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Research paper

Alvogyl versus zinc oxide eugenol after saline irrigation as a treatment for alveolar osteitis

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Abstract

Background: Alveolar osteitis is one of the most common post-odontectomy complications. An agreement is lacking regarding the relative merits of various treatment methods. Of these treatments were alvogyl and Zinc oxide eugenol after saline irrigation.
Objectives: The aim of the current study therefore was to evaluate the efficacy of both agents.
Methods: A total of 987 patients were categorized into 4 groups (I, II, III, and IV) according to pain severity (mild, moderate, severe, or agonizing, respectively). Each group was randomly divided into two subgroups according treatment method: Alvogyl (Alv) and Zinc oxide eugenol following saline irrigation (I+Z).
Results: Although, Alv was palliative in group. I, I+Z was curative in group, I and palliative in group II. Both agents were ineffective otherwise.
Conclusion: The author recommends I + Z over alv.

Keywords: *Alveolar; Alvogyl; Eugenol; Osteitis, Zinc*

1. Introduction

Alveolar osteitis (AO) is the most common complication of dental extraction (Kolokythas, Olech and Miloro 2010). Pain is the most important aspect of OA according to Fazakerlev and Field (Fazakerlev and Field 1991), and although avariety of treatment methods have been attempted to treat or alleviate this pain, considerable controversy exists regarding their relative efficacies (Faizel et al. 2014; Alexander 2000; Blum 2002). Despite of the fact that Alvogyl (alv) was recommended by Alexander (Alexander 2000) and Bloomer (Bloomer 2000), packing extraction socket (ES) with Zinc Oxide Eugenol after being irrigated with normal saline(I+Z) was the recommended agent by Bloomer (Bloomer 2000), Ahmad (Noroozi AR and Philbert RF 2009), and Blum (Blum 2002). Faizel et al stated that until their study published in 2014, there were no comparative studies for two or more agents for this condition (Faizel et al. 2014). The aim of the current study was to evaluate the efficacy of both agents (alv and I+Z) in a large population of patients, utilizing definitive parameters for diagnosis and outcome assessment.

2. Patients and methods

The author examined patients in the Hosh Isa district (Al-Behera, Egypt)who presented with pain after dental extraction during the years 2003through 2011 and were diagnosed of having AO ("dry socket"). These patients were divided into 4 groups according to pain severity (Table 1).

Table 1: Pain Severity Levels Used to Assign Patients to Groups.

Severity of Pain		Description
I	Mild	Patients had annoying (bothering) pain during most awaking hours but did not need analgesics.
II	Moderate	Patients had pain that required and was relieved by analgesics (a maximum of three "bills" per day of the analgesic type that is usually taken by the patient) but that did not interfere with normal daily activities.
III	Severe	Patients had pain that was not relieved by analgesics (a maximum of three "bills" per day of the analgesic type that is usually taken by the patient) but that did not interfere with normal daily activities but that did not interfere with normal daily activities (e.g., patients did not have to leave work and did not awaken during sleep).
IV	Agonizing	Patients had pain that was not relieved by analgesics (a maximum of three "bills" per day of the analgesic type that is usually taken by the patient) but that did not interfere with normal daily activities and that interfered with normal daily activities (e.g., the pain caused the patients to leave work or to awaken during the night).

The patients within each group were then randomly divided into two subgroups, each of which named after the treatment modality that it would receive. All patients underwent brief saline irrigation of the socket with 2ml normal saline (0.9% solution) to remove any debris. For the first subgroup, Alvogyl (Septodont Inc, Wilmington, DE, USA) (Alv) was lightly packed into the ES. For patients in the second subgroup (I + Z), the extraction socket (ES) was irrigated with 15mL warm normal 0.9% saline and then lightly packed with a cotton pellet impregnated with freshly prepared zinc oxide eugenol paste (Alamia gp, Cairo, Egypt) (ZOE).

N.B.: If any packing was needed for more than 1 day due to existence of pain mandating medical intervention, packing was replaced daily.

This study complied with the Declaration of Helsinki, and the regional ethical review board of the research unit at Hosh Isa Medical Center approved the study.

Inclusion criteria:

1) Pain after simple dental extraction (forceps extraction).
2) Diagnosis of AO (dry socket).
3) Age 25 to 55 years.

Exclusion criteria:

1) Signs or symptoms of an infected socket.
2) Systemic or local conditions hindering or otherwise affecting healing.
3) Disorders causing bleeding tendencies.
4) Tooth extraction peri-menstrually.
5) Pregnancy, lactation, or use of oral contraceptives.
6) Hormonal disturbances.
7) Smoking.

The effectiveness of the treatment modality was evaluated according definitive criteria as shown in Table 2.

Table 2: Parameters for Assessing Treatment Effectiveness

Designation	Criteria
Curative	Treatment was followed by a pain-free day without other medication (or pain became too slight to be annoying or to lead the patient to seek medical or dental intervention).
Palliative	Treatment was followed by decreased pain severity but pain remained at least annoying, or treatment was followed by a decrease in the dose of analgesics taken, or both.
Ineffective	Treatment was not followed by noticeable diminution in pain severity (and pain remained at least annoying), or the treatment had a palliative effect that was not maintained to the end of a 5- minute visit.

The total time needed after each treatment for the patient not to seek medical or dental intervention was recorded in each group in order to assess effectiveness of each method. The potency of an agent was considered high if that period was2 days or less, moderate if it was3 or 4 days, and low if it was5 days or more, as the total healing period typically ranges from 7 to 10 days (Gowda et al. 2013). Any agent who could achieve a curative effect within 1 day, thus requiring only a single application, was considered a definitive therapy.

