

Management of Severe Spreading Odontogenic Infection in Third Trimester of Pregnancy: A Case Report

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Abstract

Objective: Odontogenic infections are the most prevalent disease worldwide that presenting initially as localized and could spread causing facial cellulitis and if not treated will develop into more serious facial spaces infections. Infections are common in pregnancy due to hormonal changes and altered immunological activity aggravating response to dental infection resulting in serious life threatening condition to the mother and to the foetus. The present paper reviews the emergency treatment in the third semester of pregnancy patient with spreading odontogenic infections.

Methods: A case report of 23-year old female with 28 weeks gestation admitted with toothache, right submandibular swelling, and severe trismus consistent

with spreading of odontogenic infection into mandibular space. Her treatment included emergent incision and drainage of associated space, extraction of the offending teeth, and intravenous antibiotic coverage was explained. Mother and foetus were also assessed by the Obstetric and Gynaecology Unit.

Results: Severe infection was successfully resolved. The patient condition improved and proceeded to a normal delivery with a healthy child.

Conclusion: A third semester pregnancy patient with severe spreading odontogenic infection need a holistic and accurate emergency treatment by considering the foetal and maternal health and safety while following well established clinical guidelines in managing odontogenic infection.

Keywords: Emergency, Pregnancy, Severe odontogenic infection, Surgical management

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Introduction

Pregnancy has been shown to be associated with compromised oral health due to hormonal changes and altered immunological activity aggravating response to dental infection resulting in serious life threatening condition to the mother and to the foetus. Odontogenic infections are the most prevalent disease worldwide that presenting initially as localized and could spread causing facial cellulitis and if not treated will develop into more serious facial spaces infections. Health practitioners may be reluctant to treat orofacial infections aggressively in pregnancy due to the potential risks of imaging modalities and medications such as antibiotics.^{1,2} Severe infections during pregnancy can be life-threatening for both the mother and the foetus.² The risk of morbidity to the mother and foetus with progressing odontogenic infection therefore needs to be weighed up against the potential risks associated with dental or surgical treatment. Health care providers should appreciate the implications of severe odontogenic infections in pregnancy, and be able to manage them appropriately in a multidisciplinary team. We discuss management of odontogenic infections in pregnancy, and present a case of a pregnant patient who underwent successful surgical management of a spreading odontogenic infection.

Case Report

A 23-year-old pregnant woman, at the 27th week of gestation, presented to her local dentist with 2 days of mild swelling of right submandibular. She was otherwise healthy. The patient was prescribed analgesia and antibiotics (amoxicillin) and told to return for extraction of the offending teeth in one week. Three days later she presented to the Hasan Sadikin General Hospital Emergency Department with worsening pain and a greater swelling of submandibular.

On presentation there was asymmetrical face due to swelling at right lower jaw accompanied with fever. Physical examination revealed clinical signs of edema, localized, redness, warm, fluctuant, tenderness and pain on palpation over the right submandible region. The body temperature was 38.7°C; pulse rate 96 beats/min; blood pressure 90/60 mmHg; respiratory rate was 23 times/min. The initial laboratory count reveals a normal leukocyte level, blood glucose level and lactate level, hyponatremia and hypokalemia. Blood gas analysis was respiratory alkalosis. Severe trismus was noticed [Figure 1](#) consistent with spreading of odontogenic infection into mandibular space.

Her past medical history was unremarkable. Ultrasound obstetric examination was performed

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at admission revealed a living, intrauterine fetus of 27 weeks gestational age.

A submandible abscess formation was suspected and she was initially treated with empirical IV antibiotic coverage (Cephalosporin 3rd generation 1 gram every 12 hours and metronidazole 500 mg every 8 hours),

0.9% sodium chloride IV fluids for correction of electrolytes, incision and drainage of associated space, and also extraction of the offending teeth [Figure 2](#). The clinical and laboratory marker was improved in the following 24 hours. The patient was hospitalized for observation for two days.

Result

Severe infection was successfully resolved. Swelling has subsided before the patient discharged. Mouth opening were improved into 15 mm (measured by interincisal space) immediately after incision drainage and teeth extraction [Figure 3](#). The patient was reviewed by the Obstetrics and Gynaecology team throughout her admission, and there was no parturbation to the foetus. She proceeded to a normal delivery with a healthy child at 40 weeks of gestation.

