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JOURNAL OF Gynecological Research and Obstetrics OPEN ACCESS JOURNAL

ISSN: 2581-5288 DOI: https://dx.doi.org/10.17352/jgro

Research Article

Managing vomiting in the third trimester of pregnancy during fixed prosthodontic treatment. A case report and review of the literature

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Received: 11 January, 2022
Accepted: 25 January, 2022
Published: 27 January, 2022

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Keywords: Pregnancy; Pregnant; Retching; Vomiting; Gag reflex; Prosthetic restorations; Prosthodontics; Fixed prosthodontics; Dental implant; Crown; Women

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Abstract

Pregnancy is a specific and critical period in a woman's life. Some pregnant women face difficulty when performing effective oral hygiene care due to pregnancy-related vomiting symptoms. A hypersensitive vomit reaction in the third trimester of pregnancy is not frequent and may prevent the dental provider from successfully completing critical clinical stages resulting in poor treatment outcomes. Once pregnant women suffer an unpleasant gag reflex experience in a dental office, they may become phobic, delaying or postponing their dental treatment.

The purpose of this article is to report a case of a 32-year-old woman, primigravida in the third trimester of pregnancy (32 weeks), partially edentulous with an exaggerated vomiting reaction, focusing on successful clinical management using a simple but effective table salt technique and proper fixed prosthesis design, as also to discuss the etiology, clinical symptoms and consequences of vomiting associated with late pregnancy during the dental, especially prosthodontics , treatment in such cases.

Introduction

Rehabilitation with dental prosthetic restorations and implants is an important and commonly accepted treatment in dentistry to restore the oral cavity of partially or completely edentulous patients functionally and esthetically [1-9].

Pregnancy is a specific and critical period in a woman's life due to hormonal, physical, and emotional changes [10]. Some pregnant women face difficulty when performing effective oral hygiene care due to pregnancy-related nausea and vomiting symptoms during the first trimester [11-13], while this is unusual in uncomplicated normal pregnancies in the third trimester of pregnancy.

Nausea and vomiting of pregnancy (NVP), which is a reflex of the expulsion of the content of the stomach or intestine or both [14,15], is a usual medical symptom in pregnancy with significant, in some cases, psychological and physical complications [16]. The NVP symptoms appear in the majority (90%) of pregnant in the first trimester of gestation. Some pregnants, due to other medical conditions, may experience nausea and gagging [16,17], especially in the second or third trimester of pregnancy.

In a small number of pregnants, late nausea and vomiting (late NVP) occur later than 20 weeks of gestation (20% to 25% of pregnants) [15,18-21] with a variety of symptoms as morning sickness or Hyperemesis Gravidarum (HG) in 0,5%-3% of cases, that may need hospitalization [16,22,23].

The symptoms of nausea and vomiting in late pregnancy after 30 weeks is a rarely studied phenomenon in uncomplicated pregnancies [15].

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The NVP could be considered a multifactorial problem. Because of the poorly understood etiology of NVP, a wide spectrum of theories involve hormonal, vestibular system, psychological, gastrointestinal, genetic, hyperolfaction, and evolutionary factors as possible causes [24].

In general, vomiting occurs in some cases during dental treatment and equivalent therapeutic procedures (e.g., tooth preparation, impressions). It could be, especially for female patients, a difficult, distressing problem or even impossible to perform dental treatment [25-29]. Severe vomit reaction may cause problems during the clinical stages of fabrication of dental prostheses [30]. A severe vomit reaction may upset the patient and lead to avoiding routine dental treatment, proper oral hygiene, and finally tooth loss [26,29,31-33].

Vomiting management depends mainly on treating the cause than the symptoms. Detailed medical history and discussion with the pregnant woman, as also a detailed examination, help the dental practitioner to identify the cause [34].

This case presentation aims to describe the successful management of the vomiting reaction in the third trimester of pregnancy (32 weeks), something unusual for an uncomplicated pregnancy in a woman who needed a wide and specific dental restoration and proper fixed prosthesis design, using a simple but effective table salt technique. The relevant literature is also reviewed.

Case presentation

A 32-year-old woman, primigravida in the third trimester of pregnancy (32 weeks), with a free previous medical history and a present normal pregnancy, consistent by the ultrasound (u/s) examination and normal laboratory results, presented to our dental clinic for restoring three upper posterior teeth. The patient's main complaint was her chewing difficulty due to the first upper premolar's pain on the left side and the previous restorations of the right maxillary teeth. The pregnant was very apprehensive concerning treatment due to previous experience. She also reported discomfort when items such as a toothbrush or dental mirror were in her mouth because of her retching reaction. Consequently, the pregnant has visited the dental practitioner only to receive emergency treatment. After having discussed the case with her obstetrician who encouraged her to proceed and after a thorough consultation and her strong urge because of her free medical history, as also because there were no contraindications concerning medication, X-rays and the implant placement and prosthodontic procedures, she eventually decided to solve her functional and esthetic oral problems in the upper jaw.

