DOI: 10.30476/DENTJODS.2019.44903

Case Series

Outcome of Surgery as Sole Treatment of Eosinophilic Granuloma of Jaws

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KEY WORDS
Bone disease;
granuloma;
Histiocytosis;
Curettage;

Received: June 2017;
Revised: January 2018;
Accepted: March 2018;

ABSTRACT

Langerhans cell histiocytosis (LCH) is characterized by the congregation of proliferating langerhans cells (LC). Langerhans cells are a part of dendritic cell system of primary immune response that is responsible for presenting antigen to lymphocytes. Being a rare disease, the total incidence of LCH is reported to be 1 in 2 million people. LCH mainly affects children and young adults, with a slight male predilection. LCH is clinically divided into three groups namely Letter-Siwe disease (multiple multi organ affecting LCH at very young age), Hand-Schuler-Christian disease (LCH of bone involvement exophthalmos and diabetes insipidus), and Eosinophilic granuloma (LCH of bone, solitary or multiple). The extent of involvement influences the treatment planning. In this retrospective study, we survey five patients with eosinophilic granuloma in jaws (bony LCH). The diagnosis was confirmed by tissue biopsy and histopathologic examination. Surgery and curettage of the lesions were carried out under general or local anesthesia. After surgery, the patients were examined clinically every 6 month in the first year and then once in a year. The overall outcome was excellent. According to the results, it can be concluded that surgical curettage of localized eosinophilic granuloma is an appropriate and sufficient treatment.

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Cite this article as: Nezafati S, Yazdani J, Shahi Sh, Mehryari M, Hajmohammadi E. Outcome of Surgery as Sole Treatment of Eosinophilic Granuloma of Jaws. *J Dent Shiraz Univ Med Sci.* 2019; 20(3): 210-214.

Introduction

Langerhans cell histiocytosis (LCH) is characterized by the infiltration and proliferation of dendritic cells, featured by normal Langerhans cells (Figure 1). Langerhans cells are a part of dendritic cell system, which is in charge of primary immune response to present antigen to lymphocytes [1-2]. LCH is a rare disease and its total incidence is reported to be approximately 1 in 2 million individuals, with a slight predilection for men. LCH mainly affects young adults [3]. The etiology of LCH is unknown yet.

LCH was known as histiocytosis X and included three diseases namely as Letter-Siwe (multi organ at very young age), Hand-Schuler-Christian (bone lesions, exophthalmos and diabetes insipidus), and Eosinophilic granuloma (bone affecting, solitary or multiple) [2, 4].

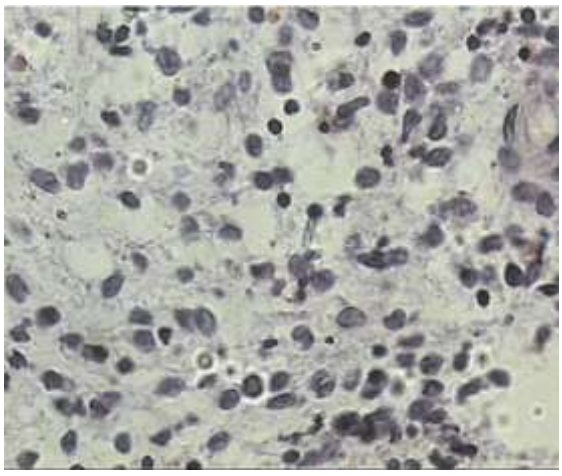

Figure 1: Histopathologic features of eosinophilic granuloma (H & E staining, 400X)

LCH bone lesions are categorized as either solitary eosinophilic granuloma (EG) or multifocal eosinophilic

granuloma. Eosinophilic granuloma as the most common form of LCH, can affect any bone, however, it is more common in the ribs, pelvis, skull, vertebrae, facial bones and long bones [1, 5]. Because of local expansion and destruction of the bone and pathologic fracture of the jaws, treatment of eosinophilic granuloma is crucial [3]. Patients with extensive disease and visceral organs involvement should undergo systemic chemotherapy.

Patients with eosinophilic granuloma can be managed by surgery, intralesional steroid therapy, low-dose radiation, and chemotherapy [1, 5]. Appropriate treatment, which depends on the phase of lesions and healing procedure, should either accelerate healing or degrade complications with any side effects [6]. This paper presents the results of the treatments in patients with eosinophilic granuloma of jaws. Five patients with eosinophilic granuloma of jaws, who had undergone surgery since 1992, were evaluated.

