

Research Article

Solitary Osseous Plasmacytoma of the Head and Neck

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Abstract

Purpose: This study aimed to report the characteristics and treatment outcome of 8 patients with solitary osseous plasmacytoma of the head and neck with special focus on mandibular plasmacytoma.

Materials and Methods: The study was conducted on 8 patients with solitary osseous plasmacytoma of the head and neck who were treated at two academic tertiary referral hospitals between 1999 and 2010. All the patients were treated with curative intent. Four patients (50%) were primarily treated with radiotherapy alone at initial diagnosis, one patient (12.5%) underwent surgery alone, and 3 patients (37.5%) were treated with gross tumor resection followed by radiotherapy. The median total radiation dose was 46 (range 30-50) GY.

Results: There were 4 women and 4 men aging from 37 to 73 years, with a median and mean age of 52 years at diagnosis. Pain (in 7 cases) and swelling (in 5 cases) were the most common presentations. Mandible (in 4 cases) was the most frequent primary site. The median tumor size was 4.8 (range 3.5-6) cm. After a median follow-up of 44 months (range 27-79 months), 5 patients are alive and without disease, one is alive with multiple myeloma, and two died of multiple myeloma.

Conclusion: Solitary osseous plasmacytomas of the head and neck have a propensity to involve the mandibular bones and response well to effective local treatments of radiotherapy and/or surgery. These Patients tend to progress to multiple myeloma even years after the initial treatment.

Keywords: solitary osseous plasmacytoma; bone; head and neck; mandible; surgery; radiotherapy

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Introduction

Plasma cell neoplasms are a group of hematologic malignancies characterized by the neoplastic single clone proliferation of plasma cells, classically producing a monoclonal immunoglobulin [1]. These neoplasms can involve a single site which are defined as solitary plasmacytoma or multiple sites which are defined as multiple myeloma. Solitary plasmacytomas account for 5% to 10% of all plasma cell neoplasms which are characterized by the presence of a plasmacytoma in the absence of evidences suggesting systemic myeloma, such as multiple osteolytic lesions [1-3]. Solitary osseous plasmacytoma usually occurs in the sixth to seventh decades of life with a median age of 55 years at diagnosis. It is 2-3 times more common in males [1,4,5]. Approximately two thirds of solitary plasmacytomas occur in the bone, which most frequently involve the axial skeleton, whereas the remaining one-third of the cases are extramedullary plasmacytomas, which most commonly present in the upper aerodigestive tract. Solitary plasmacytoma of the mandible is very rare and to date, only 52 cases have been reported [6-8]. Progression to multiple myeloma is an ominous outcome that is more likely to occur in osseous plasmacytoma compared to extramedullary plasmacytoma. Approximately 50-75% of solitary osseous plasmacytomas ultimately progress to multiple myeloma [1-3,5,9,10]. Patients with head and neck solitary osseous plasmacytoma usually present with pain, bone destruction, and pathologic fracture. Diagnostic evaluation includes a complete blood count, whole skeletal radiographic survey, serum and urine protein electrophoresis, quantitative immunoglobulin levels, urinary protein excretion in 24 hours, and bone marrow aspiration and biopsy [1,10]. Recent studies suggest that a positron emission tomography

combined with Computed Tomography (PET/CT) scan or entire spine and pelvis Magnetic Resonance Imaging (MRI) may be more accurate than a conventional x-ray bone survey for detecting other foci of plasmacytomas [11]. This study aimed to report the characteristics and treatment outcome of 8 patients with solitary osseous plasmacytoma of the head and neck with special focus on mandibular plasmacytoma.