Her clinical examination revealed multiple restored teeth in both arches poor oral hygiene, and a medium caries rate (Figures 1,2). The referring periodontist diagnosed localized gingivitis. A dental cone beam computed tomography (CBCT) with a prosthodontic radiographic template and periapical X-rays were performed only when needed during the dental clinical stages by taking always all the protective measures during the pregnancy. The oral local anesthetic (mepivacaine 3%) was used

Figure 1: Initial maxillary and mandibular teeth before prosthodontic therapy.

Figure 2: Initial maxillary teeth before initial therapy.

very carefully only when needed, and with a controlled total dose during the dental procedures. The non-restorable upper left first premolar was extracted and a dental implant (Biomet 3i™ - 4,1mm diameter*10mm length tapered internal connection) was placed, after the periodontist's recommendation, because of recurrent episodes of inflammation and often, strong pain of the premolar. Conservative periodontal therapy and CAMBRA (caries management by risk assessment) protocol were used [35].

Following the initial therapy, the missing teeth were the maxillary first premolar on the left, and the mandibular second molar on the left. Temporomandibular disorder symptoms or signs were not observed during a clinical examination.

Two conventional single crowns and a single cement-retained implant crown were planned as a treatment.

At the beginning of definitive prosthodontic treatment, a thorough medical and dental history was recorded, and trigger zones were identified with a ball burnisher. An immediate retching reaction was provoked by the burnisher and the mirror or fingers when touching the tongue and the palate.

The use of table salt as an immediate behavioral management technique was advocated to improve pregnant's tolerance during appointments and impression taking. The pregnant woman was instructed to extend her tongue, and apply salt to the tip of her tongue for approximately 5 seconds (Figure 3).

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Impressions trays were delicately and gently inserted, and contact with trigger zones was avoided. The needed preliminary diagnostic impressions were performed -in order to construct, with the resulting casts, the dental radiographic template for the CBCT already mentioned and for the provisional fixed restorations-, using stock trays and fast-set irreversible hydrocolloid impression material (Kromopan; Kromopan USA Inc., Morton Grove, IL) in a thick mix to minimize posterior flow and time. The resulting diagnostic casts were fabricated using type III dental stone.

Mouth and tooth preparation was performed. Custom trays without a palatal coverage in order to minimize gag-reflex were fabricated, and not standard plastic trays, using light-polymerized resin material (Triad Trutray; Dentsply Sirona, York, PA). Poly(vinyl siloxane) (PVS) impression materials, regular set (base and catalyst), and light-bodied consistency (Aquasil Ultra+; Dentsply Caulk, Mildford, DE) were used for the final impression (Figure 4). Definitive casts were fabricated in type IV dental stone (Silky Rock; Whipmix Corp., Louisville, KY), and the crowns and the implant's screw-retained abutment and cement-retained crown metal frameworks were waxed, sprued, and cast in a nickel- chromium (NiCr) metal alloy (GC Corp., Japan) on the dies (Figure 5).

Metal frameworks were tried in, in order to be sure about their passive fit and the occlusal alignment, by using table salt to minimize gag-reflex, and physiologic adjustment was done

Figure 3: Patient applying table salt to the tip of her tongue.

Figure 4: Maxillary teeth before the final impression.

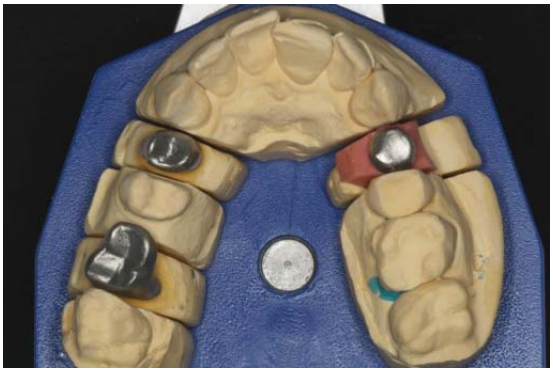

Figure 5: Maxillary FPD frameworks.

on the abutment teeth. An occlusal registration was performed using PVS material (Blu- Mousse; Parkell Inc, Edgewood, NY).

Porcelain fused to metal was used for crowns processing in compliance with the manufacturer's instructions. Try-in was performed, and occlusion and esthetics were verified prior to crown processing.