Cases Series

In this retrospective review, five patients (4 male and1 female) with eosinophilic granuloma of the jaws, referred to the first author and consequently underwent surgery and curettage of the lesions after obtaining informed consent, were evaluated. All the details regarding these cases are summarized in Table 1.The mean age of the patients was 19.2 (6-31) years. Mandible was involved in all the five patients.

However, there was maxillary involvement along with the mandible in one case. Additionally, bilateral mandibular involvement was observed in two cases. Pain and swelling were the most prevalent presentations of the disease, followed by asymmetry, tooth mobility, trismus, non-healing ulcers, and mandibular fracture.

After preparing appropriate panoramic radiographs and CT scans, diagnosis of eosinophilic granuloma was confirmed by biopsy. In two cases (numbers 1 and 2), excisional biopsy, curettage, and tooth extraction(s) were carried out under local anesthesia. For histopathologic examination, H&E staining was used. For the remaining three cases, surgery and curettage of the lesions were performed under general anesthesia after initial excisional biopsy. In three cases, the involved teeth were extracted and for the case with mandibular fracture, closed reduction was performed.

Six months later, the first follow-up session was held through taking a new radiography and clinical examination. Afterwards, the lesions were examined clinically every year. The mean follow-up period was 6.5 [1-13] years. After five years, one of the patients did not attend the next follow-up sessions. No signs or symptoms of recurrence were observed during follow-up examinations.

Discussion

Eosinophilic granuloma is a lesion with unknown etiology, characterized by solitary or multiple lesions of bone lesions that sometimes involves pulmonary system and it is reported to be most often in young adults and children [7-8] However, the diagnosis frequently is made in adulthood since many cases with the onset in childhood would develop to the adult life [9]. In the present study, two of the cases were diagnosed in the first decade (Figure 2). One of the cases was diagnosed during the third decade and two cases were in their fourth decade. Only one patient was female and males

Table 1: The details regarding the cases of study

No	Age	Sex	Site	Main symptom	X-ray features	Treatment	Complications	Years of follow up
1	30	M	4 quadrants	Non-healing ulcer, pain	Alveolar bone destruction	Biopsy of one lesion- curettage of others	Loss of involved teeth	5 years since 1992, then the patient did not come
2	31	M	Right lower quadrant,	Pain, lower lip paresthesia, mobility of the tooth No 46	Bone destruction around 46 with ragged borders	Excisional Biopsy with curettage and extraction of the involved teeth	Loss of involved teeth	15
3	7	F	Left mandibular retro molar area	Intra-oral swelling	Bone destruction in border of ascending ramus	Excisional Biopsy with curettage	Loss of 38	13
4	22	M	Bilateral mandibular body	Fracture following sport trauma	Bone destruction with fracture in mandibular bodies	Curettage and closed reduction	Nothing	1.5
5	6	M	Left mandibular angle	Facial swelling, moderate trismus, pain, asymmetry	Mild radiolucency on panoramic radiography, bone destruction in left mandibular angle with invasion to masseter muscle.	Excisional biopsy	Loss of 37	6

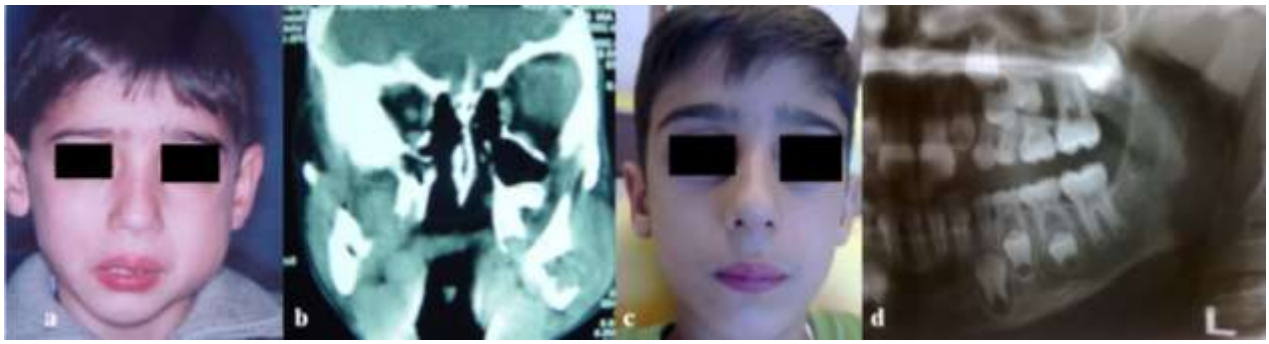

Figure 2a and b: Clinical and CT-scan features of one case. A 6-year-old boy with pain, swelling and trismus, **c and d:** The patient after excisional biopsy and tooth extraction that resulted in complete resolution of the lesion

were affected more frequently.