Materials and Methods

The present study was conducted on 8 patients with solitary osseous plasmacytoma of the head and neck who were treated at two academic tertiary referral hospitals between 1999 and 2010. The study was approved by the Clinical Research Ethics Committee of Shiraz University of Medical Sciences, Shiraz, Iran in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. In this study, solitary osseous plasmacytoma was defined as a single area of bone destruction due to neoplastic plasma cells (Figure 1), no evidence of M protein in serum and/or urine, normal skeletal survey, and normal bone marrow or less than 5% plasma cell infiltration in the bone marrow without evidence of multiple myeloma features (anemia, renal insufficiency, increased calcium, or multiple bone lesions). Nonetheless, the patients with small serum M component and post-therapy normalized serum levels were not excluded. In addition, Immunohistochemical staining was performed for kappa and lambda light chains in 5 cases (Figure 2 and 3). All the patients were treated with curative intent. Four patients (50%) were primarily treated with radiotherapy alone at initial diagnosis, one patient (12.5%) underwent surgery alone, and 3 patients (37.5%) were treated with gross tumor resection followed by radiotherapy. The median total radiation dose was 46 (range

30-50) GY.

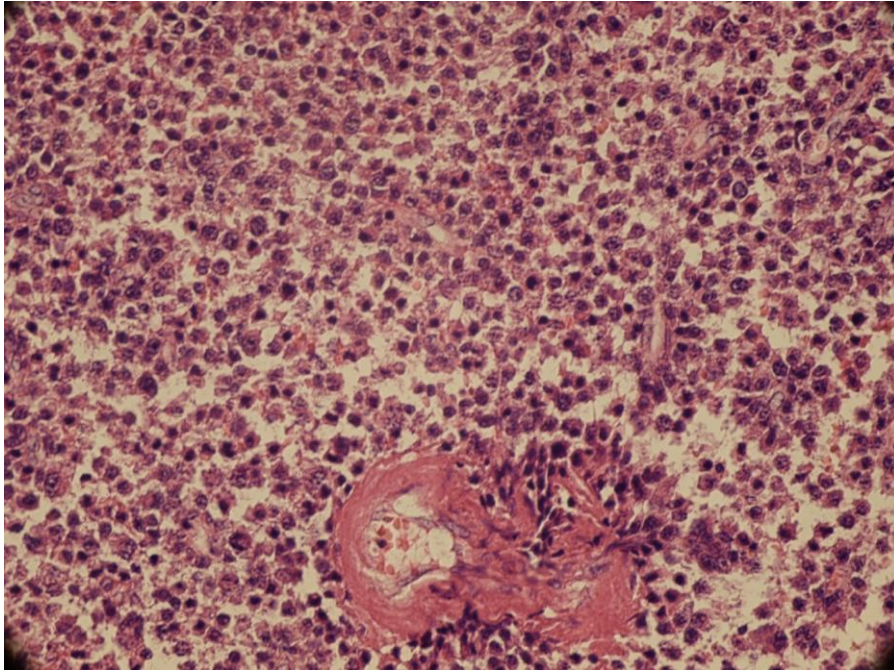


Figure 1 Plasmacytoma shows Lambda light chain restriction (case 8).

