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CASE REPORT

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Submandibular abscess originated from submandibular gland sialolithiasis: a case report

Dimaz Aryo Nugroho Bandriananto[a], Arya Wicaksono[a], Fajar Januar Mirhard[a] and Bramasto Purbo Sejati[b]

[a]Resident of Oral and Maxillofacial Surgery Study Program, Faculty of Dentistry, Universitas Gadjah Mada, Yogyakarta, Indonesia; [b]Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Universitas Gadjah Mada, Yogyakarta, Indonesia

ABSTRACT

Sialolithiasis, or the formation of stones within the salivary glands, is a common cause of the submandibular gland's duct obstruction, which can lead to submandibular abscesses. We reported the case of a 56-year-old man with a submandibular abscess caused by sialolithiasis of the left submandibular gland. A 56-year-old male patient came with complaints of swelling and pain in the left submandibular area for one week. Patients also reported fever, dysphagia, and increased pain while eating. Physical examination showed diffuse swelling and redness in the left submandibular area. Head MSCT and panoramic radiography revealed the presence of stones in the duct of the left submandibular gland. The patient underwent surgical treatment for stone removal and abscess drainage. Postoperative follow-up showed significant improvement in the patient's condition without complications. If left untreated, sialolithiasis is a primary cause of blockage of the submandibular gland's duct, which can result in infections and abscesses. Prompt and appropriate treatment, including abscess drainage and stone removal, is essential to reduce morbidity. Early diagnosis through anamnesis, physical examination, and imaging are the keys to good outcomes. A submandibular abscess caused by sialolithiasis of the submandibular gland requires quick and appropriate treatment. Surgical treatment with abscess drainage and stone removal provides satisfactory results without complications.

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Operative treatment; submandibular abscess; submandibular gland; sialolithiasis

Introduction

Sialolithiasis is the formation of stones or calculus within the salivary glands, mainly in the submandibular glands. This condition is a significant cause of salivary gland duct obstruction, which can lead to various complications if not treated quickly and appropriately [1,2]. The submandibular gland is one of the three main salivary glands at the bottom of the jaw. These glands produce most of the saliva needed for the digestive process and lubrication of the mouth. The ducts of the submandibular gland, or Wharton ducts, are the main pathways through which saliva flows into the oral cavity [3].

Sialolithiasis often occurs in the submandibular glands due to the thicker chemical composition of saliva and the long, winding duct paths [4]. These factors facilitate the deposition of minerals that eventually form the stones or calculus. These stones can vary in size and number, ranging from small and asymptomatic to large, and cause total obstruction [5]. The clinical symptoms of sialolithiasis can differ depending on the location and size of the stone. Common symptoms include pain and swelling in the affected gland area, especially when eating. This pain is caused by increased saliva production blocked by the presence of stones, causing pressure and inflammation in the glands [6,7].

Complications of poorly treated sialolithiasis can include infection of the salivary glands, which can develop into abscesses. A submandibular abscess is a severe condition characterized by the accumulation of pus within the glandular tissue due to a bacterial infection [8]. This condition can cause severe pain, fever, and significant swelling [9].

Diagnosing sialolithiasis is usually done through careful anamnesis, physical examination, and confirmation

CONTACT Bramasto Purbo Sejati bramasto.ps@ugm.ac.id Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Universitas Gadjah Mada, Jl Denta No 1 Sekip Utara, Yogyakarta 55281, Indonesia.

with imaging techniques such as ultrasound and panoramic radiography [10]. This imaging is essential for determining the location and size of the stone, as well as for planning appropriate handling actions [11].

Treatment of sialolithiasis can vary from conservative approaches to surgical interventions, depending on the severity and symptoms the patient is experiencing. Conservative approaches include good hydration, gland massage, and sialogogues to stimulate saliva flow [12]. Surgical intervention may be needed to remove the stone or drain the abscess in case of infection [13]. This report aimed to present the outcome of surgical intervention of submandibular gland sialolithiasis while highlighting the importance of early diagnosis and accurate management of sialolithiasis complications.

Patient

Subjective and objective examinations

This surgical case report is presented according to SCARE criteria [14]. A 56-year-old male patient came to the Emergency Department of the Regional Hospital with complaints of swelling of the lower jaw accompanied by fever from two days ago. The patient also experienced nausea, difficulty in swallowing, and pain that intensified during eating. He also experienced toothache and tooth mobility one week before admission. There was no history of trauma. The patient was seen to be weak upon admission, with vital signs: blood pressure 129/67 mmHg; heart rate 76 bpm; respiratory rate 20 bpm, temperature 36.7 °C. The patient's oxygen saturation was consistently above 96% upon admission.

