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MANAGEMENT OF MANDIBULAR ABSCESS IN PEDIATRIC PATIENT WITH UNDETECTED FRACTURE: A CASE REPORT

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ABSTRACT

Background: Submandibular abscess is an inflammation accompanied by pus formation in the submandibular region. Submandibular abscess ranks the highest of all deep neck abscesses. 70-85% of cases caused by dental infections are the most common cases, the rest are caused by sialadenitis, lymphadenitis, oral wall lacerations or mandibular fractures. The aim of this study was to determine the case profile of submandibular abscess caused by undetected mandibular fracture and the treatment performed.
Method: The research method used was descriptive observational method. Data were taken from direct observation during the action and secondary data came from the patient's medical record in the oral surgery section of the Sultan Fatah Demak Hospital.
Outcome: Based on the case report, the treatment given to the patient had high success with minimal intervention.
Conclusion: Submandibular abscess in the right mandible has been treated with incision and drainage so that the inflammatory products of anaerobic bacteria in the submandibular space can be removed properly.

INTRODUCTION

The mandible is a dense facial bone that can be moved, making it possible to chew, swallow and speak normally. The mandible is composed of the glenoid fossa, sigmoid notch, eminence, condyle, ramus, angle, body of mandible, coronoid, mandibular foramen, alveolar process, and mental foramen.[1] Even though the mandible is a dense bone, it is susceptible to injury because of its prominent position in the facial skeleton. In addition, mandibular fractures are susceptible to infection, especially as a postoperative complication of surgical management.[2] However, sometimes the fracture is already clinically infected at the time of surgery. The main causes of infected fractures reported are delays in seeking treatment due to low levels of patient compliance, injuries during intoxication, and lack of public understanding of the consequences of such fractures.[3]

The classification of mandibular fractures is divided into several components, including general classification, classification based on anatomy, relationship of the fracture to the location of the injury, extent of the fracture, and so on. According to Kruger, the general classification of mandibular fractures is: Simple or closed, Compound or open, Comminuted, Complicated or complex, Impacted,

Greenstick, and Pathological. According to Rowe and Killey, the classification of fractures based on their anatomical location includes Dentoalveolar Fractures, which are a type of fracture that does not involve the basal bone and fractures that involve the basal bone of the mandible, divided into single-unilateral, double-unilateral, bilateral, and multiple.[4] Table 1 shows the prevalence of fractures by location.

Table 1. Fracture prevalence by location[3]

Mandibular body fractures	38%	Symphysis	16%
Condyle fractures	29%	Rest of the body	22%
Angle fractures	25%	Ramus fractures	4%
Dentoalveolar fractures	3%	Coronoid fractures	1%

Mandibular fractures can be treated with intraoral or extraoral surgery. No differences between complication rates were found between different surgical approaches in previous retrospective studies. Surgical management of mandibular fractures is carried out considering the heterogeneity of fracture types, infection criteria, and surgical approaches, clear guidelines for the treatment of infected mandibular fractures are still lacking. Thus, we clarified the reasons for infection, surgical technique, and occurrence of postoperative surgical site complications in these fractures.[5,6]

CASE PRESENTATION

An 8-year-old girl came to the emergency room of Sultan Fatah Hospital with complaints of swollen right cheek since 4 days ago accompanied by fever, malaise, and complained of pain in the lump on the cheek, and the lump felt warm. Previously the patient had fallen while riding a bicycle so that there was an injury to his chin and had been stitched at the clinic. Currently, the patient has difficulty opening his mouth (2 fingers narrow) and has trismus. The patient denied any allergies. The patient came with GCS 15, temperature 37°C, pulse 124/min, respiration 24, SPO_2 98%, pain scale 5, total GC 15 (GCSE 4, GCSM 6), height 121 cm, weight 22.1 kg, prognosis ad bonam. Drug therapy was given in the emergency room, namely Ranitidine Injection 25mg/ml 2 ml (1 ampoule), and RL infusion 500 ml (1 bottle). Figure (A) is a clinical photograph of the patient before incision drainage of the abscess.