3. Results

A total of 987 patients were included in the current study. The numbers of patients in groups I, II, III, and IV were 407, 345, 195, and 40, respectively. The effectiveness of each treatment modality in each group is shown in Table 3.

Table 3: Number of Patients in Each Treatment Subgroup with Each Level of Effect

Group	Effect*	Treatment modality** Alv	I+Z
I	C	2	174
	P	122	16
	In	92	1
II	C	0	2
	P	94	120
	In	79	50
III	C	0	1
	P	1	53
	In	96	44
IV	C	0	0
	P	1	4
	In	19	16

*: Effect C=curative, P=palliative, In=ineffective

**: Alv=Alvogyl, I+Z=saline irrigation+ zinc oxide eugenol

However, table 4 shows the analysis of those data depicted in table 3. The palliative, ineffective, palliative/ineffective (when the difference in-between was statistically insignificant) and curative/palliative (when the difference in-between was statistically insignificant) results could be collectively termed as noncurative.

Table 4: Effect of Each Treatment Modality in Each Group

Group	Treatment modality* Alv	I+Z
I	P (0.0471)	C (<0.001)
II	P/In (0.2871)	P (<0.001)
III	In (<0.001)	P/In 0.42
IV	In (<0.001)	In 0.01

*: Effect C=curative, NC=non-curative, C/NC=curative or non-curative, P=palliative, In=ineffective, C/P=curative or palliative, P/In=palliative or ineffective

P values of Fisher's exact test are shown in brackets

Tables 5 to 7are concerned with the potency of the curative and palliative agents.

Table 5: Potency of Agents in Group I

	C/P	1 day	2 days	3 days	4 days	5 days	Median	Potency
I+Z	C	3	3	76	50	42	4	Moderate
Alv	P	8	7	27	45	35	4	Moderate

C: Curative, P: Palliative

Table 6: Potency of Palliative Agents in Group II

	1 day	2 days	3 days	4 days	5 days	6 days	Median	Potency
I+Z	0	0	30	58	28	4	4	Moderate

Table 7: Determination of which Curative Agent Is a Definitive Therapy in All Groups

Group	Agent	1 day (once)	>1 day	P value*	Decision
I	I+Z	3	171	<0.001	not definitive

*: P value for Fisher's exact test

Although I+Z was curative in group. I, it was palliative in group II. Alv was palliative for group, I patients. Otherwise, both agents failed to show any positive results. Both agents were of moderate potency either when the agent was curative or palliative.

No agent was recorded as a definitive therapeutic agent.

4. Discussion

Since AO is by far the most common complication of odontectomy (Kolokythas, Olech, and Miloro 2010), a plethora of treatment protocols to have been suggested to prevent and to treat this condition. However, results are quite controversial (Faizel et al. 2014; Alexander 2000; Blum 2002). Faizel et al stated that before 2014, there were no comparative studies for two or more agents for this condition (Faizel et al. 2014). Therefore, the author conducted the current large prospective study comparing alv and I+Z.

In order to study as homogenous group of patients as possible, the study population was restricted to otherwise healthy patients who underwent simple (forceps) extraction and did not have any known conditions affecting their healing capacities, since AO seems to reflect an interference during the healing process, resulting in blood clot loss (Birn 1973). The inclusion and exclusion criteria were determined accordingly.

To my knowledge, no published studies of AO treatment have classified patients according to pain severity or analyzed the outcome according to definitive assessment criteria. However, in the current study, patients were categorized into 4 major groups according to pain severity. The severity rating was not based on the patient's description (for example, use of words like "mild" or "severe") or on the patient's estimation on a visual pain analogue scale; rather, it relied on behavioral measures: the need for analgesics and whether the condition interfered with daily life. On as-

sessing the outcome of treatment methods in the current study, only 3 possibilities, all well-defined, were considered. These features, in addition to the size of the population, appear unique to the current study.

Although Alv was palliative in group, I patients, that palliative effect was lost in more difficult cases (those cases of group II, III and IV).Whereas, I+Z was curative in group, I, it was palliative only in group II. Furthermore, I+Z lost its positive effect in more severe cases. Since alv is mainly composed of Eugenol, butamben and iodoform (Alvogy lMaterial Safety Data Sheet, Septodont, 2011), it seems that saline is a more synergistic agent to Eugenol than butamben and idoform. Therefore, in the light of the current study, the author recommends I + Z rather than Alv. That recommendation isin disagreement with Faizel et al, who supported Alvogyl over, I+Z; however, however, they used the agent after irrigating the socket with warm normal saline in both groups (Faizel et al. 2014), but they did not record the amount of saline they used. I+Z was the treatment recommended by Bloomer (Bloomer 2000), Nozoori and Philbert (Noroozi AR and Philbert RF 2009), and Blum (Blum 2002); however, Alvogyl was recommended by Alexander (Alexander 2000) and Bloomer (Bloomer 2000). It might be important to limit the author's recommendation for I + Z over alv to mild and moderate pain cases; since both agents were considered ineffective in severe and agonizing pain cases.

5. Conclusion

Although there has been no generally agreed-on treatment of choice for alveolar osteitis, alv and I+Z were recommended by more than one author. Furthermore, until 2014there were no comparative studies for two or more agents. In the current large prospective study, I+Z was more effective than alv in mild and moderate cases. However, both agents were ineffective for severe and agonizing pain cases. Thus, the author recommends I+Z over alv.

The author declares no conflict of interest.

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