Physical examination demonstrated diffuse swelling in the submandibular region, soft and tender on palpation. The margin of the swelling was well-defined and had a color similar to that of the surrounding skin. Intraoral examination revealed no abnormalities (Figure 1). Oral hygiene was moderate, with some calculus accumulation on the lingual face of the tooth. The patient was treated with parenteral medication, including Ondansetron, Ketorolac, Ranitidine, and Asering®.

Ketorolac was used to relieve the patient's pain. The patient also experienced nausea upon admission; therefore, Ondansetron was administered. The patient was found to be weak upon admission. Asering® was administered to provide stable electrolyte condition and prevent the patient's dehydration. The medication was aimed to manage the signs and symptoms experienced by the patient and to prepare the patient for the operative treatment.

Panoramic, anteroposterior, and lateral radiography revealed a well-defined, lobulated, irregular-shaped radiopaque mass within the submandibular region (Figure 2). No additional stones are noted in the immediate vicinity. Head Multi-Slice Computed Tomography (MSCT) revealed a hyperdense mass surrounded with a hypodense shadow, reflecting the presence of stones in the duct of the left submandibular gland (Figure 3). The patient was diagnosed with submandibular abscess *et causa* submandibular gland sialolithiasis, and stone and partial gland removal were planned.

Surgical technique

Under general anesthesia, the stone and partial submandibular gland were surgically removed, along with the drainage of the submandibular abscess. Submandibular surgical access was established. Tissue dissection was done layer by layer including skin, connective tissue, until the platysma muscle. The submandibular gland was dissected out and partial removal of the submandibular gland was done. After the submandibular gland specimen evacuation, it was dissected to reveal the salivary gland stone, measuring approximately 1.2 cm (Figure 4). Postoperative medication, including intravenous antibiotics and symptomatic medication, was given. These regimens includes

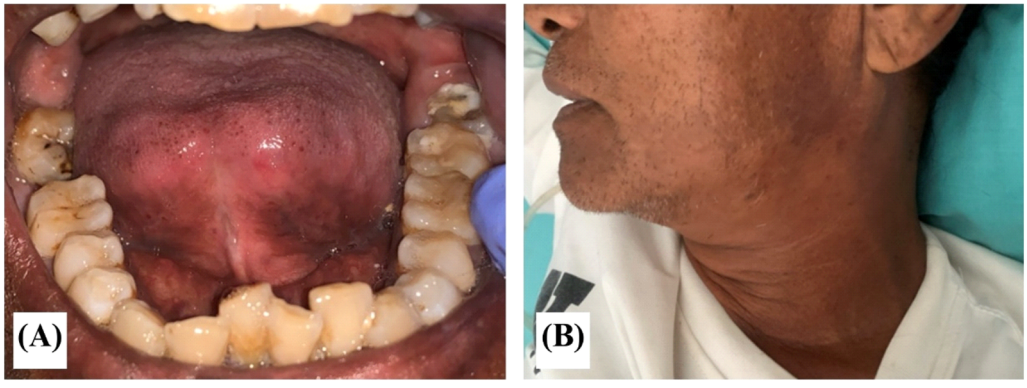

Figure 1. (A) Intraoral and (B) extraoral examination.