Discussion

This article shows that the pregnant patient with severe odontogenic infections were successfully managed and proceeded to successful delivery of a live baby without congenital defects. Anaesthetic and surgical management requires modification to that of non-pregnant patients.³ The principles of surgical and anaesthetic management need to be well understood by the initial dentist managing the case, otherwise there is a potential risk that the patient will be undermanaged. This occurred with our patient who preferentially should have been treated properly and or referred earlier. A careful consideration of risks and benefits of any traetment modality is important in planning best management in patients with severe odontogenic infencion. There seems to be a tendency to under-utilise antibiotics and imaging modalities in the setting of pregnancy because of fears of the potential harm to the fetus.¹ However, it would be also necessary to remember the serious nature of these infections, and the risk of loss of life of either the mother or the foetus.

The submandibular space is the most common location of odontogenic abscesses³. Extension of the infection to adjacent fascial spaces develop in more than 50% of cases^{2,3}. Without proper and adequate treatment, the infection can spread along fascial planes caudally to the skull base, and in a rostral direction down to the mediastinum⁴.

Pregnancy has been associated with many changes to haemodynamics and the immune system.^{4,5} Some of the changes relevant to patients with odontogenic infections are presented in



Figure 1 Intra oral picture. Noticed the severe trismus (with inter incisal space about 3 - 4 mm).



Figure 2 A. Incision drainage.
B. Offending teeth extraction.



Figure 3 Inter incisal space widened into 15 cm right after incision and drainage and teeth extraction.

Table 1 Summary physiologic changes relevant to patients with odontogenic infections¹.

Change	Mechanism	Implication
Increased cardiac output	- Increased stroke volume - Increased heart rate 3 rd trimester	- May be able to maintain end organ perfusion until stages of septic shock
Decreased blood pressure	- Decreased total peripheral vascular resistance	- Decreased ability to compensate for sepsis related hypotension - Patient should be kept in left lateral position to prevent IVC compression
Increased gastric reflux	- Gastric compression from gravid uterus with potential of bacterial - Decreased gastric motility - Relaxation of the lower oesophageal sphincter	- Increased intra-oral acidity shift to more acidophilic, cariogenic flora. - Increased risk of aspiration at general anaesthetic induction
Relevant anaemia and leucopenia	- Increased erythrocyte and leucocyte counts, but physiological anemia / leucopenia due to increased plasma volume	- Decreased ability to fight infections
Shift of leucocytes	- Increased monocytes and regulatory T cells - Decreased CD4+ and CD 8+T cells, B cells	- Increased risk of severity to some infections in third trimester
Hypercoagulable state	- Decreased production of anticoagulant factors - Increased Production of clotting factors	- Increased emphasis of DVT prophylaxis

Table 2 Intraoral changes in pregnancy¹.

Change	Mechanism
Pregnancy gingivitis	- increased blood flow to oral mucosa - altered immune function as per table 1
Increased risk of periodontal disease	- altered immune function as per table 1 - increased risk in setting of gestational diabetes

Table 1. Intraoral changes in pregnancy were also noticed which may increase the patient's risk of developing odontogenic infections.^{6,7} Beside there is cumulative evidence linking periodontal diseases with preterm delivery and low neonatal birth weight Condition of intraoral changes are presented in Table 2.

Prevention is the most ideal way and whenever possible, patients considering pregnancy should be assessed by their dentist first and have appropriate treatment before starting their pregnancy. They should also be reviewed during their pregnancy to ensure they remain dentally fit. Unfortunately, in real condition this may not always possible, therefore the dental or medical practitioner needs to be able to manage odontogenic infections in the setting of pregnancy. Elective dental treatment is best done in the second trimester, whereas emergency dental treatment can be provided in any trimester, which in this case happened in third semester as the risk of harm to the foetus from stress of dental treatment is less than the risk of harm from a progressing infection.⁸

Broad-spectrum intravenous antibiotics should be empirically administered before the results of cultures to cover gram-positive cocci, gram-negative enteric rods, and anaerobic flora.² They can change according to culture results and clinical response of the patient. Antibiotics often used in the setting of odontogenic infections are penicillin, amoxicillin and cephalosporins. None of these are associated with risk to the developing foetus⁹ and therefore can and should be used without delay in cases with odontogenic infection pregnant patients. Metronidazole has also been shown to be safe in pregnancy (category B2).¹⁰

