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Editorial case report Ludwig Angina – The longest distance in this planet

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Abstract: Ludwig Angina is a potentially lethal condition, the rapidly expanding nature makes early diagnosis and treatment essential. Unfortunately, Angel's mind is not always well understood. Patients may underestimate it or be trapped by dental fear and thus refuse treatment or follow up. This is a case report.

Keywords: Emergency; dental infection; periodontal disease; dental caries; Ludwig Angina; bone resorption; patient's compliance; management; abscesses

1. Case report

Day 1(Nov 18, 2017) – First appointment

A 54-year-old female attended this clinic on Nov 18, 2017 requesting extraction of the very mobile lower left third molar(indicated by pointing). She had no remarkable medical history or general malaise.

On extraoral examination, there was no obvious facial asymmetry, facial swelling or palpable lymph nodes. Intraoral examination revealed that 38(lower left third molar) was mesially tilted, showed mobility III in Grace & Smales Mobility Index and with a probing depth of over 12mm. 27(upper left second molar) overerupted.

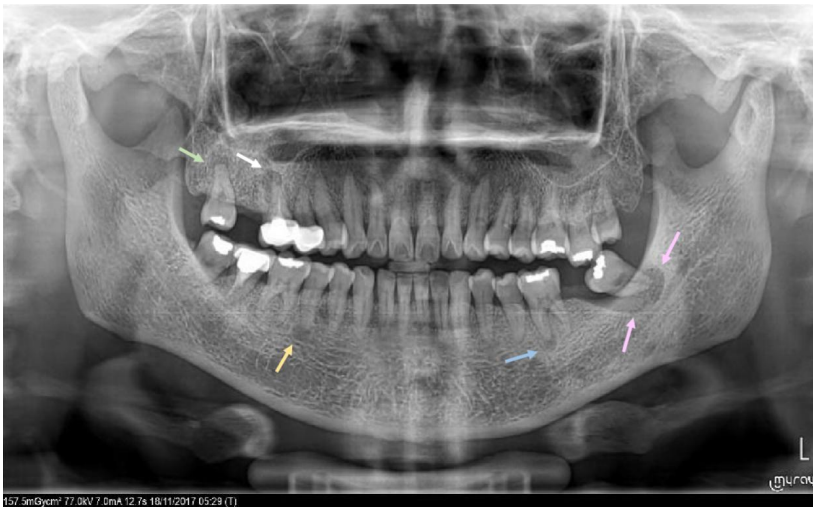

Figure 1. Orthopantomogram on Nov 18, 2017(Day 1) of the patient showing gross bone loss around apical region of 38(lower left third molar) and apical radiolucency around 36(lower left first molar) mesial root. There were 5 sites of apical radiolucency.

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Figure 1. Orthopantomogram on Nov 18, 2017(Day 1) of the patient showing gross bone loss around apical region of 38(lower left third molar) and apical radiolucency around 36(lower left first molar) mesial root. There were 5 sites of apical radiolucency.

Orthopantomogram(**Figure 1**) showed gross bone loss around apical region of 38 and apical radiolucency around 36 mesial root. Multiple apical radiolucencies were also found at other quadrants, respectively at 18(upper right third molar), 16(upper right first molar) and 45(lower right second premolar). First phrase treatment planning included extraction of the 38 and options of root canal treatment or extraction of 36.

Treatment for other teeth would be planned later.

Extraction of 38 was performed under local anesthesia with 2.5ml Xylestesin A(2% anhydrous lidocaine hydrochloride with 1:80000 adrenaline) by buccal infiltration & intraligamental infiltration. Socket was curetted and 1 Gelatemp sponge(9.5mg hardened gelatine and 0.5mg colloid silver) was packed to achieve hemostasis. Post-operative instructions were given verbally and in written notice(appendix I). Diclofenac sodium 25mg tds and famotidine 20mg bd, both for 5 days were prescribed.

Day 3(Nov 20, 2017) – Second appointment

Patient came back 2 days later complaining of progressive swelling in the face.

On extra-oral examination, she had a mild swelling, erythema and tenderness in the lower left face, these signs were more intense in the submandibular area(figure 2 & 3), the submandibular region was very painful to palpation. Intra-oral examination revealed wound healing was normal.

This diagnosis was early stage of Ludwig Angina. The potential airway blocking and lethal nature due to rapid progression if untreated were explained to the patient. However, she appeared unfazed and unworried(figure 4 & video 1).