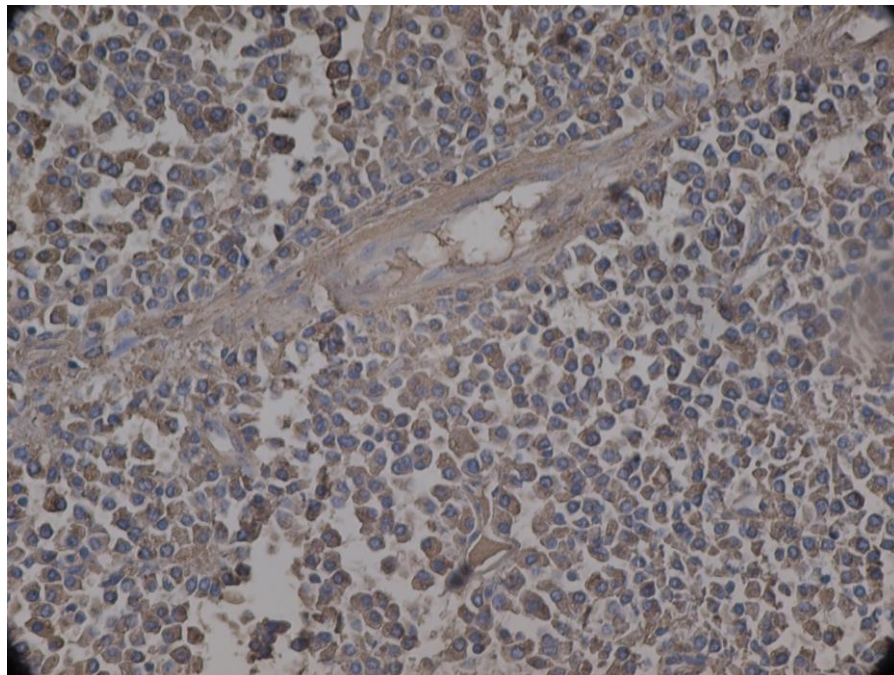


Figure 2 Plasmacytoma shows Lambda light chain restriction (case 8).

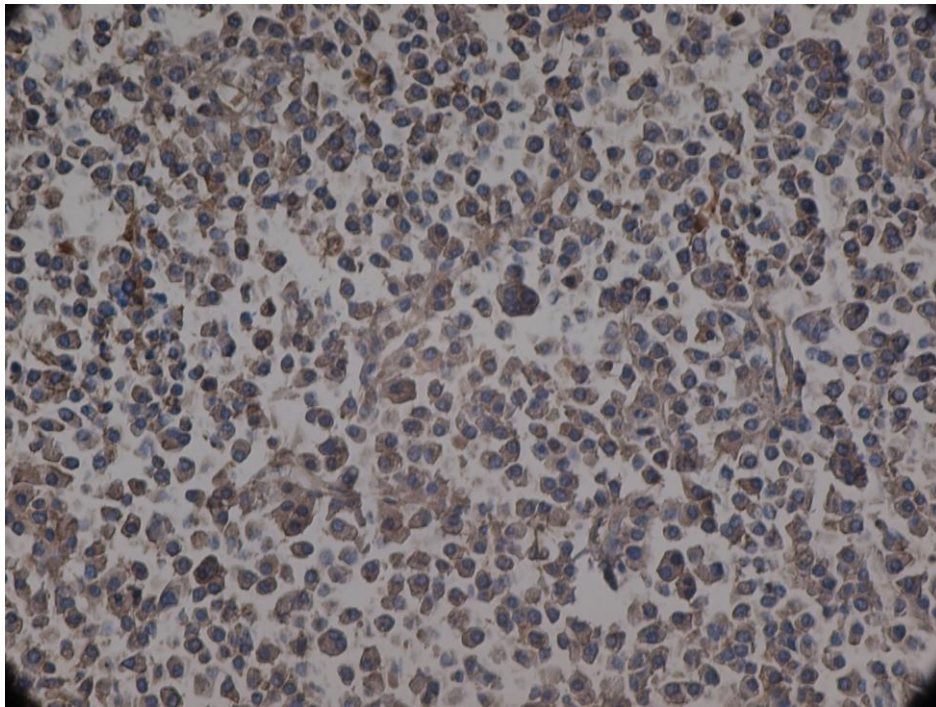


Figure 3 Plasmacytoma shows Kappa light chain restriction (case 5).

Results

There were 4 women and 4 men aging from 37 to 73 years, with a median and mean age of 52 years at diagnosis. Pain (87.5%) and swelling (62.5%) were the most common presentations (Table 1) and mandible (50%) was the most frequent primary site. Besides, pain, mass and swelling, teeth loosening and infection, and mandibular numbness were the signs and symptoms of 4 patients with mandibular plasmacytoma (Table 2). A well-circumscribed osteolytic lesion was the most imaging finding in all cases (Figures 4-6). This finding was observed in plain x-ray images in the mandibular angles (2 cases), ramus (one case), and molar region (one case) (Figure 7). The median tumor size of 8 patients was 4.8 (range 3.5-6) cm. Two patients (cases 3 and 5) had small serum M components which were normalized after the initial treatment. In 5 out of the 8 patients (cases of 1, 4, 5, 7, and 8) who had Immunohistochemical staining,

monoclonal Lambda or Kappa light chain expression was demonstrated. The median follow-up was 44 (range 27-79) months. Following the initial radiotherapy and/or surgery, all the patients achieved good local control. Also, none of the patients developed local recurrent disease; however, three out of the 8 patients (37.5%) developed multiple myeloma after an average time of 21 (with a range of 9 to 34) months from the initial local treatment. These patients (cases of 5, 6, and 7) were subsequently treated with chemotherapy with or without thalidomide and bortezomib; two patients (cases of 5 and 7) died 16 and 31 months after developing myeloma (49 and 58 months after the initial diagnosis) and the other remaining patient is alive and receiving systemic therapy for his multiple myeloma (Table 2).