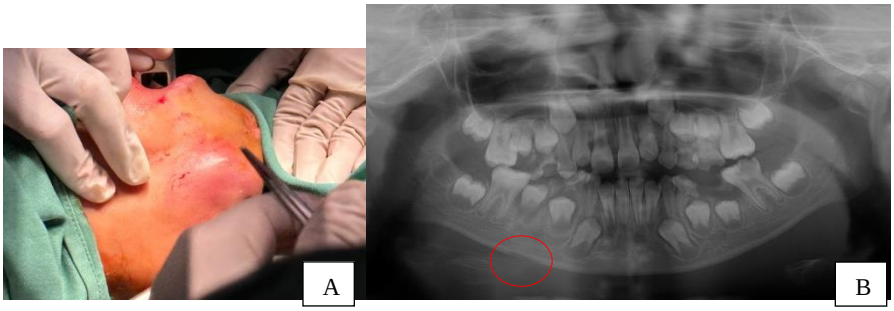

Figure (A) Photograph of the patient before abscess drainage incision, **(B)** panoramic radiographic examination

After supporting examination through panoramic radiographs (Figure B), it can be interpreted that there is dental caries in teeth 55, 56, 66, 76, and 86, and there is a radiolucency picture which is a mandibular bone discontinuity (*unilateral closed fracture of the body of the mandible*). Based on laboratory support examination, the results of Hematocrit 34.9, Leukocytes 17.47, Neutrophils 76, Lymphocytes 18. The patient was asked to be hospitalized because the patient would perform drainage incision and abscess debridement. Before the action, the patient and family were explained the clinical condition, action plan, and prognosis followed by signing a letter of consent for medical action.

RESEARCH FINDINGS

The patient enters the Central Surgical Installation area under sterile conditions, and the patient, operator, and room are prepared. The patient entered the OK room with an IV already attached to the left hand, and a vital sign monitoring device was installed. The patient underwent anesthesia induction, sedation and inhalation, and intubation fixation by an anesthesiologist. The patient's eye area was closed using *hypavix*. Extraoral and intraoral asepsis and anti-sepsis were performed using povidone iodine 10 % (Figure C). The patient's body was covered with a sterile towel and a gauze pad was placed on the oropharynx. The patient was given an adrenaline injection, followed by incision, dissection, and removal of overlying bone using a *bone bur*, then tooth splitting and tooth removal, and socket curettage with bone smoothing. Spooling of the surgical area and bleeding control, as well as intra oral suturing. Drainage incision was performed using a number 11 *blade* with blunt dissection. Pus was removed thoroughly (Figure D), bleeding control was performed, abscess debridement was performed, Penrose drain was placed on the extraoral side and drain was sutured (Figure E), the surgical area was cleaned, the patient was placed in a loose bandage, and the operation was completed.

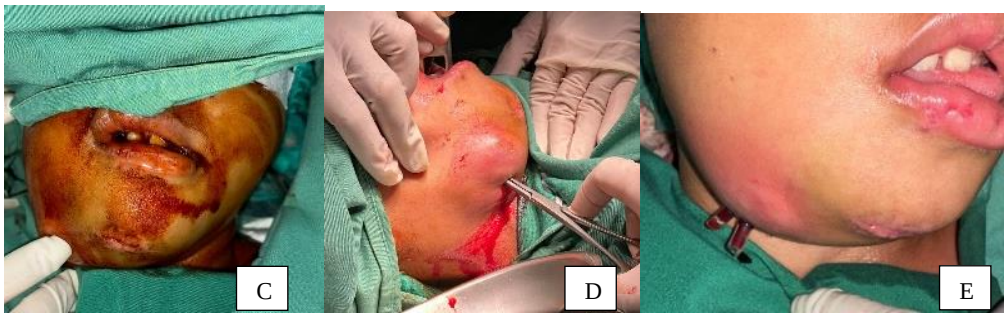

Figure (C) Extraoral and intraoral asepsis and anti-sepsis, **(D)** Pus clearance, **(E)** Drain placement.

DISCUSSION

An abscess is formed by the body's response to bacteria that develop due to infection in the body. Submandibular abscess is an inflammation accompanied by pus formation in the submandibular region and is a type of infection in the inner neck. The bacteria that cause submandibular abscesses generally consist of a mixture of aerobic, anaerobic and facultative anaerobic bacteria. Infection of the submandibular fascia causes a cavity to form in the tissue due to the destruction of cells within the tissue. The cavity contains dead tissue and cells and becomes a collection of pus due to the entry of white blood cells into the cavity and phagocytosis of bacteria. Phagocytosis is the process of white blood cells in eating or swallowing bacteria which aims to block or stop the development of bacteria. White blood cells that successfully phagocytose bacteria will die and form pus that fills the cavity.[7]

Signs and symptoms of a submandibular abscess are the onset of fever and neck pain accompanied by swelling under the mandible and/or under the tongue which may fluctuate. The duration of symptoms varies from 12 hours to 28 days with an average of 5 days. The condition is usually accompanied by trismus. Severe submandibular abscess may cause other symptoms which are manifestations of complications of submandibular abscess such as airway compromise, septic shock and mediastinitis. The presenting infection appears as moderate swelling of the submandibular area that spreads and then causes larger edema that hardens and reddens the skin, the mandibular angle appears to disappear, accompanied by pain on palpation and moderate trismus due to involvement of the medial pterygoid muscle.[8,9] Pus collection under the tongue can cause the tongue to be pushed upwards resulting in dysphagia, odynophagia, dysphonia, and even cyanosis, and in some cases symptoms of infection such as high fever, malaise, tachycardia, and chills are found.[10]