Patent refused routine management of referral to hospital and injection of antibiotics and thus operator decided to closely monitor the patient in clinic. First dose amoxicillin 500 mg and 250mg clavulanic acid(in two tablets of Augmentin 375mg), metronidazole 400mg, lysozyme HCL 20mg, famotidine 20mg and diclofenac sodium 25mg were given to the patient by oral administration.

5-day course of Augmentin 375mg tds, metronidazole 200mg tds lysozyme HCL 20mg tds, famotidine 20mg bd and diclofenac sodium 25mg tds were given. Chlorhexidine mouthrinse 10ml bd 90ml was also prescribed. The patient was instructed to have the second dose of all medication 4 hours and then to come back for review 5.5 hours after the initial dose of medication in clinic respectively.

On review 5.5 hours later, the redness disappeared and the pain on palpation of submandibular space decreased.

Figure 2. Frontal view of the patient on Nov 20, 2017(Day 3) showing mild lower left facial swelling.

Figure 3. Side view on Day 3 showing diffuse lower left facial swelling with overlying erythema.

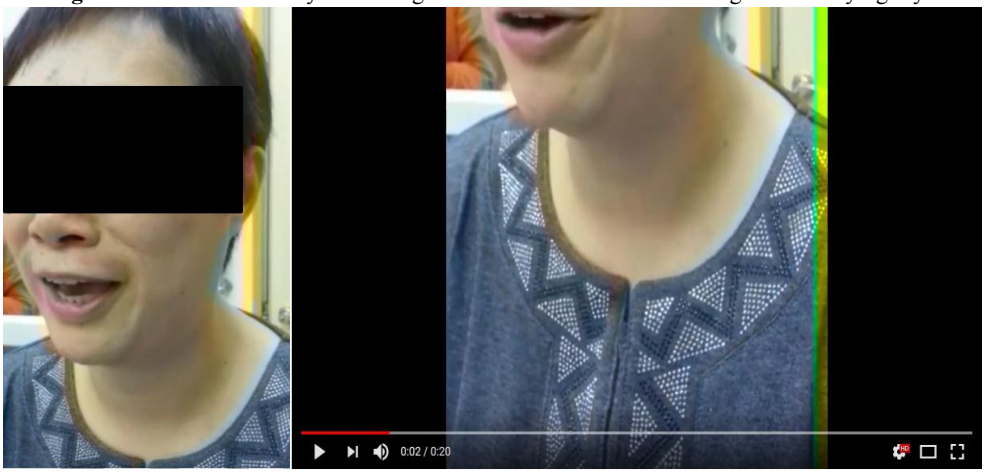

Figure 4 & Video 1. The potential airway blocking and lethal nature due to rapid progression if untreated were explained to the patient but the patient appeared unworried and insisted in travelling to Japan.（https://www.youtube.com/watch?v=5QCqpVxwdlI）

Day 5(Nov 22, 2017) – Third appointment

On day 5 patient came back for review of the facial swelling. Examination showed that the left submandibular swelling had reduced but not yet completely subsided. Patient was explained to again that Ludwig Angina was a severe and potentially lethal condition and thus close monitoring and removal of all infective sources were required. However, the severity of the disease was disregarded again by the patient who had a plan of travelling to Japan the day after.

The operator told the patient the cause of Ludwig Angina might be due to the non-vital 36 rather than 38 and therefore root canal treatment of 36 was advised. Patient refused it and operator instructed her to continue the medication prescribed. Oral and written information for root canal treatment were also given(appendix II).

Another 5 days course of antibiotics(including Augmentin 375mg tds and metronidazole 200mg tds), lysozyme HCL 20mg tds and paracetamol 500mg qds were prescribed as backup. Patient was instructed to bring the backup medication to Japan, and to inform the operator with photos/videos via Whats app prior to taking the medication if the swelling and other symptoms did not subside completely or progress. A referral letter with the orthopantomogram attached was also given to the patient and the patient was told to seek care from dentists or physicians in Japan if her condition aggravated.

Day 7(Nov 24, 2017) – Whats app communication

Patient messaged the operator from Japan and complained of mild swelling which was not painful. She reported that she had already finished the course of medication prescribed on Day 3(Nov 20, 2017). The operator instructed her to take photos of her face in frontal and side views. The photos showed slight swelling in the left submandibular region. Patient was then advised to start the second course backup medication.

Figure 5. Frontal view of the patient on Nov 24, 2017(Day 7) showing slight mandibular facial swelling.

Figure 6. Side view of the patient on Nov 24, 2017(Day 7) showing slight mandibular facial swelling.