The crowns were fitted and cemented with a resin-reinforced, glass ionomer luting cement (GC Fuji Plus®, GC Corp., Japan) and the implant screw-retained abutment was fitted with a torque of 20 N/cm and the crown was cemented with self-curing zinc-oxide non-eugenol temporary cement (TempBond-NE™, Kerr™, KerrHawe SA, Switzerland) (Figures 6,7). The crowns' design resulted in comfort and the pregnant woman was instructed in prostheses' hygiene. A schedule of periodic preservation appointments was set to re-evaluate the patient.

Discussion

The present case report describes the use of a very specific method, the table-salt method in a woman with a normal pregnancy in the third trimester with a severe vomiting reaction, who needed dental restorations and prosthodontic procedures, something which has not been reported in the current literature for pregnant women.

Pregnancy is a specific and critical period for the health of both mother and fetus. Dental care should be provided during this period and compatible and implant prosthodontic treatment is also needed for esthetic and functional reasons in some cases, like in our case, as it is very difficult to postpone them after labor and delivery.

Scientific multidisciplinary cooperation is very important between the involved health practitioners, obstetricians and dental providers, and they should be aware of the available methods concerning dental, mainly prosthodontic, treatment in pregnant women.

Although vomiting is a physiologic protective reaction, it can cause a disturbance, dental fear, and make patients very anxious. This condition, especially in late normal pregnancy, is a little-studied phenomenon [15].

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Figure 6: Definitive prostheses (FPDs) - occlusal view.

Figure 7: Definitive prostheses, frontal view.

In the general population (except pregnant women) vomiting is a reflexive defense-reaction in order to protect the pharynx and throat [30,31,36,37]. Nerve endings located in five intraoral zones [37-39] called "trigger zones" [40], control and trigger the vomiting mechanism.

A variety of reasons such as anatomical [40], iatrogenic, medical, and dental factors can cause vomit reaction [29,31,34,39].

Gender may have an impact on the type of vomit reaction. Females are reported to have shown a higher percentage of dental fear and vomit reaction than males [29]. The possible explanation is that women have relatively smaller jaws and may be psychologically more sensitive when compared to males [38].

The diagnosis of NVP is usually clinical [16]. Other causes of persistent nausea, retching and/or vomiting are rarely encountered. Sometimes it is difficult to distinguish them from NVP and they are associated with serious complications [16,41].

Predisposing risk factors causing the NVP include decreased maternal age, increased placental mass, previous history of NVP, genetic predisposition, fetal gender, multiparity, and helicobacter pylori infection [16,42-44].

Another hypothesis, that there is an association between race/ethnicity and NVP, has not been extensively studied, so further studies are needed [13].

It has also been reported that low socioeconomic status was associated with NVP [13].

Except for the maternal consequences, the NVP can influence the growth of the fetus, family interrelationships, as also the entire job performance [12,16,44]. Very often in cases with exaggerated gagging, adverse fetal outcomes are low birth weight and preterm birth [16,42,44].

Dental procedures as the obtaining impressions of mandibular and maxillary arches [25-27,29,37], the taking of radiographs [26,37,39], molar extractions [25], tooth preparations in posterior teeth [25,26], and in some patients, the insertion of a finger for examination purposes [26], may cause a severe vomit reaction, which poses difficulty in performing the procedures successfully [25]. Other factors causing vomiting are fear, stress, phobia, olfactory and visual stimuli and alcoholism. For many patients, the accurate differential diagnosis between psychogenic and somatogenic vomit reaction is difficult and in some cases impossible [29].

The dental provider should minimize the level of stress and gain the patient's confidence [33]. Identifying and managing trigger zones appropriately increases patient comfort, and makes many steps of treatment easier.

Some techniques are useful and help both dental practitioner and patient to deal with vomit reaction [25,26,28,31,34,36,37,39,45,46]. Use of table salt, ginger, vitamin B6, dietary adjustments, acupressure, acupuncture and behavioral modification, are the non-pharmacological approaches that have been proposed, investigated, recommended and often used in cases of women who are not pregnant [16,30,31,39,45,46]. The positive impact of these safe and non-invasive methods has been demonstrated. Pharmacological techniques are available with varying effectiveness and consist of medications that manage vomiting by acting centrally or peripherally [31,39,46].

However, very few drugs are marketed specifically for the treatment of NVP in pregnancy such as the combination of vitamin B6 and doxylamine [16]. Appropriate medical management of symptoms will ensure the mental and physical wellbeing of pregnant women [16].

Very few studies reported NVP in the 2nd and 3rd trimesters of pregnancy [13,47]. Since most of the NVP symptoms disappear by the 20th week of pregnancy [13], it is normal to expect that the majority of the women progressing their gestation, experienced less NVP condition.

The medical literature of late NVP is limited [15]. Increased occurrence of gallstone formation has been associated with late NVP as also possible effects of dehydration [15,48,49], especially in cases of hyperemesis gravidarium (HG), but this pathology (HG) was not present in our case.

