NOVEMBER 30, 2021 • VOLUME 5 • ISSUE 11 PRINT ISSN 2519-2086 • ONLINE ISSN 2522-1965

DT Journal

11 2021

Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology

omf publishing

Official Journal of the
Ukrainian Association for
Maxillofacial and Oral Surgeons

DTJournal.org

U-Impl®
SWITZERLAND

№ R3M 804 252 B2

Сертифікат відповідності
технічного регламенту
щодо медичних виробів

Switzerland Aarbergerstrasse 107A, CH-2502
Biel, Phone/Fax +41 323230188
info@u-impl.com
www.u-impl.com

About the Journal: Aims and Scope

NOVEMBER 2021 • VOLUME 5 • ISSUE 11
www.dtjournal.org

Official Title

Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology

Standard Abbreviation: ISO 4

J. Diagn. Treat. Oral Maxillofac. Pathol.

Acronym

JDTOMP

International Standard Serial Numbers (ISSNs)

Print ISSN 2519-2086 | Online ISSN 2522-1965

Aims & Scope

This is a monthly peer-reviewed oral and maxillofacial surgery journal focused on: Microvascular and jaw reconstructive surgery, dental implants, salivary gland tumors/diseases, TMJ lesions, virtual surgical planning, implementation of ultrasonography into the practice of oral and maxillofacial surgeons.

Editorial Board (EB) Composition

- EB shows significant geographic diversity representing 28 opinion leaders from 13 countries: Brazil, Canada, Colombia, Greece, Hong Kong (SAR, China), India, Israel, Italy, Slovak Republic, Spain, Ukraine, United Arab Emirates, and United States.
- The majority of the EB Members have a discernible publication history in Scopus, Web of Science, and journals with a high impact factor.
- The publication records of all EB members are consistent with the stated scope and published content of the journal.
- The journal has a several full-time professional editors.
- Gender distribution of the editors: 10.71% women, 89.28% men, 0% non-binary/other, and 0% prefer not to disclose.

Frequency

12 print/online issues a year (from January 2020)

Publication History

2017: 4 issues a year
2018: 4 issues a year
2019: 10 issues a year
From 2020: 12 issues a year

Publishing Model

Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology is a fully open access and peer-reviewed publication.

Type of Peer Review

The journal employs "double blind" reviewing.

Article Publishing Charge (APC)

During hard times of Covid-19 pandemic our journal trying to support authors by reducing the APC by 50%. And by the end of December 2021 the APC will be 100 USD and 50 USD (excluding taxes) depending on the article`s type. Details at website: dtjournal.org.

13 Types of Articles Currently Published by the Journal

Editorials/Guest Editorials/Post Scriptum Editorials, Images, Case Reports/Case Series, Original Articles, Review Articles, Discussions, Paper Scans (*synonyms*: Review of Articles, Literature Scan), Book Scans (*synonym*: Book Reviews), Letters to the Editor (*synonym*: Letters), and Viewpoints.

State Registration: Ministry of Justice of Ukraine

Registration: Jul 28, 2016 (Certificate: КВ № 22251-12151 Р)
Re-registration: May 21, 2019 (Certificate: КВ № 23999-13839 ПР)
Re-registration: Aug 10, 2021 (Certificate: КВ № 24951-14891 ПР)

Co-Founders

1. Shupyk National Healthcare University of Ukraine (formerly known as Shupyk National Medical Academy of Postgraduate Education).
2. Private Higher Educational Establishment "Kyiv Medical University."
3. OMF Publishing, Limited Liability Company.

Publisher

OMF Publishing, LLC is an academic publisher focused on medical and linguistic sciences.
Address: 13-A Simferopolska Street, Office 121, Kyiv 02096, Ukraine.

Crossref Membership

OMF Publishing, LLC is a member of Publishers International Linking Association, Inc. which doing business as a Crossref. OMF Publishing`s active membership: From February 2017 to present.

Official Journal of the Association

Ukrainian Association for Maxillofacial and Oral Surgeons

Ukrainian Association for Maxillofacial and Oral Surgeons (UAMOS)

Address: 4-A Profesora Pidvysotskoho Street, Kyiv 01103, Ukraine.
Tel., fax: +38 044 528 35 17.
Website: uamos.org.

Subscription Index

In Ukraine: 60077 | In Donetsk/Luhansk Regions: 88263.
See page A5.

