

Dental Extraction of Myasthenia Gravis Patient with Multiple Systemic Implications: A Case Report

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Abstract. Myasthenia gravis is a chronic autoimmune neuromuscular disorder that results in progressive skeletal muscle weakness. Dental management of patients diagnosed with myasthenia gravis is challenging. In this article, a case report of dental extraction in a 75-year old myasthenia gravis patient with other medical problems complicating his condition is presented. The management of such cases in dental clinics will be discussed. When planning a treatment, dentists must be aware of facial and masticatory muscle weakness that affects majority of patients. Myasthenia gravis patients usually suffer from the long-term effect of the disease on different body systems, mainly respiratory and endocrine systems. Moreover, the drugs used in the management of myasthenia gravis have side-effects that might interfere with the dental treatment or interact with dental medication. Patients with myasthenia gravis require specific dental treatment planning in order to avoid exacerbation and myasthenic crisis during the dental treatment.

Keywords: Myasthenia gravis, Dental extraction, Oral maxillofacial, Surgery.

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Introduction

Myasthenia gravis (MG) is a chronic autoimmune neuromuscular disorder that is characterized by progressive skeletal (voluntary) muscle weakness^[1]. It is caused by antibodies directed against the acetylcholine receptors (Anti-AChR Ab) in the post-synaptic muscle membrane, destructing and blocking them. Thus, preventing or weakening muscle contraction^[1-3]. Physical examination and blood level of anti-AChR Ab titre ($N < 0.25$) are the most reliable tools for diagnosis^[4]. Other diagnostic modalities include repetitive nerve stimulation (RNS) and single fiber electromyography (EMG) can detect impaired nerve-to-muscle transmission^[5]. The auto-antibodies are associated in 75% of the cases with thymic hyperplasia or thymoma. It is also present in few other diseases, such as small cell lung cancer and Lambert Eaton syndrome; hence, gives a similar picture.

Dental management of patients diagnosed with myasthenia gravis presents a challenge to the dental profession. In most of the cases, the facial and masticatory muscles are involved which complicate the dental treatment and affect the patient's cooperation^[3]. MG medications have side effect that might interfere with the dental treatment or counteract the dental medications. Additionally, the myasthenic crisis is highly anticipated during the dental procedure.

In this report, a case of dental extraction in a 75-year old MG patient following chronic dental abscess is presented, and discussed the management of such cases in dental clinics.

Case Report

A seventy-five-years-old Saudi male patient referred from peripheral hospital to King Fahad Armed Forces Hospital in Jeddah for the management of recurrent dental abscess. Patient is known to suffer from MG for the past 20 years (Fig. 1). In addition, he had history of ischemic heart disease, transient ischemic attack, peripheral vascular disease, *diabetes mellitus*, dyslipidemia, hypertension and benign prostatic hyperplasia. As a complication of long-standing *diabetes mellitus*, the patient had bilateral transmetatarsal amputation few years ago (Fig. 2). His peripheral vascular disease is progressing into ischemia of his fingertips (Raynaud's phenomenon).

He is allergic to penicillin and sulfa drugs. The patient is on multiple medications including anti-cholinesterase, anticoagulants, anti-diabetic drugs, and antihypertensive. During physical examination, the patient was conscious, alert, fatigued and showed signs of facial muscle weakness (Fig. 1); afebrile and the vital signs were: BP = 105/50 mm/mg, RR = 22 B/min. and HR = 55 B/min. There was mild crepitation in the chest with shortness of breath and pitting edema was noted on the lower extremities.



Fig. 1. Facial muscles weakness.



Fig. 2. Bilateral transmetatarsal amputation.

Oral examination showed fair oral hygiene, multiple carious teeth and multiple fixed prosthodontic restorations. In addition, the periodontal condition showed generalized moderate periodontitis. The patient's complaint was recurrent abscess related to lower left posterior tooth started a month ago. Oral panoramic and periapical radiography were taken and showed periapical radiolucency related to the apices of the lower left second premolar and first molar teeth (Fig. 3).

