

FREQUENCY AND COMPARISON OF DIFFERENT REGIMENS FOR THE PREVENTION OF DRY SOCKET AT PRINCE HASHEM HOSPITAL, JORDAN

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ABSTRACT

Many dental extractions were done in the maxillofacial and oral surgery clinic under local anesthesia at Prince Hashim Hospital in Zarka without any complications. Very few dental extractions resulted in some complications. One of the most serious and painful complication was dry socket which can be defined as a condition in which blood clot is dislodged and/or disintegrates with the production of a foul odor and severe pain but no suppuration. Many procedures and number of materials were tried in the management of such entity. The main aim of this prospective study was to investigate the frequency of dry socket. Hyaluronic acid gel (Gengigel) and Alvogyl were used as postsurgical dressing and compared with controls. The study group consisted of 570 patients with a mean (\pm SD) age of 40.27 ± 15.75 years. Two hundred eighty five were male patients with a mean (\pm SD) age of 42.30 ± 16.50 years compared to 285 female patients with a mean (\pm SD) age of 38.25 ± 14.72 years. The difference in mean age between both groups was statistically significant ($P < 0.05$, *t*-test). Age range was 12-85 (average of 73) years. Alvogyl was used for 187 (33%) patients, Gengigel was used for 241 (42%) patients while 142 (25%) patients were controls. The difference in mean age between all groups was statistically significant ($P < 0.05$, *t*-test).

It can be concluded from this study that there was significant reduction in the prevalence of dry socket due to use of postsurgical dressing materials like alvogyl and Gengigel. However, all materials have the potential to cause local and systemic adverse reactions. It is therefore important to be aware of the constituents and effects of these materials on the oral tissues. The prevalence of dry socket was significantly seen in smokers than in non-smokers.

Key Words: Dry socket, Alvogyl, Gengigel.

INTRODUCTION

Dry socket literally mean dry appearance of the extraction site after washing out the blood clot which was first described by Crawford in 1896.¹ There is a postoperative pain at the extraction site that can be

severe within two to four days of extraction, blood clot within the alveolar socket may be completely or partially disintegrated with possibility of halitosis.² As far as medical terminology is concerned, many terms were used to describe this condition such as localized osteitis, alveolar osteitis, alveolitis, alveolitis sicca dolorosa, localized alveolar osteitis, fibrinolytic alveolitis, septic socket, necrotic socket, alveolagia.³

Different studies have shown variations in the clinical picture and prevalence of dry socket. Clinical features include local signs such as open socket covered by food debris, halitosis, severe throbbing pain that may radiate to the surrounding structures like nose, ear, and eye according to the extraction site, tender inflamed gingiva, pus formation and regional lymphadenitis. Systemic involvement may include fever, insomnia and dizziness.^{4,5} Dry socket is more common in females than

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in males. It occurs in 0.5-5% of routine dental extractions and 25-30% in extractions of impacted mandibular third molars.⁶ Clear etiology of dry socket is unknown, but a number of predisposing factors have been described in the literature such as smoking, trauma, gender, extraction site, vasoconstrictors, microorganisms, oral contraceptives and radiotherapy.⁷⁻¹¹

The above predisposing factors in summary suggest a number of mechanisms that help explain the occurrence of dry socket which include delayed healing, increased fibrinolytic activity, microvascular thrombosis and peripheral ischemia that decreased blood supply to the extraction site. In the literature, many prophylactic measures have been adopted against dry socket. Some of these are topical and other are systemic. These include the use of anti-inflammatory and antibacterial agents, antiseptics, steroids, obtundent dressings, and clot support agents.^{12,15}

Eugenol acts as an obtundent. It was found that eugenol causes local irritation and delayed wound healing. Commercial dressing Alvogyl® is available which contains eugenol, which is to be replaced every two days.¹⁶ Immediate use of medicated packing reduced the incidence of Alveolar osteitis in patients with impacted third molars. The medicated packing consists of Petroleum jelly, Balsam of Peru and Eugenol. The incidence of Alveolar osteitis was 8% in sockets which were immediately packed with medicated dressing and 26% in sockets which were not immediately packed.¹⁷ Alvogyl is a proprietary material that has butamben, iodoform and eugenol as its active ingredients. It is primarily used for the treatment of dry socket. Butamben is an ester local anaesthetic with the chemical name butyl 4-aminobenzoate. Iodoform is an iodine-based antimicrobial agent. Eugenol is an essential oil, which is derived from numerous plants, including cloves.¹⁸⁻²³ The aim of this study was to determine the frequency of dry socket and to find out a good remedy which could reduce the frequency of this condition.

METHODOLOGY

A prospective cross sectional study involved 570 patients, 285 males and 285 females, between the ages

of 12 and 83 years of Jordanian patients who attended the oral and maxillofacial clinic at Prince Hashem Ben Al-Hussein Military Hospital, Zarqa/ east of Jordan during 2014, seeking dental extraction of hopeless permanent teeth. These cases were already diagnosed and appointments were given for such purpose. Informed consent was obtained from the patients.