Eosinophilic granuloma can affect almost any bone but is more common in the pelvis, ribs, skull, vertebrae, facial bones, and long bones of extremities and the most common sites of involvement are skull and mandible [5-6, 8]. About 50% of all bone lesions of LCH are located in the skull and facial bones [3]. Howarth *et al.* [9] studied 340 patients with LCH and reported that the most common site was the skull. According to their study, 6.7% of the cases were occurred in the mandible and maxillary involvements were demonstrated in 1.2% of the cases, respectively [9]. Mandibular involvement was reported to be in 11% and 10-20% of the cases by Dinardo *et al.* [10] and Holzhauer *et al.* [11], respectively. Furthermore, posterior of the mandible is the most frequently assumed site and in the third decade of life [5, 7, 10-11]. In our study, all the five patients had mandibular involvement. In one patient, premolar region was affected and another hadpremolar-molar region involvement. One patient had simultaneous involvement of both jaws.

Eosinophilic granuloma might be asymptomatic and found out on routine radiographic evaluation or be presented with localized pain and swelling. According to the literature, pain is the chief complaint of patients [4, 8-9]. Other clinical symptoms consist of mobile teeth within affecting area, tooth pain, headaches, bleeding, sensational disturbances, gingival inflammation, mucosal ulcerations, and pathologic fractures [2, 3, 8,12]. In this study, the most common complaints of patients were pain and swelling. Although pain was present in all the patients, swelling and trismus in one patient were the main reasons for seeking treatment (Figure 2a, b, c and d). Lower lip anesthesia was present in two cases and one of the patients referred for the treatment of mandibular fracture (Figure 3a and b).

Radiographically, eosinophilic granuloma can imitate many conditions such as cysts, osteomyelitis, central giant cell granuloma, and malignancies. The radiographic characteristics include round or oval solitary intraosseous radiolucencies with periosteal new bone formations. Multiple, well-defined, non-sclerotic borders, a scooped-out appearance and mild root resorption, characterize lesion of alveolar process [3, 7-8]. In most of the cases in this study, radiologic evaluation revealed radiolucent lesions with bone destruction and ragged borders, resembling malignant conditions (Figure 4a). Since local expansion leads to bone destruction and pathologic fractures of the jaws, treatment of eosinophilic granuloma is critical [3]. There are sever-

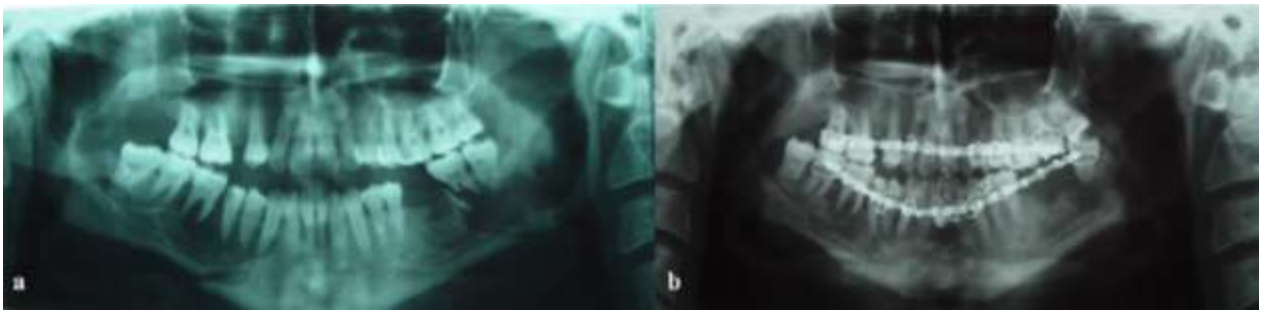

Figure 3a: Panoramic view of the case that had bilateral mandibular body fractures, **b:** Eight weeks after initial treatment, osteogenesis was obvious