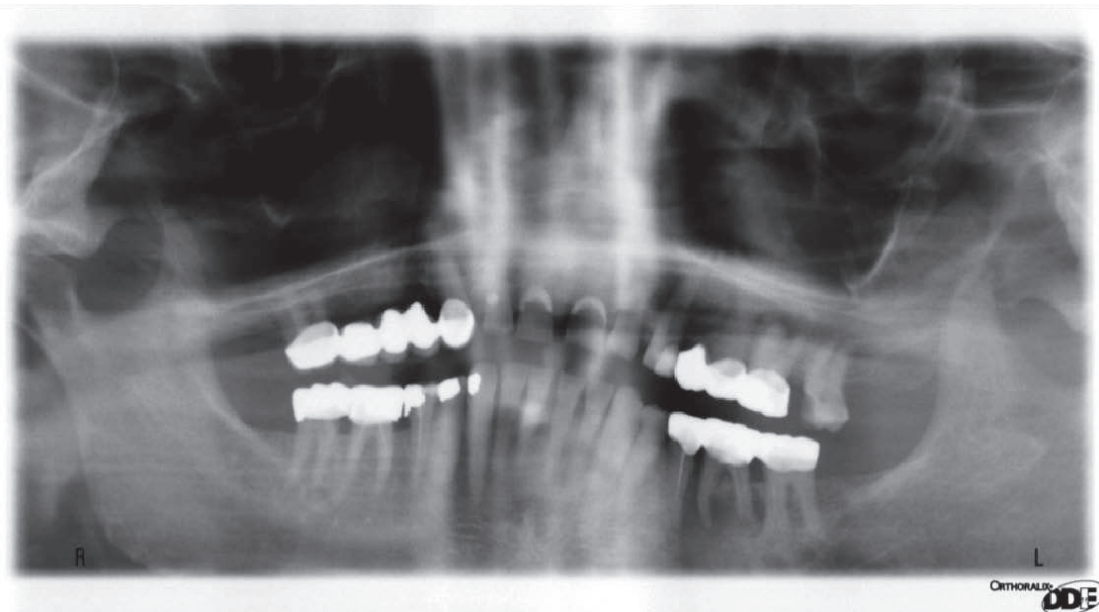


Fig. 3. Oral Panoramic radiograph.

The case was discussed in a meeting between oral and maxillofacial surgeons and advanced general dentists. The plan was to provide a comprehensive dental treatment to the patient under general anesthesia (GA). In order to proceed with the plan and avoid post operative complications, a number of investigations and consultations with different specialties were done. Hematology profile showed critical increase in PT: 25.4/sec, PTT: 64/sec and INR: 2.4. Arterial blood gases demonstrated respiratory acidosis (pH: 7.31 PaCO₂: 65 mm/mg). Despite, prostate specific antigen (PSA) level was relatively high, urine cytology excluded any malignancy.

Chest X-ray showed bilateral white patches, which suggested the presence of bilateral pulmonary edema in the lungs. The history of ischemic heart disease with peripheral pitting edema mandate further cardiac studies. Electrocardiogram (ECG) revealed left axis deviation, atrial fibrillation and left bundle branch block. Echocardiogram showed the following: Left ventricle was grossly dilated with severely impaired contractility and ejection fraction was 10-15%. Furthermore, the right ventricle was dilated and showed impaired contraction. Mitral valve and tricuspid valve both showed mild to moderate regurgitation, and the aortic valve was sclerotic.

Based on the previous findings, the cardiologist decided that the patient is a high risk for GA, and the planned treatment is better to be executed under local anesthesia.

Hematologist plan for the patient to stop the warfarin and start enoxaparin 1 mg/Kg BID; then stop the enoxaparin 12 hrs preoperative and resume it 8-12 hrs postoperative with warfarin at the same dose. ICU doctors recommended continuous positive airway pressure (CPAP) or bi-level positive airway pressure (BiPAP) for the patient during the operation. It was decided to admit the patient and start his anticoagulant regime and oxygen therapy, and to proceed with the dental extraction only on the dental chair under local anesthesia when his condition is optimized.

On the day of the surgery, the patient was brought to the Oral and Maxillofacial Clinic during the morning session; CBC and coagulation profile was done, INR was less than two, and vital signs were stable. The patient seated in upright position on the dental chair and O₂ was provided *via* nasal canula. Local anesthetic solution (lidocain 2%) without epinephrine was administered. Closed extraction of the lower left second premolar and first molar was done by simple elevation, and curettage of the periapical area was done and the attached lesion was sent to the histopathology. Surgicel (hemostatic material) packed inside the extraction socket to minimize the bleeding; suturing was done to approximate the soft tissue. Pressure pack was applied and post extraction instructions were given, and analgesic (acetaminophen) was prescribed. After 3 days of close monitoring and follow up, the patient was stable and the surgical site was clean. There was no bleeding, no pain, minimal swelling, his INR was back to pre-operative level and resumed his warfarin. The patient was discharged home.