Delay or misdiagnosis can result in abscess traveling to the neck and mediastinal space. This can lead to complications such as mediastinitis, sepsis, and death due to airway obstruction, in the modern antibiotic era a mortality rate of 40% has been reported. Generally, the source of infection in the submandibular space comes from the infectious process of the teeth, floor of the mouth, pharynx, submandibular lymph nodes. In addition to dental infections, infections in the submandibular space can be caused by lymphadenitis, trauma, or surgery.[11,12]

The top priorities for submandibular abscess treatment are maintaining airway patency, intravenous antibiotics, and then surgical drainage. Maintaining airway patency if there is obstruction is the most important thing to do immediately in the operating room with intubation using fiberoptic (*blind* intubation both nasotracheal and orotracheal with neuromuscular relaxants can trigger an airway crisis), if very necessary, tracheostomy can be done immediately.[13]

Streptococcus and Staphylococcus bacteria are the dominant flora found in pus culture in submandibular abscess cases. Empirical antibiotic administration of Amoxicillin 500 mg tablet and Metronidazole 500 mg tablet was in accordance with the literature, although culture and antibiotic sensitivity tests are needed for more definitive treatment.[8] Every patient with deep neck infection should receive empirical antibiotic therapy until culture and sensitivity results are available. The choice of empirical antibiotics should be effective against aerobic and anaerobic microbes that are often the cause. Combinations of penicillin class antibiotics with B-lactamase inhibitors (amoxicillin with clavulanic acid) or B lactamase resistant inhibitors (cefoxitin, cefuroxime, imipenem or meropenem) plus drugs sensitive to anaerobic microbes (clindamycin or metronidazole) are effective in treating mixed infections with a success rate of more than 70%. Some special cases of mild degree can be treated only with antibiotics and gentle observation, thus accelerating healing and boosting the body's immune system.[14]

Symptomatic therapy in the form of analgesics / antipyretics needs to be given to reduce patient complaints and betadine gargle as an antiseptic measure in the oral cavity to prevent further infection in the oral cavity. Patients with submandibular abscesses often experience dehydration and poor intake due to difficulty swallowing so that fluid and nutritional administration needs to be considered because if malnutrition occurs, the prognosis will worsen.[15]

Indications for surgery are airway obstruction, critical condition, sepsis, complications, descending infection, diabetes mellitus, no therapeutic progress with intravenous antibiotics >48 hours, abscesses with a diameter of >3 cm, abscesses covering 2 deep neck area locations. The incision can be done intraoral, extraoral or both. Intraoral incision is performed when the infection is localized only in the sublingual area, taking care not to affect the lingual nerve or submandibular duct. Extraoral incision is performed when the infection is localized to the *submaxillary* area. Both intraoral and extraoral incisions can be performed through the submandibular approach when there is concurrent involvement of infection in the sublingual and *submaxillary* spaces. The transverse incision extends from one corner of the mandible to the other (note the mandibular marginal nerve) followed by opening the platysma muscle by blunt dissection using a blunt hemostat until pus is obtained and drained, after which a drain is placed, and partial suturing of the incision wound is performed.[12]

Mandibular fractures are the most common facial fractures in pediatric patients. Complications of mandibular fractures include malocclusion, infection (abscess and osteomyelitis), and delayed wound healing (malunion and non-union fractures and wound dehiscence). Bone fractures themselves can cause infection and become an entry point for microorganisms. Microorganisms in infections involving fractures are 30-42% Staphylococcus aureus, 20-39% coagulase-negative staphylococci, 14-27% Enterobacteriaceae, 16% Anaerobic bacteria, and 11% Streptococci. The infection involving the fracture in this patient manifested as a submandibular abscess due to the formation of pus in the submandibular space that occurred due to the infection.[15]

RESULT

Successful management of mandibular fractures is preceded by management of the submandibular abscess infection as a complication by drainage incision, administration of controlled antibiotic therapy, and control of the source of infection by extraction of the untenable tooth 85. The infection-causing mandibular fracture line adjacent to the tooth will be treated after infection control is resolved. One week postoperatively, the patient was discharged with no complaints or recurrent infection (Figures F and G).

Figure (F) Post-control intra oral clinical photograph, **(G)** Post-control extra oral clinical photograph

CONCLUSION

Infections involving fractures often occur due to untreated fractures and trigger infection as in this case, the patient had a submandibular abscess in the right mandible due to a mandibular fracture and was not previously detected. The patient in this case report underwent incision and drainage and antibiotic therapy. At the time of follow-up, the patient's condition had improved and there were no other complaints.

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