Editorial Board

NOVEMBER 2021 • VOLUME 5 • ISSUE 11
www.dtjournal.org

TANTUM VERDE®

INFORMATION LEAFLET
for the medicinal product

Composition:
active substance: **benzydamine hydrochloride**;
100 mL of solution contain benzydamine hydrochloride 0.15 g;
excipients: ethanol 96%, glycerol, methyl parahydroxybenzoate (E 218), flavor (menthol), saccharin, sodium hydrocarbonate, Polysorbate 20, Quinoline Yellow (E 104), Patent Blue V (E 131), purified water.

Dosage form. Oromucosal solution.
Basic physical and chemical properties: a clear green liquid with a typical mint flavor.

Pharmacotherapeutic group. Dental preparations. Other agents for local oral treatment.
ATC code: A01A D02.

Pharmacological properties.
Pharmacodynamics.
Benzydamine is a non-steroidal anti-inflammatory drug (NSAID) with analgesic and antiexudative properties.

Clinical studies have shown that benzydamine is effective in the relief of symptoms accompanying localized irritation conditions of the oral cavity and pharynx. Moreover, benzydamine has anti-inflammatory and local analgesic properties, and also exerts a local anesthetic effect on the oral mucosa.

Pharmacokinetics.
Absorption through the oral and pharyngeal mucosa has been proven by the presence of measurable quantities of benzydamine in human plasma. However, they are insufficient to produce any systemic pharmacological effect. The excretion occurs mainly in urine, mostly as inactive metabolites or conjugated compounds.

When applied locally, benzydamine has been shown to cumulate in inflamed tissues in an effective concentration due to its ability to permeate through the mucous membrane.

Clinical particulars.
Indications.
Symptomatic treatment of oropharyngeal irritation and inflammation; to relieve pain caused by gingivitis, stomatitis, pharyngitis; in dentistry after tooth extraction or as a preventive measure.
Contraindications.
Hypersensitivity to the active substance or to any other ingredients of the product.

Interaction with other medicinal products and other types of interaction.
No drug interaction studies have been performed.

Warnings and precautions.
If sensitivity develops with long-term use, the treatment should be discontinued and a doctor should be consulted to get appropriate treatment.

In some patients, buccal/pharyngeal ulceration may be caused by severe pathological processes. Therefore, the patients, whose symptoms worsen or do not improve within 3 days or who appear feverish or develop other symptoms, should seek advice of a physician or a dentist, as appropriate.

Benzydamine is not recommended for use in patients hypersensitive to acetylsalicylic acid or other non-steroidal anti-inflammatory drugs (NSAIDs).

The product can trigger bronchospasm in patients suffering from or with a history of asthma. Such patients should be warned of this.

For athletes: the use of medicinal products containing ethyl alcohol might result in positive antidoping tests considering the limits established by some sports federations.

Use during pregnancy or breast-feeding
No adequate data are currently available on the use of benzydamine in pregnant and breastfeeding women. Excretion of the product into breast milk has not been studied. The findings of animal studies are insufficient to make any conclusions about the effects of this product during pregnancy and lactation.

The potential risk for humans is unknown.

TANTUM VERDE should not be used during pregnancy or breast-feeding.

Effects on reaction time when driving or using machines
When used in recommended doses, the product does not produce any effect on the ability to drive and operate machinery.

Method of administration and doses.
Pour 15 mL of TANTUM VERDE solution from the bottle into the measuring cup and gargle with undiluted or diluted product (15 mL of the measured solution can be diluted with 15 mL of water). Gargle 2 or 3 times daily. Do not exceed the recommended dose.

Children.
The product should not be used in children under 12 years due to a possibility of ingestion of the solution when gargling.

Overdosage.
No overdose has been reported with benzydamine when used locally. However, it is known that benzydamine, when ingested in high doses (hundreds times higher than those possible with this dosage form), especially in children, can cause agitation, convulsions, tremor, nausea, increased sweating, ataxia, and vomiting. Such acute overdose requires immediate gastric lavage, treatment of fluid/salt imbalance, symptomatic treatment, and adequate hydration.

Adverse reactions.
Within each frequency group, the undesirable effects are presented in order of their decreasing seriousness.

Adverse reactions are classified according to their frequency: very common (≥ 1/10); common (≥ 1/100 to <1/10); uncommon (≥ 1/1,000 to <1/100); rare (≥ 1/10,000 to <1/1,000); very rare (<1/10,000); frequency unknown (cannot be estimated from the available data).