Day 10(Nov 27, 2017) – Whats app communication

The operator asked the patient for updates of her condition via Whats app and informed her that the swelling should have been dealt with as soon as possible if it had not yet subsided completely. Patient replied that she had recovered already and the swelling was subsided. Patient confirmed that she did not need treatment.

Day 11(Nov 28, 2017) – Whats app communication

Consent of all clinical records including notes, photos and videos for teaching, oral health education and research purposes was obtained through Whats app. The operator informed the patient that the case was closed since the patient replied she did not need further treatment. The operator would not send further information to the patient unless upon request.

2. Discussion

Karl Friedrich Wilhelm von Ludwig described the condition of Ludwig Angina without the name in 1836, as a rapidly progressive cellulitis with oedema of the soft tissues of the neck and floor of the mouth[1,2].

Majority of the cases are caused by odontogenic infections[3-5,12], most commonly involving mandibular second and third molars, due to the proximity of their roots with the submandibular fascial space, separated only by a thin inner

cortex of the mandible[3,5]. Submandibular space is a potential space above the hyoid bone bounded antero-laterally by mandible, inferiorly by the superficial layer of deep cervical fascia and superiorly by the mucosa of the floor of mouth(and tongue)[6].

In this case, the orthopantomogram showed substantial bone loss around the apex of the 38. Apical radiolucency around the mesial root of 36 also indicates presence of infection at the periapical area. Persistence of infection of bone despite extraction of 38 and/or periapical infection of 36 were possible sources of infection that spread to the submandibular space, resulting in Ludwig angina.

Infection of the submandibular space gives rise to edema, subsequently causing displacement of the floor of mouth and the tongue supero-posteriorly[6]. Without prompt intervention, airway can become compromised as cellulitis progresses, making it progressively difficult for clinicians to manage in a controlled setting, thus increasing the risk of mortality[3,7,9,13].

Treatment for Ludwig Angina typically includes maintenance of a patent airway[3,7,8,10,11-13] intensive antibiotic therapy[3,7,8,10,11-13] elimination of source of infection(e.g. root canal treatment, scaling and root surface debridement and extraction of the infected tooth)[3,8,10-12] and drainage[7,8,10-13]. Early diagnosis, close monitoring and maintenance of patient's airway are essential. Intubation and tracheostomy may be needed when the airway is not secured[3,7,8,10-13].

In Hong Kong, patients with Ludwig Angina are best to be hospitalized due to the short travelling distance from private clinic to hospital and the emergency nature of the disease. Management of the patient in this case was however complicated by patient's extreme underestimation of the disease's severity. Her refusal of hospitalization for parenteral antibiotic therapy and insistence in travelling overseas, despite repeated explanation and advice, endangered herself and gave heavy pressure to the operator.

Oral administration of antibiotics with empiric combination of amoxicillin clavulanate and metronidazole was prescribed. Amoxicillin clavulanate and metronidazole respectively targets gram-positive cocci and penicillin-resistant Bacteroides species, all of which have been reported to be involved in this polymicrobial infection[8,10,14-16]. Lysozyme hydrochloride was also administered as an adjunct agent for antibacterial and anti-inflammatory purposes[17]. The conservative medical therapy suppressed the swelling, but the low compliance of the patient and her refusal of further treatment ultimately caused the remaining of 4 apical radiolucencies i.e 4 sources of infection.

Choy and Wong(2017) suggested that patient-related stresses greatly contribute to occupational stresses experienced by dentists in Hong Kong, and that dentists are advised to update their knowledge and skills to equip themselves for the increasing expectations and challenges from patients and society[18].

While it its integral for individual clinicians to equip themselves knowledge-wise and skill-wise for effective management of urgent and severe yet uncommonly encountered oral diseases like Ludwig Angina, these alone are not sufficient to treat the diseases due to low compliance of patients. Oral health education and promotion should be focused on how to combat patients' underestimation of oral diseases and their avoidance of dental treatment due to fear and economic issue.

3. Conclusion

Ludwig Angina is a relatively rare yet potentially fatal condition. Its rapidly progressive nature makes early diagnosis and prompt treatment essential. Treatment typically includes empiric antimicrobial administration, elimination of source of infection, drainage and close monitoring of the airway. Unfortunately, patients often underestimate the severity of oral diseases and delay seeking of treatment. Low compliance of patients inevitably pose challenges for clinicians to manage the disease. While it is of paramount importance for clinicians to become more knowledgeable and adept at managing such an unfamiliar yet lethal disease, it is perhaps even more crucial for practitioners and the government to educate the public the importance of oral health maintenance and regular dental checkups.

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