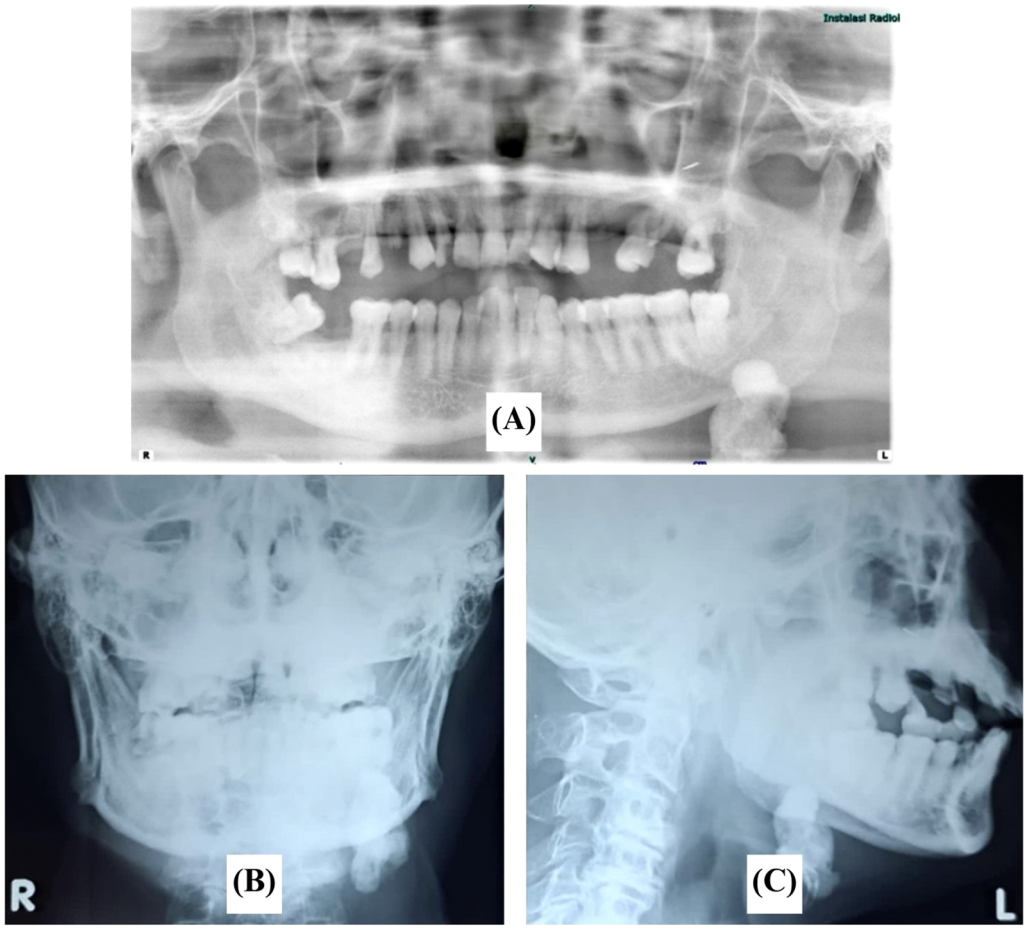

Figure 2. (A) Panoramic radiography, (B) Anteroposterior, and (C) Lateral radiography revealing the radiopaque submandibular gland stone.

Ceftriaxone injection 1 g/12 h, Metronidazole injection 500 mg/8 h, Dexamethasone injection 5 mg/12 h, Ketorolac injection 30 mg/8 h, Paracetamol injection 500 mg/8 h, and Ranitidine injection 50 mg/12 h.

Results

The patient was followed up seven days after the operation. Pain and swelling decreased significantly, and there was slight edema in the submandibular region. There were no wound-healing complications or postoperative complications with extraoral sutures intact and no dehiscence (Figure 5). The sutures were removed during this follow-up period. After the follow-up period, the patient was discharged with a stable and complication-free condition.

Discussion

Sialolithiasis is the leading cause of obstruction of the duct of the submandibular gland [15]. Complications such as abscesses can occur if the obstruction is not resolved quickly [16]. Prompt and appropriate treatment, including abscess drainage and stone removal, is essential to reduce morbidity [17]. Early diagnosis through anamnesis, physical examination, and imaging are crucial for good outcomes [18].

Our patient had moderate oral hygiene and calculus accumulation on the lingual faces of the anterior tooth. Oral bacteria, as such accumulated in the calculus, serves to form the organic component of the salivary stones [19]. Bacteria including *S. aureus*, as well as anaerobic bacteria such as *Prevotella*, *Fusobacterium,* and *Peptostreptococcus* are known to cause sialolithiasis. These bacteria cause retrograde infection into the salivary duct and cause this condition [20].

Imaging modalities including conventional radiography, ultrasound imaging, computed tomography, and cone beam computed tomography are available for sialolithiasis diagnosis [21,22]. Computed tomography is quite useful in circumstances when other procedures yield confusing results. When used with the soft tissue and bone methodology, a CT scan can readily identify an associated abscess or ranula. A CT