Gastrointestinal disorders: rare – burning mouth, dry mouth; *unknown* – oral hypesthesia, nausea, vomiting, tongue edema and discoloration, dysgeusia.

Immune system disorders: rare – hypersensitivity reaction, *unknown* - anaphylactic reaction.

Respiratory, thoracic and mediastinal disorders: very rare –laryngospasm; *unknown* – bronchospasm.

Skin and subcutaneous tissue disorders: uncommon – photosensitivity; *very rare* – angioedema; *unknown* – rash, pruritus, urticaria.

Nervous system disorders: unknown – dizziness, headache.

TANTUM VERDE contains methyl parahydroxybenzoate, which can cause allergic reactions (including delayed-type reactions).

Shelf life. 4 years.

Storage conditions.
Do not store above 25°C. Keep out of reach of children.

Packaging.
120 mL of solution in a bottle with a measuring cup; 1 bottle per cardboard box.

Dispensing category.
Over-the-counter medicinal product.

Manufacturer.
Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A., Italy.

Location of the manufacturer and its business address. Via Vecchia del Pinocchio, 22 – 60100 Ancona (AN), Italy.

Date of the last revision of the text.
September 26, 2018.

Information leaflet is
APPROVED by
Order of the
Ministry of Health of Ukraine
No. 636 dated 01.10.2015
Registration Certificate
No. UA/3920/01/01

Our Supporters

NOVEMBER 2021 • VOLUME 5 • ISSUE 11
www.dtjournal.org

FIGURE. Evangelos G. Kilipiris, MD, DMD from the National Institute of Children's Diseases and Faculty of Medicine at Comenius University, Bratislava, Slovak Republic. A kind support of Dr. Kilipiris during the 5 years at the position of Director, Journal Development Department helped our journal to move forward and to evolve. An honorary plaque was presented to him on behalf of the Chief Editor with words "To a Founding Director, Author of Multiple Articles and Reviews, Great Thanks and Appreciation." Photo was taken on November 23, 2021.

Content

of the Volume 5 • Issue 11 • November 2021

COURTESY

Journal`s cover image (virtual surgical planning for a segmental mandibular reconstruction with fibula transplant) is courtesy of Rui P. Fernandes, MD, DMD, FACS, FRCS.

Image was taken from the article: Fernandes RP, Quimby A, Salman S. Comprehensive reconstruction of mandibular defects with free fibula flaps and endosseous implants. *J Diagn Treat Oral Maxillofac Pathol* **2017**;1(1):6–10.

https://doi.org/10.23999/j.dtomp.2017.1.1

CASE

Obstructive Submandibular Sialadenitis Complicated with Severe Neck Phlegmon: Transcutaneous Removal of Sialolith with a Flow of Pus: Literature Review of Extraoral Complications

Lilia A. Savchuk[a] & Ievgen I. Fesenko[b,c,*]

SUMMARY

Sialolithiasis, as the most common reason (60–85 percent) of obstructive salivary gland disease, in the rare cases, may be complicated by soft tissues abscess or/and fistula. The purpose of this report is to present a rare case of submandibular gland sialolithiasis complicated with severe neck phlegmon in a 47-year-old Caucasian male. Ultrasonography and transcutaneous removal of sialolith upon the purulent locus lancing are highlighted. Our literature review based on the existed ones with a total 24 complication cases is presented. Wakoh et al`s classification of submandibular gland sialolith-associated fistulas types is analyzed. The ultrasound imaging is still underestimated and not adequately popularized among head and neck and oral and maxillofacial surgeons. Presented case and published reports show the usefulness of this constantly developing diagnostic technique in a combination with knowledge of possible extraoral purulent complications' and its management.

Kyiv, Ukraine

[a] Doctor of Ultrasound Diagnostics (DUD), Polyclinic, Kyiv Regional Clinical Hospital.

[b] PhD, Associate Professor, Department of Oral and Maxillofacial Surgery, Private Higher Educational Establishment "Kyiv Medical University."

[c] Doctor-Stomatologist-Surgeon (DSS), Doctor of Ultrasound Diagnostics (DUD), Center of Maxillofacial Surgery, Kyiv Regional Clinical Hospital (place of work at moment of material collection).