Table 1 Patients' characteristics and treatment outcome

Case	Age (yr) /sex	Tumor location	Tumor size (cm)	First presentation	F.U (month)	Treatment	Dose of RT (Gy)	PTMM	Survival status
1	37/F	Mandible	5	Pain and swelling	39	RT alone	50	-	ANED
2	48/F	Mandible	5	Pain and swelling	66	Surgery alone	-	-	ANED
3	61/F	Mandible	6	pain	79	RT alone	46	-	ANED
4	71/F	Mandible	5	pain and swelling	35	GTR + RT	40	-	ANED
5	52/M	Cervical spine	4	pain	33	RT alone	30	+	DOD
6	41/M	Cervical spine	3.5	pain	44	RT alone	40	+	AWD
7	45/M	Occipital bone	4.5	Mass and swelling	27	GTR + RT	48	+	DOD
8	60/M	Frontal bone	5	Pain and swelling	62	GTR + RT	50	-	ANED

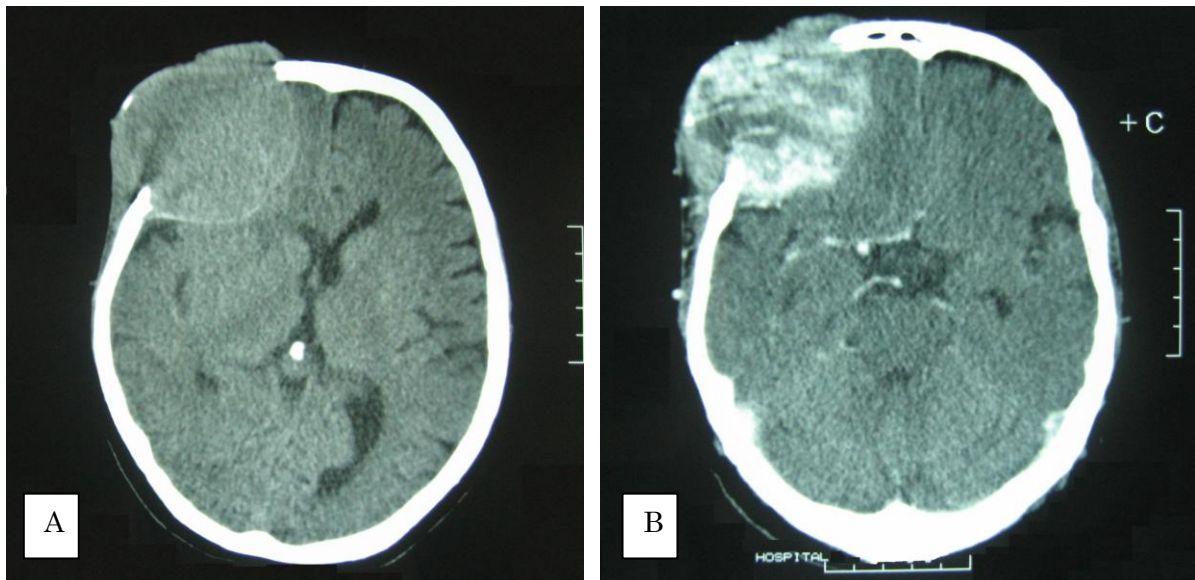


Figure 4 CT scan without (A) and with (B) contrast of the skull shows a large well defined osteolytic lesion in frontal skull bone (case 8).