While penicillin administered intravenously and in high doses is the empirical antibiotic of choice, it is often recommended to use metronidazole as well. For patients who have had repeated episodes of dental infections, clindamycin is often the antibiotic of choice Figure 4.⁵ Similarly, local anaesthetic agents such as lignocaine and articaine have not shown to be harmful in pregnancy, therefore it is consider safe to used under local anaesthesia during pregnancy.¹⁰ Postpone the dental treatment until after the labor (or until after breastfeeding) could increase the risk of progression of severe odontogenic infections, and is not warranted.

Radiology was not obtained in this case, due to the patient's pregnancy. Although normally a CT

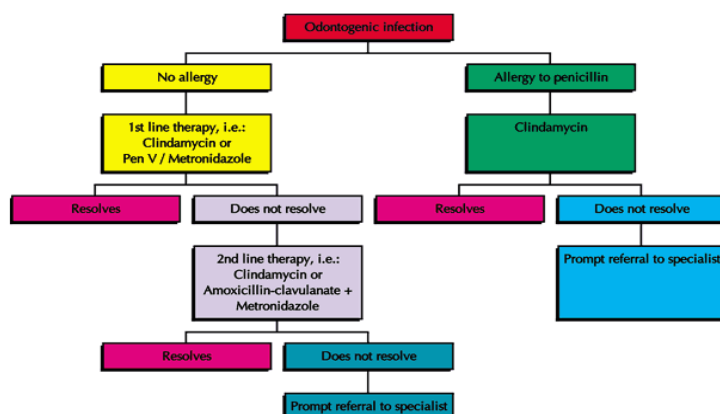


Figure 4 Algorithm for selecting antimicrobial therapy and referral to specialist. <<https://cda-adc.ca/jcda/vol-64/issue-7/antimicrobial-t-pic1.html>>.

head and neck would help to ascertain which fascial spaces were involved, in this case the diagnosis was made on clinical grounds alone to avoid radiation to the developing foetus. Not obtaining imaging pre-operatively risks missing surgical exploration of infected fascial spaces, but since we consider there is no deeper spaces involvement such as retropharyngeal space therefor this issue can be eliminate. Since radiation to the head and neck area is often associated with minimal radiation to the developing foetus even with direct radiation to the foetus, doses of less than 50mGy are associated with negligible risk when compared to other risks of pregnancy.¹² As always, imaging should only be obtained if it is likely to change the clinical management of the patient. Plain radiographs of the head and neck are safe in pregnancy.

The definitive management of odontogenic abscesses is surgical exploration and drainage in need of decompression.^{11,14} In the setting of pregnancy this does not change, and early and aggressive surgical management is likely to be less harmful than prolonged IV antibiotics, which is commonly associated with progression of disease to sepsis and multi-organ dysfunction syndrome, compromising both the patient and her baby.² In severe odontogenic infection of third semester pregnancy patient, therapy has to include early surgical removal of the source of infection (which is often grossly carious dentition) via extraction, aggressive, and vigorous incision and drainage procedures with appropriate placement of drains, along with

intense and prolonged antibiotic therapy and maintenance of a patient airway.² Effective management of pregnant patients with a spreading odontogenic infection requires a multidisciplinary team including Oral and Maxillofacial Surgeons, Anaesthetists, and Obstetricians.

The combination of altered immune function in pregnancy, as well as the reluctance of health practitioners to treat odontogenic infections in pregnancy means that these patients are at exceedingly high risk of developing severe odontogenic infections. These infections can be life threatening for both the mother and her baby. This case serves as a timely reminder for all health practitioners to have a low threshold for diagnosis of odontogenic infections in pregnancy, and to refer these patients for timely and appropriate management by a multi-disciplinary team.

Conclusion

A third semester pregnancy patient with severe spreading odontogenic infection need a holistic and accurate emergency treatment by considering the foetal and maternal health while following well established clinical guidelines in managing odontogenic infection.

Acknowledgment

None .

Conflict of Interest

The authors report no conflict of interest.

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