* Corresponding author's address: Department of Oral and Maxillofacial Surgery, Private Higher Educational Establishment "Kyiv Medical University." 7 Antona Tsedika Street, Kyiv 02000, Ukraine.
E-mail: *eugenfesenko@gmail.com* (Ievgen Fesenko)
ORCID: https://orcid.org/0000-0002-8901-1632
Instagram: *@dr_eugenfesenko*
Facebook: *Eugene Fesenko*

Please cite this article as: Savchuk LA, Fesenko II. Obstructive submandibular sialadenitis complicated with severe neck phlegmon: transcutaneous removal of sialolith with a flow of pus: literature review of extraoral complications. J Diagn Treat Oral Maxillofac Pathol 2021;5(11):125–34.

Abbreviation 'US' at the upper right icon means that article contains ultrasound image.

Paper received 25 October 2021
Accepted 07 November 2021
Available online 30 November 2021

https://dx.doi.org/10.23999/j.dtomp.2021.11.1

INTRODUCTION

Sialolithiasis, as the most common reason (60–85 percent)[1] of obstructive salivary gland disease, in the rare cases, may be complicated by soft tissues abscess[2,3] or/and fistula.[4,5] A clinical study by Kishore Kumar et al (2012) of the 200 cases of cutaneous sinuses revealed that only in 0.5 percent of cases was noted cutaneous fistula as a result of submandibular gland calculus.[6] Such fistula usually is named by authors as *orocutaneous* or *sialo-cutaneous fistula*.[5,7]

According to our literature search, submandibular gland calculus-associated abscesses/phlegmons are even rarer comparing with sialo-cutaneous fistulae. Purulent floor of the mouth processes as a complication of obstructive salivary stone usually were diagnosed by multi-slice computed tomography (MSCT).[3,8] Despite ultrasound (US) are widely described as a diagnostic tool for submandibular sialolithiasis[1,9,10] its application in case of calculus-associated cervical fistulae and abscess/phlegmon to our knowledge is presented in very limited publications.[11,12]

The purpose of this report is to present a rare case of submandibular gland sialolithiasis complicated with severe neck phlegmon in a 47-year-old male. Ultrasound and transcutaneous removal of sialolith upon the purulent locus lancing are highlighted. Our own literature review based on the existed ones with a total 24 complication cases is presented.

CASE

A 47-year-old Caucasian gentleman was referred to the Kyiv Regional Clinical Hospital with a left neck and submandibular swelling (Fig 1), fever, difficulty of swallowing. The complaints had been initiated with salivary colics several weeks before. Previously, during the last years, patient noted a painful chewing–associated submandibular swelling at the left side.

US was performed by an experienced doctor of ultrasound diagnostics (L.A.S., her experience – 31 years). Submandibular and neck regions were examined bilaterally according to the protocol (ie, swelled and healthy side). Using linear transducer (12-5MHz) in a longitudinal submandibular position, the gray scale US (also known as B-mode [brightness mode]) showed hyperechoic semilunar structure (ie, sialolith, measured 0.76 × 0.78 cm) with an artifact of acoustic shadowing behind (Fig 2). Also, in this left submandibular region, the submandibular gland with a hypoechoic parenchyma and the collection of hypoechoic heterogenic content (ie, pus) were visualized. The diagnosis of obstructive sialadenitis caused by sialolith and complicated with submandibular and left neck phlegmon was established.

The phlegmon lancing was done under the local infiltration anesthesia using 8.0 ml of 4 percent Ultracain® D-S solution (Sanofi-Aventis Deutschland GmbH, Frankfurt am Main, Germany) mixed with 12.0 ml of 0.9% saline solution in a 20-ml syringe. Intravenous sedation was done by anesthesiologist`s team. An oblique 3.5-cm incision was planned and done inside the prominent upper neck skin crease (Fig 1C). A 1.2-cm salivary calculus (ie, sialolith) was removed with a flow of pus (~22 ml) upon the finger examination (ie, revision) of the purulent wound (Fig 3). Tubular double drainage was installed after rinsing with an antiseptic solution. Post-operative period associated with infusion and antibacterial therapy and wound rinsing showed gradual decrease of soft tissues inflammatory changes and complaints.

DISCUSSION

Digestion-associated swelling[9] (also known as "mealtime syndrome"[13]) in the submandibular region is a common disorder at the in- and out-patient oral and maxillofacial units. And typically, this is a manifestation of obstructive sialadenitis caused by sialoliths. Such complications of obstructive sialoliths as pus collection in the cellular spaces and fistulae are not common and its diagnostic features and management strategies are to be analyzed. In a literature review we analyze all purulent extraoral complications' manifestations (abscesses, phlegmons, sialo-cutaneous fistulae, and tender cutaneous nodules).