Gengigel and alveogyl were the topical agents that have been used intra-alveolar post extraction. 10ml of gel contains Hyaluronan 200mg The main ingredient in Gengigel, Hyaluronan. It is an element naturally found in the body's connective tissues and acts as a barrier and repairs any damage. It is administered topically. Alveogyl is a paste for alveolar surgical dressing after tooth extractions. It contains with Penghawar fibers. The paste promotes haemostasis by compression and protects from superinfection (alveolar osteitis) by its barrier effect. Introduced into the socket. Alveogyl easily adheres to the alveolus due to its fibrous consistency. Assisted by the patients tongue movements, it gradually self eliminates without an intervention by the practitioner as the normal healing of the wound takes place.

The exclusion criteria for this study were the following: Patients who were treated and have been given any medication 4 days before the extraction; patients with contra-indications for surgery.

A clinical record was taken and complete medical history was filled. Each patient was given score of 1 for past or present chronic medical illness like diabetes mellitus or hypertension, smoking, extraction of lower wisdom tooth, and pain 2-4 days postoperatively. At the same time, patient with free medical history, non-smoker, extraction of other teeth, and with no signs of dry socket was given a score of 0. No patient was given any antibiotics or analgesics preoperatively or postoperatively.

The main variable was evaluated as, whether post-operative alveolitis appeared or not, using the diagnostic criteria specified by Blum,² postoperative pain in and around the extraction site, which increases in severity at any time between one and 3 days after

TABLE 1: STUDY SUBJECTS ACCORDING TO AGE, GENDER, MATERIAL USED AND SMOKING HABIT

Factors	Male	Female	Total
Age(years)	42.30±16.50	38.25±14.72	40.27± 15.75
(mean± SD)	285 (50%)	285 (50%)	570
Gender male/female	Alveogyl	Gengigel	Control
Material used Percentage	187 (33%)	241 (42%)	142 (25%)
Smokers	96 (17%)	30 (5%)	126 (22%)
Non-smokers	189 (33%)	255 (45%)	444 (78%)

TABLE 2: TOOTH LOCATION * SIGNS AND SYMPTOMS. CROSS TABULATION

Count		Signs and symptoms		Total
		Free	Pain drysocket	
Extraction	Other teeth	444	26	470
	Wisdom teeth	90	10	100
Total		534	36	570

P=0.095

TABLE 3: MEDICAL HISTORY * SIGNS AND SYMPTOMS. CROSSTABULATION

Count		Signs and symptoms		Total
		Free	Pain drysocket	
Medical history	Free	422	24	446
	DM, HT	112	12	124
Total		534	36	570

P=0.082

TABLE 4: MATERIAL USED * SIGNS AND SYMPTOMS. CROSS TABULATION

Count		Signs and symptoms		Total
		Free	Pain drysocket	
Medical history	Nothing	127	15	142
	Alveogel	227	14	241
	Gengigel	180	7	187
Total		534	36	570

P=0.038

TABLE 5: SMOKING HISTORY * SIGNS AND SYMPTOMS. CROSS TABULATION

Count		Signs and symptoms		Total
		Free	Pain drysocket	
Medical history	Non-smoker	428	16	444
	Smoker	106	20	126
Total		534	36	570

P=0.0

TABLE 6: GENDER * SMOKING HISTORY. CROSS TABULATION

Count		Signs and symptoms		Total
		Non-smoker	Smoker	
Gender	Female	255	30	285
	Male	189	96	285
Total		444	126	570

P=0.0

TABLE 7: GENDER * SIGNS AND SYMPTOMS. CROSSTABULATION

Count		Signs and symptoms		Total
		Non-smoker	Smoker	
Gender	Female	271	14	285
	Male	263	22	285
Total		534	36	570

P=0.16

TABLE 8: MEDICAL HISTORY * SMOKING HISTORY. CROSS TABULATION

Count		Signs and symptoms		Total
		Non-smoker	Smoker	
Medical history	Free	349	97	446
	DM, HT	95	29	124
Total		444	126	570

P=0.7

the extraction accompanied by a partially or totally disintegrated blood clot within the alveolar socket with or without halitosis.

The patient was the unit of analysis in this study. A descriptive statistical study (mean, standard deviation) was carried out on the measurements of variables collected. Normality of the distributions for the variables number of carious teeth and age was measured by test of normality (p-p plot). The metric data (patients age) were averaged for all patients. Statistically significant differences between group means were tested using student t-test. The Chi-square distribution or Fisher's exact test where appropriate were used when concerning proportions. Simple Pearson's correlation was used for the study of possible association and interrelationships between medical history, smoking, type of extracted tooth, medication used and signs of dry socket. The level of significance was set at P<0.05.