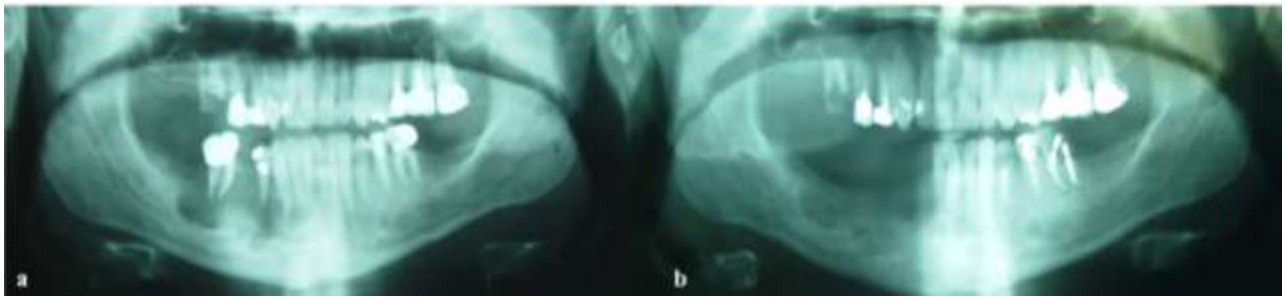

Figure 4a: Radiolucent lesions with bone destruction and ragged borders, resembling malignant conditions, **b:** After simultaneous excisional biopsy and curettage, no recurrence was detected

al approved management and treatment plans for eosinophilic granuloma of bone including vigorous surgical curettage, low-dose radiation, and chemotherapy. These procedures have been practiced either alone or in combination, showing appropriate outcomes [13-14].

Radiation therapy of eosinophilic granuloma is generally recommended for the treatment of unavailable lesions in the skull or spine. Moreover, this treatment might be endorsed for areas in which surgery might lead to dysfunction or compromising, and for large lesions in weight-bearing bones [7]. Radiation therapy also has been used as an adjunct to initial surgical curettage in the management of recurrent lesions [7, 14], however, many known side effects of radiation on the tissues, growth centers and dentition must be concerned.

Systemic chemotherapy is usually employed for more disseminated types of LCH. In localized lesions, direct injection of corticosteroids into the lesion has been reported to bereliable. Since eosinophilic granuloma of bone usually reactscourteously to curettage or local radiation, chemotherapy is generally proposed in failed approaches or in disseminated diseases [5, 7, 14].

Surgical procedures range from large resections toapproaches that are more conservative. LCH of the bone has been perceptibly managed with minimal treatment procedures, which usually contains biopsy and curettage [1]. Although most authors do not recommend surgical curettage for treatment of large lesions in weight-bearing bones due to the risk of pathologic fractures, this method of management is very appropriate for the lesions of the calvarium [7,9]. In most cases of maxillofacial LCH, surgery seems to be successful as the solitary treatment. Accessible lesions of the jaws are best managed by intraoral curettage. The teeth in the lesion that benefit from enough bone support might be retained in the jaws without influencing the prognosis of LCH [5,15]. To obtain a favorable treatment response, total removal of the lesions has not always been suggested. Reports of suitable response to biopsy as the solitary management procedure are available in the literature [16-17]. Key *et al*. [12] reported the lesions regressed spontaneously after biopsy of three cases of eosinophilic granuloma in the jaws. In the present study, one of the cases, a 6-year-old boy, had undergone excisional biopsy and tooth extraction for a lesion on the left mandibular angle area. Consequently, the diagnosis of eosinophilic granuloma was confirmed and the biopsy resulted in complete resolution of the lesion (Figure 2c and d). In another case with lesions in four quadrants of the jaws, incisional biopsy from one lesion led to spontaneous regression of that lesion and surgical curettage was performed for other remaining lesions. In other two cases, excisional biopsy and curettage were carried out simultaneously, which were sufficient and no recurrence was observed (Figure 4b).

The pathologic fracture as the complication of eosinophilic granuloma is rare in jawbones and occurs if the bone is seriously weakened, whereas this complication frequently affects long bones [7, 16]. The management of the patient with mandibular pathologic fracture is depended on two factors including treatment approach of the lesion and stability of the pathologic fracture. Primarily, treatment of the lesion is accomplished by a surgical curettage and subsequently the stability of mandibular fracture can beachieved [11]. One of the cases in this study had bilateral mandibular body fractures, which resulted from sport trauma (Figure 3a).The diagnosis of the lesions was made radiographically. Under general anesthesia, the lesions were exposed and curetted. Stabilization of the mandibular fracture was achieved through closed reduction and intermaxillary fixation. The definitive histopathological examination revealed eosinophilic granuloma. Eight weeks after the initial treatment, the patient was disease-free and

showed functional integrity of the mandible. In radiographic evaluation, osteogenesis was detected (Figure 4b). Solitary bone lesions are treated effectively by surgical excision. Bartnick *et al.* [15] reported surgery as the sole competent treatment in most cases of oral and maxillofacial LCH.