Table 1 is presenting our literature review of submandibular sialolithiasis complications and its management strategies based on the reviews of Ha et al (2020),[14] Wakoh et al (2021)[7].

Among all 24 published cases (Table 1) of submandibular sialolithiasis with extraoral complications in the majority of cases (n = 17) there were noted the cutaneous fistulous tracts (in 69.56 percent), collection of pus in cellular space – in 5 cases (in 21.74 percent), and tender cutaneous nodule – in 2 cases (in 8.7 percent).

FIGURE 1. Preoperative anterior view (**A**). Notes perspiration on the lower face, soft tissue swelling (*arrow*) in submental, left submandibular, and left neck region. Skin erythema visualized at the area of swelling and reached the level of left clavicle and suprasternal notch. **(FIGURE 1 continued on next page.)**

FIGURE 1 (continued). Preoperative 45 degree angled (**B**) and lateral view (**C**). An oblique 3.5-cm incision was planned and done inside the prominent upper neck skin crease (*arrowhead*).

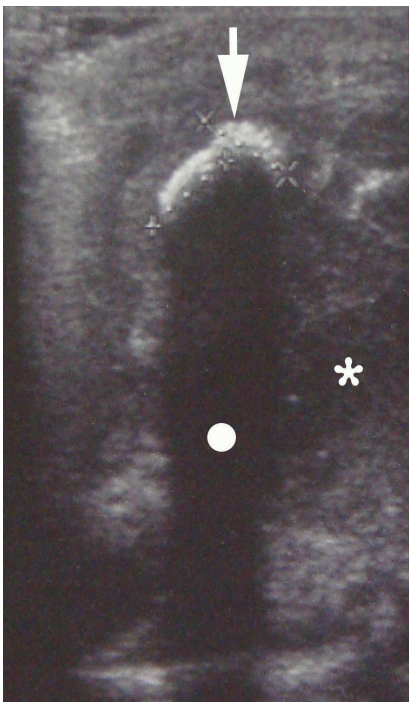

FIGURE 2. Preoperative gray scale ultrasound shows hyperechoic semilunar structure (ie, sialolith) (indicated by '+' and '×' calipers and *arrow*) with an artifact of acoustic shadowing behind (*dot*) and the collection of hypoechoic heterogenic content (pus, indicated by *asterisk*).

FIGURE 3. A cropped view of a 1.2-cm sialolith after its removal upon the phlegmon lancing. The sialolith was removed with a flow of pus upon the finger revision (ie, exploration) of the purulent wound.

TABLE 1. Literature Review of Submandibular Sialolithiasis with Purulent Extraoral Complications' Manifestations and Its Management. **(TABLE 1 continued on next page.)**

#	Authors	Sex/Age (Yrs)	Salivary Gland	Extraoral Complication	Imaging	Surgical Management
1	Present case (treated in 2015, published in 2021)	M/47	Left submandibular	Submandibular and upper neck phlegmon	US	Transcutaneous removal of sialolith during the stage of finger examination of the purulent wound upon the phlegmon lancing
2	Wakoh et al (2021)[7]	M/49	Ectopic right submandibular	Abscess with discharging sialo-cutaneous fistula in submandibular region	OPG, MSCT (non-contrast and contrast enhanced)	Abscess lancing and calcified mass removal
3	Bridwell et al (2020)[3]	F/64	Right submandibular	Mouth floor purulent process in cellular spaces (abscess, according to authors)	MSCT	Ductotomy with removal of sialolith and drain placement
4	Hoffman (2018)[8]	M/Adult	Left submandibular	Submandibular abscess	MSCT	First surgery: Abscess lancing, draining. Second surgery: Sialadenectomy with a stone removal
5	Stegmann et al (2018)[11]	F/6	Left submandibular	Submandibular cutaneous fistula	US, sialendoscopy	Endoscopic removal of the sialolith and excision of the fistula
6	Kusunoki et al (2017)[4]	M/72	Left submandibular	Poor left upper neck granuloma in a skin defect with a fistulous tract	MSCT	Sialadenectomy with sialolith removal and fistula excision
7	Ballal et al (2016)[15]	M/80	Left submandibular	Cutaneous fistulous opening at the left neck	CT (No data it was CBCT or MSCT)	Excision of fistulous tract and submandibular gland with removal of calculus
8	Singh et al (2015)[16]	M/53	Left submandibular	Fistulous opening in submandibular region	Contrast-enhanced MSCT, X-ray fistulogram	Excision of the fistulous tract and submandibular gland
9	Rangappa et al (2014)[17]	F/55	Left submandibular	Cutaneous fistula in the left neck	Lateral X-ray view	Excision of the fistulous opening, tract and submandibular gland with sialolith removal
10	Saha et al (2012)[5]	M/54	Right submandibular	Cervical fistula	X-ray fistulography	Excision of the submandibular gland with the fistulous tract
11	Kishore Kumar et al (2012)[6]	No data	Submandibular	Cutaneous sinus	No data	No data
12	Jayachandran et al (2011)[18]	M/52	Right submandibular	Both, sialo-oral and sialo-cutaneous fistula	Lateral oblique X-ray view, MSCT, MRI	Excision of the gland with removal of sialolith and surgical fistula closure.
13	Salikumar et al (2006)[19]	F/56	Right submandibular	Discharging sinus in the right submandibular region	US, MSCT, fistulogram	Submandibular sialadenectomy with sialolith removal and fistulectomy