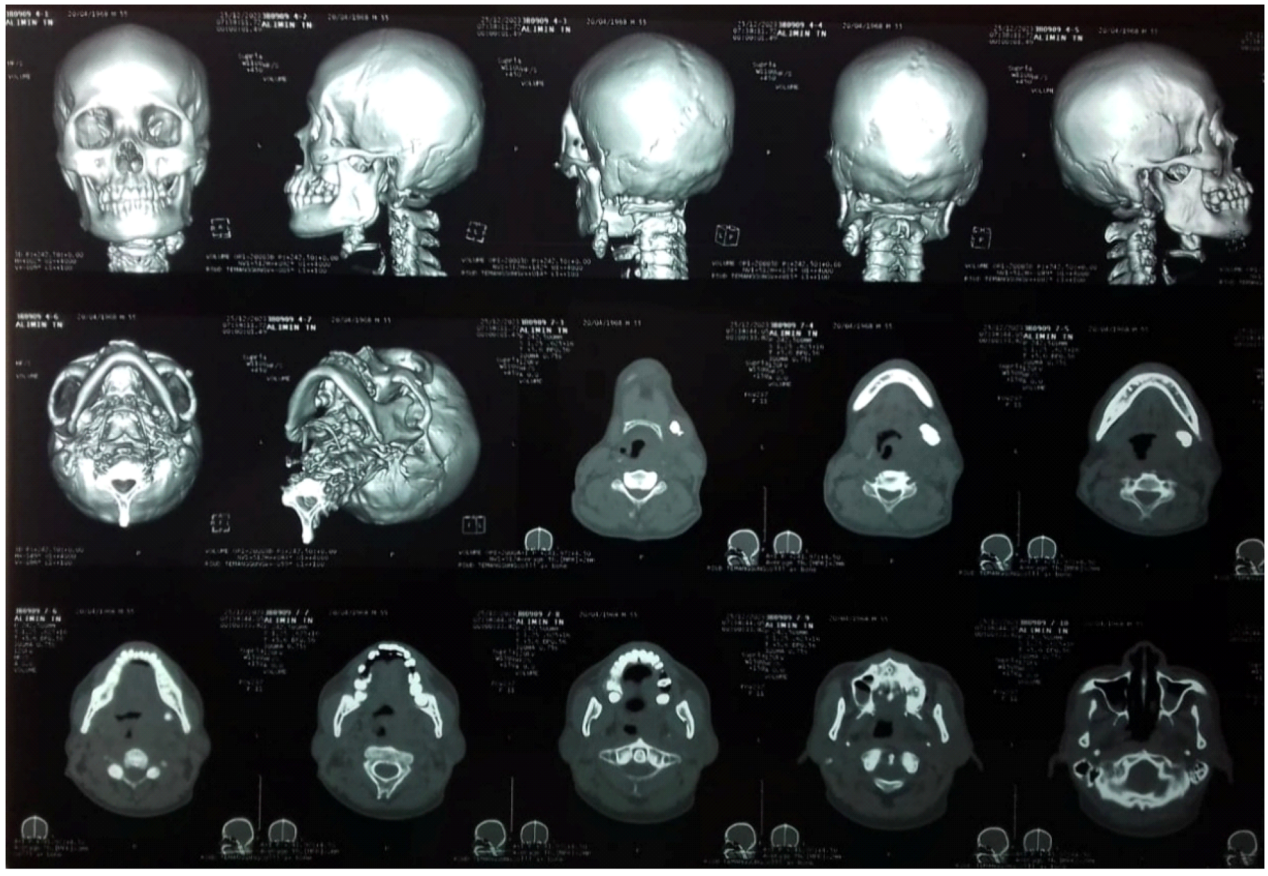

Figure 3. Multi-slice computed tomography revealed a hyperdense mass surrounded by hypodense shadow, reflecting the presence of stones in the duct of the left submandibular gland.

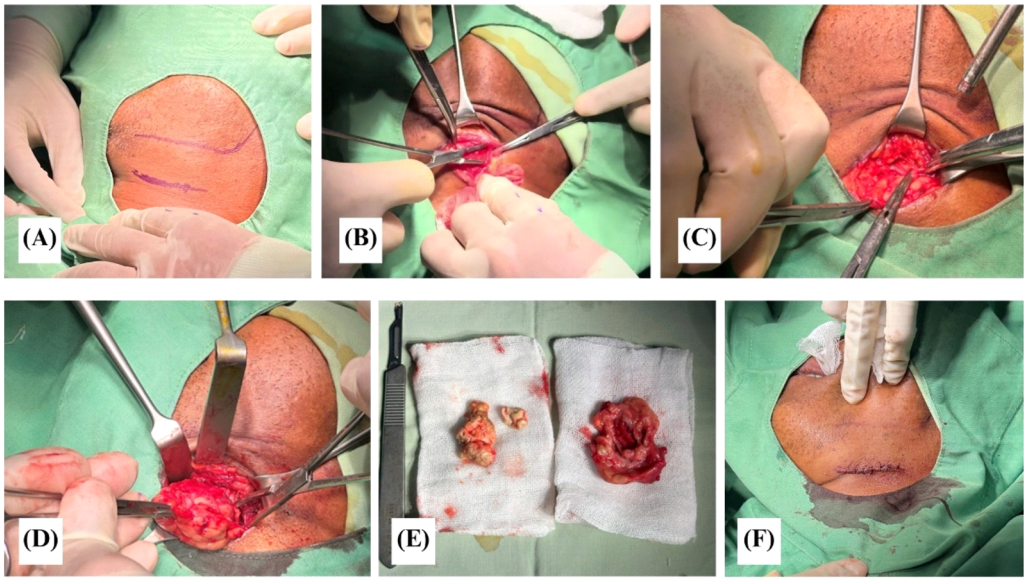

Figure 4. Surgical removal of the submandibular gland and the sialolith, (A) submandibular approach for submandibular gland removal, (B) Tissue dissection layer by layer including skin, connective tissue and platysma muscle, (C) Exposing the submandibular gland, (D) Removal of the submandibular gland, (E) Size of the siaolith and the gland, (F) Suturing layer by layer.