Discussion

Muscle weakness and easy fatigability are the hallmarks of MG^[1]. The extra-ocular muscles and muscles of the face and neck are frequently affected, resulting in ptosis, diplopia and limited facial expressions^[2]. Since the masticatory muscles are also involved, the patient may experience dysphagia and some difficulties in speech^[3]. In advanced stage of the disease; the involvement of respiratory muscles might have a

dreadful complication that can cause aspiration pneumonia and respiratory failure.

The two most serious and fatal complication of MG are cholinergic and myasthenic crisis. Cholinergic crisis can follow overdose of cholinesterase inhibitors; and myasthenic crises can be triggered by many stress inducing factors such as emotions, menstruation, surgery immunization, or drug interaction with Ca-channel blockers and β -blockers.

Myasthenia Gravis patients have higher risks for various autoimmune diseases, including *diabetes mellitus*, hyperthyroidism, rheumatoid arthritis and systemic lupus erythematosus^[1]. Proper management of such accompanying diseases should receive more attention and priority for optimizing the patient's condition prior to routine dental treatment.

Removal of the thymus gland will cure the disorder if it was due to thymoma or thymic hyperplasia. Otherwise, acetylcholine esterase (AChE) inhibitors for mild cases and immunomodulating therapy (*e.g.* steroids, azothioprine, and I.V. immunoglobulin) for generalized MG are the mainstay treatment. Due to the rarity of the disease and variation between patients and treating doctors, there is no clear difference between various immunomodulating therapies.

Preoperative plasma exchange (Plasmapheresis) is indicated for patient with frequent severe myasthenic crises who is undergoing major oral surgery, and also if the exacerbation is expected during the procedure as well. It is considered as a short term immunotherapy with temporary effect only aim to remove the Ach antibodies from the circulation resulting in muscle strength^[1,2,6]. Our patient did not give a history of a sever crisis that there was no clear indication for plasmapheresis preoperatively. IV immunoglobulin can be used also for the same purpose^[1,2,6].

Dental treatment is best carried during the remission period; therefore, close liaison with the patient's primary physician is essential. Short morning appointments are preferred to minimize the fatigue and muscle weakness during the day^[1]. Moreover, the appointment should be one to two hours following oral anti cholinesterase medication to ensure its therapeutic effect^[1,2].

The patient should be in more upright position to allow easier breathing and avoid airway obstruction. Therefore, MG patient is better treated on dental chair rather than on the flat bed of the operating room.

The anesthetic management of the myasthenic patient must be decided according to the severity of the disease and the type of dental procedure to be carried out. The use of regional or local anaesthesia is preferred over general anesthesia^[1]. Amide type is safer choice rather than ester local anesthetic as the later is hydrolyzed by plasma cholinesterases. Although in this case, local anesthesia without adrenaline was used. Vasoconstrictor 1:100,000/epinephrine was used in combination with lidocaine as it is beneficial in maximizing anesthesia efficacy at the oral site and reducing drugs toxicity in the systemic circulation. General anesthesia (GA) and I.V. sedation should not be given in the dental office. However, if the case demand a form of behavioral management, N₂O sedation is a safe and good alternative^[1,2]. If the dental treatment under general anesthesia is a must, then the anesthetist should prepare for the possibility of post operative mechanical ventilation as the risk of respiratory depression is high^[2]. Potent inhalational anesthetics such as isoflurane is associated with reduced neuromuscular transmission, and can lead to profound muscle relaxation in myasthenic patient^[2]. Alternatively, propofol has been used successfully in myasthenic patients^[2]. Many other drugs such as barbiturate, muscle relaxant and β -blockers are used in GA and carry the risk of aggravating the MG status, hence need to avoid it.

There are many drugs used in dental field have some complications in myasthenia gravis patients. The dentist must be aware of different side effects of the medications used by the patient in order to avoid any possibility of drugs interaction. Anticholinestrase drugs such as Mestinon or Prostigmin increase the salivation^[1], and this can be problematic to the dentist in achieving good moisture control^[1,2,5]. Prednisone and cyclosporine are the most commonly used long-term immunosuppressant in MG patient^[5]; therefore, oral infections (*e.g.*, chronic candidosis) are not unusual finding in MG patient^[2]. Antibiotics such as aminoglycosides, tetracycline, erythromycin, azithromycin, fluoroquinolones and ampicillin are well known to impair neuromuscular transmission and produce clinically significant weakness in MG patients^[1]. Alternatively, penicillin and its derivatives are safe and not associated with neuromuscular blocking properties and is less likely to

exacerbate myasthenic crisis^[1]. In this case, the patient was allergic to penicillin and received mitronidazol to cover the anaerobes microbia which worked very well.