TABLE 1 (continued). Literature Review of Submandibular Sialolithiasis with Purulent Extraoral Complications' Manifestations and Its Management.

#	Authors	Sex/Age (Yrs)	Salivary Gland	Extraoral Complication	Imaging	Surgical Management
14	Almasri (2005)[20]	M/70	Left submandibular	Discharging fistula in the left neck	MSCT, OPG	Excision of submandibular gland and the stone
15	Drage et al (2005)[13]	F/45	Left submandibular	Sinus at the lower third of left neck	CT, fluoroscopy	Transcutaneous removal of the migrated stone from the superficial soft tissues
		M/73	Left submandibular	Discharging sinus in the middle third of left neck	Plain radiographs	
16	Karengera et al (1998)[21]	M/64	Left submandibular	Cutaneous fistula in a submandibular region	–	First surgery: Widening the fistula and drainage placement. Second surgery: Transcutaneous removal of the stone with a drain and large amount of necrotic tissue. Third surgery: Sialadenectomy do to the further calculi
17	Paul and Chauhan (1995)[22]	M/45	Right submandibular	Both, sialo-oral and sialo-cutaneous fistula	Lateral X-ray of the neck	Intraoral removal of the calculus and excision of the cutaneous fistula
18	Abe et al (1990)[12]	M/25	Right submandibular	Cervical fistula	X-ray sialogram, OPG, US	Excision of the submandibular gland and salivary fistula
19	Asfar et al (1989)[23,14]	M/55	Submandibular	Orocervical fistula	No data	Excision
		M/43	Submandibular	Tender cutaneous nodule	No data	Excision
		M/75	Submandibular	Tender cutaneous nodule	No data	Excision
20	Cartwright and Hardingham (1983)[2]	F/79	Left submandibular	Left neck abscess	Plain X-ray of the neck	First management: Pus aspiration and prescription of ampicillin. Second management: At day 10 after aspiration – partial excision of the submandibular gland with a sialolith
21	Druez et al (1982)[24]	No data	Submandibular	Cutaneous fistula	No data	No data

US, ultrasound.
OPG, orthopantomography.
MSCT, multi-slice computed tomography.
CT, computed tomography.
X-ray, radiography.
MRI, magnetic resonance imaging.

Among 16 fistulous cases, in two cases both sialo-oral and sialocutaneous fistulae were noted from one calculus, and in one case – the fistula located in a tissues with a resolution of the submandibular abscess.

Among five abscess/phlegmon cases, the abscess with discharging fistula was noted in one case (Wakoh et al)[7].

Bridwell et al presented the description and computed tomography of an obstructed submandibular sialolith with abscess mimicking Ludwig's angina.[3]

Henry Hoffman presented an adult patient with submandibular region abscess due to the submandibular gland sialolithiasis, obstruction disease, and acute infection.[8] In the reported institution`s protocol, the step by step management strategy was perfectly highlighted with a purpose to be a helpful guidelines for other practitioners designed to bridge the gap between procedural concepts and their implementation.[25]

Among five calculus-associated abscesses presentations and descriptions in three cases (Cartwright and Hardingham, Hoffman, and Wakoh et al)[2,8,7] a limited collection of pus was noted, and in two cases (Bridwell et al and our case)[3] the purulent process was diffuse and localized in two or more anatomical regions.

