and 60 mg). Each group was given a single-dose infusion over a 4- to 8-h period based on the severity of the hypercalcemia at presentation. Previous studies reported that within 3-4 days, around 90% (87.5% to 100%) of patients achieved normocalcemia after being given pamidronate.[3,6,11] The serum calcium levels remained within normal limits for a median of about 3 weeks, which is longer than that achieved with etidronate.[3,5,6,12] In our study, most patients (82.4%) achieved prolonged normocalcemia with a median normocalcemic duration of 18 days. The median time for attaining normocalcemia was 4 days. The results are almost compatible with those authors of Body et al.[12] Relapse of hypercalcemia was 42.9% in our responders. When a second course of pamidronate was given, only 1 patient achieved normocalcemia. We suspected that this was due to an insufficient dosage having been administrated in the second course. Some authors recommended that a high dosage (90 to 180 mg) of pamidronate was effective in the inhibition of bone resorption in hypercalcemic patients, who were resistant to a conventional dosage of bisphosphonates.[4] Using an escalated dosage of pamidronate for relapsed hypercalcemia needs further discussion and research.

Bisphosphonates appear to be less effective in some patients with malignancy related hypercalcemia owing to high serum level of parathyroid hormone-related protein (PTH-rp).[2,13,14] In our study, 3 non-responders were revealed to have this phenomenon. However, we lacked the necessary laboratory data to support this finding.

In conclusion, most patients experienced significant improvements after being given pamidronate in our study . This result supports the viewpoint that intravenous pamidronate provides a useful palliative therapeutic modality in improving quality of life of terminal cancer patients.

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