Table 2 Presenting signs and symptoms for 4 patients with mandibular plasmacytoma

Signs and symptoms	NO
Pain	4/4
Mass or swelling	3/4
Teeth loosening	1/4
Infected teeth	1/4
Numbness	1/4



Figure 5 CT scan of the cervical spine shows a well demarcated lytic lesion in C2 vertebral body (case 6).

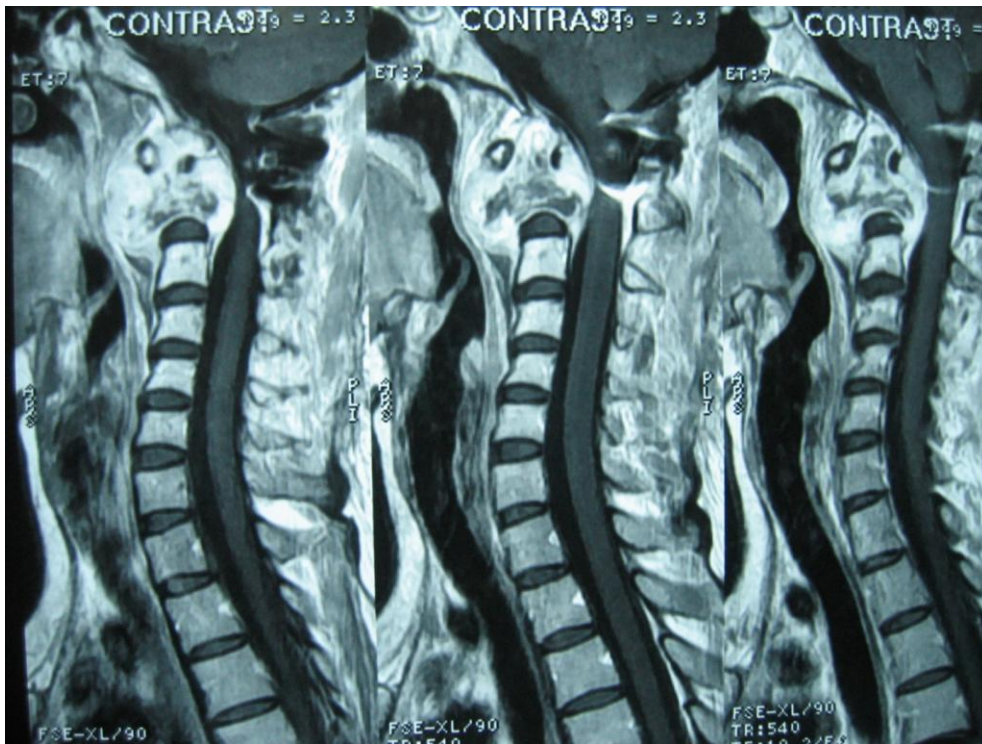


Figure 6 Sagittal gadolinium-enhanced T1-weighted MR images of the neck shows inhomogeneously enhancing soft-tissue mass in the C2 vertebral body (case 6).



Figure 7 Panoramic radiograph shows osteolytic lesion in right molar region of the mandibular bone with intraoral soft tissue component (case 3).

Discussion

The majority (83%) of the cases with solitary osseous plasmacytoma occur in the axial skeleton and skull and facial bones are rare locations for these neoplasms accounting for approximately 10-25% of all the primary sites for solitary osseous plasmacytoma [4,9,12]. There are very limited data regarding the solitary osseous (or bone) plasmacytoma of the head and neck in the literature. Moreover, most available reports include head and neck primary sites in the context of all solitary plasmacytoma and are usually mixed with the extramedullary plasmacytoma [2,4,5,12-18]. These neoplasms usually occur in the sixth and seventh decades of life. In the literature review, the median age of 946 patients in 4 studies was 62.5 (range 54-65) years [2,12,13,15]. In the present study, on the other hand, the median age of the patients was 52 years, which is about 10 years lower than that is reported in the literature. There is a sex-specific susceptibility difference to solitary osseous plasmacytoma. In all the reported series in the literature, men comprise a higher proportion of solitary osseous plasmacytoma sufferers compared to women, with a mean male/female ratio of 1.75 (range from 1.66 to 6.3) in 3 studies including 886 patients [2,12,13]. In the present study, there was no sex predilection which is not consistent with the average range of the literature review. Maxilla, skull, cervical spine, and mandibles were the most common primary sites for head and neck plasmacytoma in large reported series [2,4,12,16,19,20]. In 2003, Lae *et al.* reported clinicopathologic characteristics of large series of 33 cases with solitary osseous plasmacytoma (21 cases) or secondary myeloma involvement (12 cases) of jaw that were treated at the Mayo Clinic from 1923 to 1995. Mandible was the involved bone in five (24%) cases of solitary plasmacytoma and 5 cases (42%) of secondary myeloma involvement [19]. Ozsahin *et al.* reported a large series of 206 cases with solitary osseous plasmacytoma. Cervical spine, maxillary bone, and skull were the most common locations in head and neck region [12]. In 2011, Agostini *et al.* systematically reviewed and collected all the case reports and case series describing solitary plasmacytoma of the jaw in English language through PubMed from 1948 to 2010. They found only 50 cases of solitary