Late NVP cases are associated with lower maternal weight gains and lower birth weights. The relationship between late NVP and the risk for preterm spontaneous births is also known [15,50].

In our case, after having informed the pregnant and her family members extensively and taken their approval before the whole dental process, we have been very careful concerning

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in all the important clinical stages where X-rays have been taken and the specific anesthetic used in controlled doses.

From the dental point of view, there could also be an association with vomit reaction and the lack of posterior support [31]. Patients with severe vomit reactions avoid brushing posterior teeth which are close to triggering zones, resulting in caries and loss of tooth structure. Restoring posterior teeth close to trigger zones usually leads to retching and makes patients avoid treatment, resulting in posterior support's loss [32].

What is more, in our case there were no complications of the usage of table salt and the pregnant during the entire treatment did not appear any change in her blood pressure or other side effects . The pregnant had normal blood pressure before, during and after the pregnancy.

The table salt method, with a superimposed simultaneous stimulation of the chorda tympani branches to the taste buds in the anterior 2/3 of the tongue, has a psychologic effect on patients with "dental fear" and severe vomiting [33].

The advantages of the table salt technique are the extended working time and the potential of facilitating prosthodontic procedures in a comfortable manner. It does not require expensive or special instrumentation, it is simple and adequately effective for the treatment of prosthodontic cases when compared to other available treatment methods [30]. The impression techniques and materials that are used in order to construct dental prostheses with passive fit are paramount [51]. The impression material was regular set (base and catalyst), and light-bodied consistency (Aquasil Ultra+; Dentsply Caulk, Mildford, DE) PVS in order to minimize flow beyond the tray and increase comfort during the procedure. Another advantage is that regular appointments should be scheduled for pregnant women.

The medical evaluation of each patient individually is the priority for the dentist. The dental practitioner attempts to identify situations that trigger vomiting. The previous history of dental treatment as also a detailed questionnaire should be recorded. Clinical examination should be conducted with a ball burnisher to identify trigger zones. Various vomiting reduction therapies such as behavioral techniques (relaxation, distraction, desensitization), as also dietary advice, psychological approaches, and certain medication [33,34,39], can be scheduled as a treatment approach.

Apart from desensitization such as the marble technique [52], soft vacuum-form splints, and slow swallowing technique [53] that are mainly used [34], there are some other distraction methods including detailed discussion [54]. Additional techniques are raising one of the legs or putting table salt on tip of the tongue [30,31,33,34,37], as we used in our case. Table salt, for 5 seconds on the tip of the tongue, decreases the vomit reaction as we have previously reported, acting on chorda tympani branches in 2/3 of the tongue's taste buds [30,31,33,34,37].

The dentist needs to gain the pregnant women's confidence [36], so it makes routine dental care comfortable and possible by reducing stress and phobia. It helps them to forget previous behavior that causes vomiting [32,39,46] and these must be applied at any type and stage of treatment, including impression taking, maxillomandibular registration, and during the recall stage [55-57].

Another important issue is the best cooperation and awareness of the existing and used dental methods by obstetricians and dental practitioners.

The impression taking procedure is described in many publications as the most stressful and fearful dental procedure for patients with exaggerated vomit reaction [27-29,31,33,34,37,39,55]. As a result, some techniques have been used to reduce vomit reaction [26,31]. Such techniques are the following: a) Tray extension and adaptation [26,34,55], b) the use of alternative impression materials [26,34], c) altered consistency to avoid overflow [34], d) breathing techniques [26,34], e) acupressure [26,45], acupuncture [58] or hand pressure point [32,45,59], as well as f) nitrous oxide inhalation [33]. Nitrous-oxide inhalation has been suggested to reduce the negative perception and the conditions associated with vomiting, and thereby it increases patient tolerance to the placement of intraoral objects [32]. Dental practitioners may have to try some of these, sometimes in combination, in order to help their patients [26,34].

Apart from all the already mentioned details, finally, in our specific pregnant, it is very interesting the fact that all these dental procedures have been made successfully by using the simple method of table salt to avoid vomiting of the pregnant.

Conclusion

The usage of the table salt technique is a comfortable, very practical, easy and quick method for a dental practitioner to manage vomiting during critical clinical stages, leading to successful treatment of pregnant women with severe gag reflex especially during the third trimester of pregnancy.

Scientific multidisciplinary cooperation is very important between the involved health practitioners, obstetricians and dental providers.

Acknowledgement

All authors acknowledge contribution to this manuscript and are in agreement with its content.

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Citation: Stefos S, Stefos T (2022) Managing vomiting in the third trimester of pregnancy during fixed prosthodontic treatment. A case report and review of the literature. J Gynecol Res Obstet 8(1): 007-013. DOI: https://dx.doi.org/10.17352/jgro.000108