Conclusion

This paper presents the effectiveness of surgical curettage in eradication of eosinophilic granuloma in the jaws. Surgical curettage as a sole treatment for localized LCH lesions in jaws was sufficient and in periodic reevaluation, the patients were disease-free, without any recurrences. Despite the small sample of patients, the results of the present study showed that surgery is an effective treatment and it should be regarded as the first line in the management of localized LCH of the jaws.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

[1] Nakamura S, Bessho K, Nakao K, Iizuka T, Scott RF. Langerhans' cell histiocytosis confined to the jaw. J Oral Maxillofac Surg. 2005; 63: 989-995.

[2] Putters TF, de Visscher JG, van Veen A, Spijkervet FK. Intralesional infiltration of corticosteroids in the treatment of local isedlangerhans' cell histiocytosis of the mandible Report of known cases and three new cases. Int J Oral Maxillofac Surg. 2005; 34: 571-575.

[3] Watzke IM, Millesi W, Kermer C, Gisslinger H. Multifocal eosinophilic granuloma of the jaw: long-term follow-upof a novel intraosseous corticoid treatment for recalcitrantlesions. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2000; 90: 317-322.

[4] Moenning JE, Williams KL, McBride JS, Rafetto LK. Resorption of the mandibular condyle in a 6-year-old child. J Oral Maxillofac Surg. 1998; 56: 477-482.

[5] Roychoudhury A, Shah N, Parkash H, Mukhopadhyay S, Chopra P. Eosinophilic granuloma of the jaws. Br J OralMaxillofac Surg. 1998; 36: 380-383.

[6] Kessler P, Wiltfang J, Schultze-Mosgau S, Neukam FW. Langerhans cell granulomatosis: a case report of polyostoticmanifestation in the jaw. Int J Oral Maxillofac Surg. 2001; 30: 359-361.

[7] Whitcher BL, Webb DJ. Treatment of recurrent eosinophilic granuloma of the mandiblefollowing radiation therapy. J Oral Maxillofac Surg. 1986; 44: 565-570.

[8] Ardekian L, Peled M, Rosen D, Rachmiel A, Abu el-Naaj I, Laufer D. Clinical and radiographic features of eosinophilicgranulomain the jaws: review of 41 lesions treated by surgery and low-dose radiotherapy. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1999; 87: 238-242.

[9] Howarth DM, Gilchrist GS, Mullan BP, Wiseman GA, Edmonson JH, Schomberg PJ. Langerhans cell histiocytosis: diagnosis, natural history, management, and outcome. Cancer. 1999; 85: 2278-2290.

[10] DiNardo LJ, Wetmore RF. Head and neck manifestations of histiocytosis-X in children. Laryngoscope. 1989; 99: 721-724.

[11] Holzhauer AM, Abdelsayed RA, Sutley SH. Eosinophilic granuloma: a case report with pathologic fracture. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1999; 87: 756-759.

[12] Key SJ, O'Brien CJ, Silvester KC, Crean SJ. Eosinophilic granuloma: resolution of maxillofacial bony lesions following minimal intervention. Report of three cases and a review of the literature. J Craniomaxillofac Surg. 2004; 32: 170-175.

[13] Jones LR, Toth BB, Cangir A. Treatment for solitary eosinophilic granuloma of the mandible by steroid injection: report of a case. J Oral Maxillofac Surg. 1989; 47: 306-309.

[14] Wong GB, Pharoah MJ, Weinberg S, Brown DH. Eosinophilic granuloma of the mandibular condyle: report of three cases and review of the literature. J Oral Maxillofac Surg. 1997; 55: 870-878.

[15] Bartnick A, Friedrich RE, Roeser K, Schmelzle R. Oral Langerhans cell histiocytosis. J Craniomaxillofac Surg. 2002; 30: 91-96.

[16] Uckan S, Gurol M, Durmus E. Recurrent multifocal Langerhans cell eosinophilic granuloma of the jaws: report of a case. J Oral Maxillofac Surg. 1996; 54: 906-909.

[17] Dagenais M, Pharoah MJ, Sikorski PA. The radiographic characteristics of histiocytosis X. A study of 29 cases that involve the jaws. Oral Surg Oral Med Oral Pathol. 1992; 74: 230-236.