plasmacytoma of the mandible [6]. Mandible accounts for less than 5% of all solitary osseous plasmacytomas [2,4,6,12,16,19]. In the literature, the peak age and sex ratio of solitary mandibular plasmacytoma was similar to the other primary sites [6,19]. In our series, the patients' mean age was 54.3, which is consistent with other reports; however, all the patients were female that is on the contrary to other series in which male/female ratio was 2.5:1 [6,19,21].

Mandibular body, ramus, angle, molar, and premolar region were the most common locations in the reported series. These locations are consistent with bone marrow rich area in the mandible [6,19]. The involved area in our series also showed similar locations. Painful or painless swelling with a few weeks to several months duration was the most frequent signs and symptoms in the literature. On the other hand, infected or loose teeth, facial numbness, and paresthesia were reported as less frequent presentations [6,19,21]. Pain and swelling were the most common presentations in our series.

In imaging studies, mandibular plasmacytoma usually presented with well-circumscribed lytic lesion or destructive mass with soft tissue component with or without pathologic mandibular fracture [6,19,21,22]. In this series, all the patients presented with destructive mandibular mass with soft tissue component in 3 cases and pathologic fracture in the remaining patient. Radiologic differential diagnoses include infections, benign cysts, hyperparathyroidism, metastases, other rare primary malignant tumors, and granulomatous disease, such as Langerhans cell histiocytosis [23-27].

Given the rarity of this entity, there is no consensus regarding the standard treatment for the patients with solitary mandibular plasmacytoma. Both surgery and radiotherapy have demonstrated effective long-term local control in the literature. Surgical resection may be considered in the cases with small localized disease, pathologic fracture, or impending mandibular fracture for restoring the mandibular function and avoiding long-term mandibular deformity and late radiation sequelae. On the other hand, radiotherapy may be preferred in bulky diseases or the cases with significant soft tissue component in which surgery may be associated with remarkable functional and cosmetic complications. In addition, radiotherapy is the preferred choice in the

patients with poor performance status not fitted for surgical resection. In some patients, a combined approach may be used for better local control and functional preservation [4,6,7,9,18,28].

Following initial local treatment, most patients achieve prolong local control; however, progression to multiple myeloma remains the most common recurrent pattern and worst long-term outcome in the patients with solitary mandibular plasmacytoma. In the study by Lae *et al.*, the rate of progression to multiple myeloma was 43% after a median of 20.7 months [19]. However, Agostini *et al.* [6] found a rate of 12% which is significantly lower than the report by Lae *et al.* [18]; particularly compared to other solitary osseous plasmacytomas that progressed to multiple myeloma in 50-75% of the cases [5,12,21,27]. These discrepancies may be due to different patients' follow up rather than a true disagreement. In our series, 3 out of the 8 patients (37.5%) with head and neck solitary osseous plasmacytomas developed multiple myeloma.

Conclusion

This study suggests that solitary osseous plasmacytomas of the head and neck have a propensity to involve the mandibular bones and response well to effective local treatments of radiotherapy and/or surgery. These Patients tend to progress to multiple myeloma even years after the initial treatment.

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