RESULTS

As shown in Table 1 the study group consisted of 570 patients with a mean (\pm SD) age of 40.27 ± 15.75 years. Two hundred eighty five were male patients with a mean (\pm SD) age of 42.30 ± 16.50 years compared to 285 female patients with a mean (\pm SD) age of 38.25 ± 14.72 years. The difference in mean age between both groups was statistically significant ($P < 0.05$, t-test). Age range was 12-85 (average of 73 years) years. Alveogyl was used for 187 (33%) patients, Gengigel was used for 241 (42%) patients while 142 (25%) patients were controls. Smokers in this study were 126 (22%) patients; 96 (17%) were males while 30 (5%) were females. Non-smokers were 444 patients. The difference between both groups was statistically significant, Chi square test $P < 0.05$.

The prevalence of dry socket in this study was 0.063; 0.059 in teeth other than lower wisdom teeth while in lower wisdom teeth it was 0.11. The difference between both groups was not statistically significant Table 2.

As far as medical history was concerned, 12 out of 112 patients were with diabetes mellitus or hypertension and dry socket (prevalence = 0.11), but the difference was not statistically significant. Table 3.

Two hundred and forty one patients were treated with alveogyl, 14 of them were with dry socket, while 187 were treated with gengigel, 7 of them were with dry socket. Controls were 142, 15 of them were with dry socket. The difference between all groups was statistically significant, $p < 0.05$, Chi square test. Table 4.

Thirty females and 96 males were smokers; the difference between both groups was statistically significant ($P < 0.05$). Smoking had significant association with incidence of DS ($P < 0.05$). In contrast, age, gender, medical status had no significant association with the incidence of DS ($P > 0.05$). Table 7 and 8.

DISCUSSION

The result of the current study revealed that incidence rate of DS following non-surgical extraction of permanent teeth was 6.3%. This finding is in compliance with the incidence rate between 0.5%- 5% and 1%-37.5% for routine dental extraction and surgical extractions of mandibular third molars, respectively, in literature reported in some previous studies. Some other studies showed that the incidence of dry socket has ranged from 1% to 4% of extractions, reaching 45% for mandibular third molars.²⁴⁻²⁹ In one study the peak prevalence of dry socket was in 18 to 33 year age group and was 7.9% compared to 2.7% in patients whose ages ranged from 34 to 49 years and 4.3% in patients who were older than 50 years. None of the patients under 18 years of age developed dry socket. These differences were statistically insignificant. In another study the

peak age in the incidence has been reported 20 to 40 years old in some studies.^{25,28,29-31} In the current study there were no statistical differences in incidence of DS in age groups. However, third and fourth decades of life had the highest incidence which was in consistency with the results of previous studies. Although the exact reason is unknown, fewer periodontal diseases and higher compaction of alveolar bone in this age group could lead to higher trauma during extraction and higher incidence of DS.

There exists conflicting reports regarding the effect of gender on DS. Amaratunga and Senaratne³² found that incidence of DS in women was 2.4 times than in men. In addition, Tjernberg³³ found the proportion of female to male 5 to 1. In the current study there were no statistical differences in incidence of DS in gender groups, 14 (0.05) females versus 22 (0.08) males were with DS. However, some other studies revealed that gender is not an effective factor in incidence of DS.^{29,34} The findings of the current study are in accordance with the results of later reports as no association was observed between DS and gender. In the current study relationship was found between smoking and the development of DS. This difference was statistically significant ($P = 0.0$). These findings are in accordance with the results of other studies. Larsen reported that smoking was one of the most effective factors in DS incidence.³⁵ It has been observed that healing of extraction socket is significantly lower in smokers when compared to non-smokers.¹² In contrast, Hermes et al reported that smoking has no influence on the incidence of DS. The higher incidence of DS among smokers could be related to suction and heat production during smoking. Smoking has been shown to reduce neutrophil chemotaxis and phagocytosis, and impede production of immunoglobulin. Nicotine is absorbed through oral mucosa and hence acts as a vasoconstrictor.³⁷ Although some studies have reported relationship between some medical diseases and incidence of DS. In this study 12 out of 112 patients with blood hypertension and or diabetes mellitus developed DS compared to 24 out of 422 medically free patients. This difference was not statistically significant ($P = 0.08$) the results of the current study did not support this association; which was in agreement with the study of Nusair and Younes.²⁹ Oginni²⁴ reported that incidence of DS in mandible extractions is 2.5-3 times more than in maxilla. In present study a significant association between DS and tooth location was recorded which was in compliance with the results of Oginni.³⁴ However, in the current study the incidence of DS following mandibular wisdom extractions was 11.1% compared to 6.3% in other locations. The difference between all groups was statistically significant ($P = 0.038$).

CONCLUSION

It can be concluded from this study that there was significant reduction in the prevalence of dry socket due to use of postsurgical dressing materials like alveogel and Gengigel. However, all materials have the potential to cause local and systemic adverse reactions. It is therefore important to be aware of the constituents and effects of these materials on the oral tissues. The prevalence of dry socket was significantly increased in smokers than in non-smokers.

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