scan is often performed with or without contrast enhancement in order to distinguish between vascular structures and calculi [23]. CT scan was chosen in this case because this modality is readily available in our facility and it can precisely project the location of the gland stone.

Figure 5. Examination during 7th day postoperatively, (A) extraoral examination revealing no swelling of the left submandibular region (B) extraoral suture, intact, no bleeding and no dehiscence.

Removal of sialolith by excision of the submandibular gland is a surgical procedure performed to address stones in the submandibular gland that cause obstruction. Preoperative preparation includes clinical evaluation, diagnostic imaging, and patient counseling [24]. The procedure is performed under general anesthesia, starting with an incision of the skin under the jaw to expose the glands. The submandibular gland is then isolated from the surrounding tissue, and the Wharton duct is tied before the gland and stone are carefully removed [25].

In this case, the extraoral approach, namely the submandibular approach, is preferred. The clinical assessment serves as the foundation for the intra- or extra-oral approach. It is well acknowledged that when the sialolithiasis is anteriorly localized, the intraoral technique should be used [19]. The stone in this case was located postero-inferiorly, even below the level of the inferior margin of the mandible. Therefore, an extraoral approach was preferred.

After the gland is removed, the surgical area is examined and cleaned to ensure no stone residues or infections, and the surgical wound is closed layer by layer [26]. Postoperatively, patients are monitored for signs of complications such as infection or nerve injury and given analgesics and antibiotics to prevent infection [27]. Follow-up visits are scheduled to monitor wound healing and gland function, with additional imaging checks if needed [28]. However, a culture examination was not performed in this patient treatment, making it the limitation of this case management.

Although this procedure is effective, some possible complications include wound infections, hematomas, mandibular marginal nerve injuries, the formation of salivary fistulas, and postoperative swelling and pain. Complication such as infection occurred in 14.6% of the cases, nerve injuries occurred in 16% of the cases, and inflammatory events occurred in 25.3% of the cases [29,30]. However, with proper treatment, postoperative outcomes are generally good, with minimal risk of long-term complications [31].

Excision of the submandibular gland is often necessary in severe cases of sialolithiasis, especially if the stone is large, located deeply, or causes repeated infections and abscesses. This procedure ensures total removal of the affected stones and glands, preventing further complications such as chronic infections and permanent damage to the glands [32]. Excision is performed due to the stone's size and location, recurrent infection complications, and failure of non-surgical methods [33]. This approach ensures good outcomes and minimal risk of long-term complications.

Other treatment options may be considered before excising a submandibular gland. Conservative therapies such as hydration, gland massage, sialogogue, and antibiotics to treat secondary infections are often the first steps. Massaging the external aspect of the gland can be done after each meal. Daily intake of 1.5 L of water also includes conservative nonsurgical management for these cases [19]. In addition, minimally invasive procedures such as sial-endoscopy and extracorporeal lithotripsy can remove or destroy stones without significant surgery [34,35]. Sialoendoscopy

involved localizing the stone using a camera and ablation of the stone. Extracorporeal lithotripsy or Extracorporeal Shock Wave Lithotripsy (ESWL) were shown to give satisfactory results with very few side effects. This modality can easily be considered as first-line treatment of sialolithiasis [34]. Extracorporeal lithotripsy can be used especially in stones greater than 4 mm in size [19].

Conclusion

A submandibular abscess caused by sialolithiasis glandular submandibular requires prompt and appropriate treatment. In this case, surgical treatment with abscess drainage and stone removal provides satisfactory results without complications.

Author contributions

Conceptualization, B.P.S.; data curation, D.A.N.B., A.W., F.J.M.; writing—original draft preparation, D.A.N.B., A.W.; writing—review and editing, B.P.S.; visualization, F.J.M. All authors have read and agreed to the final version of the manuscript.

Ethic statement

This study is a case report and our institution does not require an ethical clearance for this type of study. Written informed consent from the patient was acquired for the examination, treatment, and also the publication of this case.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

The data presented in this case report are available on-request to the corresponding author.

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