The analgesics for MG patient should not cause respiratory depression. In this case, acetaminophen was a safe option to use. The patients' reactions to the different medications are not certain and dependent on disease severity, types of drugs and the significance of the dental treatment needed. Thus, close monitoring of the patient vital signs and his overall medical status is necessary, intra- and postoperatively.

Conclusion

Myasthenia gravis is a serious disease that requires specific treatment modifications in order to avoid exacerbation and complication even in well controlled patients. The dentist should be aware of the patient's disease status; consult all the related specialties and modify dental care to accommodate existing neuromuscular weakness, and be prepared to manage complications that might occur in the dental office.

References

- [1] **Yarom N, Barnea E, Nissan J, Gorsky M, Aviv T.** Dental management of patients with myasthenia gravis: A literature review. *Oral Med Oral Pathol Oral Radiol Endod Oral Surg* 2005; **100**(6): 158-163.
- [2] **Jamal BT, Herb K.** Perioperative management of patients with myasthenia Gravis: prevention, recognition, and treatment. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009; **107**(5): 612-615.
- [3] **WeijnenFG, van der Bilt A, Kuks JBM, van der Glas HW, Oudenaarde A, Bosmana F.** Masticatory performance in patients with myasthenia gravis. *Arch Oral Biol* 2002; **47**(5): 393–398.
- [4] **Dubey SR, Shah NP, Patel HG, Swadia VN, Agrawal D, Ghandi A.** Anesthetic management of a patient with myasthenia gravis in a known casw of hyperthyroidism and bronchial asthma posted for thymectomy – case report. *Indian J Anaesth* 2004; **48**(1): 59-61.
- [5] **Bianca M, Conti-Fine, Milani M, Kaminski HJ.** Myasthenia gravis: past, present, and future. *J Clin Invest* 2006; **116**(11): 2843–2854.
- [6] **Murthy JMK, Meena AK, Chowdary GV, Naryanan JT.** Myasthenic crisis: clinical features, complications and mortality. *Neurol India* 2005; **53**(1): 37-40.

عملية خلع ضرس لمريض مصاب بمرض وهن العضلات: دراسة حالة

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المستخلص. وهن العضلات هو مرض مزمن ذاتي المناعة يصيب الجهاز العصبي العضلي ويؤدي إلى ضعف في العضلات الهيكلية، المرضى المصابون بوهن العضلات يعانون عادة من التأثير على المدى الطويل للمرض على أجهزة الجسم وخاصة الجهاز التنفسي والجهاز الإفرازي، بالإضافة إلى ضعف في عضلات الوجه والفكين، أيضاً الأدوية المستخدمة لعلاج المصابين بهذا المرض قد يكون لبعضها آثاراً جانبية على علاج الأسنان. يهدف هذا التقرير إلى عرض حالة مريض مصاب بوهن العضلات يعاني من خراج في الأسنان بشكل متكرر، ويناقش وضع خطة علاج تناسب الحالة وكيفية التعامل مع حالات مشابهة في عيادات الأسنان والاستعداد لأي مضاعفات قد تحدث خلال علاج الأسنان، حيث تمت مناقشة الحالة في اجتماع بين جراحي الفم والوجه والفكين وأطباء علاج الأسنان المتقدم، الخطة العلاجية المقترحة كانت بتقديم علاج أسنان شامل للمريض تحت التخدير الكامل في غرفة العمليات والقيام بعدد من الاستشارات والتحاليل قبل تقديم العلاج، أدخل المريض إلى قسم التنويم وعرضت الحالة على عدد من الأطباء في مختلف

التخصصات لمناقشة حالته العامة ولتفادي تعقيدات ما بعد الجراحة،
وبالنظر إلى حالته الصحية تم الإجماع على أن حالة المريض لا
تسمح بالعلاج تحت التخدير الكامل ويفضل استكمال علاج الأسنان
تحت التخدير الموضعي على كرسي الأسنان، وتم خلع الضرس في
عيادة جراحة الوجه والفكين تحت التخدير الموضعي.