Worth of attention is the classification proposed by the authors from Japan who classified all submandibular gland sialolith-associated fistulas into four types[7]:

1. Sialo-oral fistula.[26]
2. Sialo-cutaneous fistula.[4–6,11–13,15–17,19–21,23,24]
3. Sialo-pharyngeal fistula (synonym: sialo-parapharyngeal fistula).[27]
4. Sialo-oro-cutaneous fistula.[18,22]

Wakoh et al presented the case of cutaneous fistula related with ectopic submandibular gland sialolith.[7] Ha et al (2020) exhibited a sialo-cutaneous fistula but with no evidence of submandibular gland sialolith. In their cases the diagnosis of submandibular sialadenitis was established and the conservative treatment helped to eliminate the symptoms.[14]

Cases with intraoral complications of submandibular sialolithiasis (like submandibular duct fistula, etc.) were excluded from this discussion and can be analyzed in further studies. Despite the fact that in the report of Chandak et al (2012) the case with diagnosis of acute submandibular sialadenitis complicated with abscess was established there was no radiological evidence of sialoliths in submandibular gland.[28]

In the reported cases, some authors combined multiple diagnostic tools, like Jayachandran et al (X-ray, MSCT, MRI),[18] others used a single one, like Hoffman (MSCT)[8]. Among 24 complication cases presented in the Table 1, computed tomography (non-contrast/contrast enhanced) was used in 10 cases, OPG – in three cases, X-ray – in five cases, X-ray fistulography – in three cases, fluoroscopy – in one case, US – in four cases, MRI – in one case, sialoendoscopy – in one case, and X-ray sialography – in one case. Thus, despite the fact that in the majority of cases (n = 10) the teams had chosen CT, ultrasonography (n = 4) has an undiscovered potential among surgeons.

US became a vital diagnostic tool for pathology detection in different glands – thyroid,[29] lymphatic (ie, lymph nodes),[30] and salivary ones[31]. Katz et al are more than right pointing out that a clinical US is to be indicated as soon as the first symptoms of sialadenitis occur.[32] US is more than useful in the detection of structural changes of the salivary gland parenchyma, vascularization, condition of the duct system, sialoliths[9,10] and even mucous plugs[31]. The authors note that approximately 20 to 40% of the salivary stones are not opaque on plain radiography, but most of these sialoliths are visible upon sialography.[32] 2.0-mm and longer sialoliths can be detected on gray scale US.[32]

Practitioners must keep in mind the possible calcifications in the area of major salivary glands as potential mimickers of sialoliths. These can be: healed tuberculous lymphadenitis, phleboliths, tonsilloliths, segmental ossification of the stylohyoid ligament.[33] So, analysis of the anamnesis data, complaints and radiological features can significantly help in differential diagnostics.

In different countries, the purulent process presented in our case can be described by different terms. In English-speaking countries the term *abscess*[34] is usually used, and in some of East European countries (Ukraine, etc.) the term *phlegmon* can be used for the similar condition. In general, *phlegmon* is an acute, clearly not limited purulent inflammation of cellular tissue.[35] And *abscess* is a cavity filled with pus and delimited from the surrounding tissues by a pyogenic membrane.[35] In this particular case the

term *phlegmon* was used to describe the spread of the purulent process up to two anatomical regions.

In general, based on our literature search, the transcutaneous removal of submandibular gland sialoliths was reported in 4 cases. And our case became the fifth one. More than rare case of cutaneous exfoliation of the submandibular gland sialolith was recorded Karengera et al (1998).[21] Very unusual two cases of the submandibular salivary stones migration in the cutaneous direction was described by Drage et al (2005).[13] In 2021, Wakoh et al also highlighted the submandibular gland calculus migration to subcutaneous tissue.[7] Calculi removal in those three cases[7,13] was similar with our case in which the gland was preserved.

CONCLUSIONS

Ultrasound imaging is still underestimated and not enough popularized among head and neck and oral and maxillofacial surgeons. Presented case and published reports show the usefulness of this constantly developing diagnostic technique in a combination with knowledge of possible extraoral purulent complications' and its management.

PATIENT CONSENT

The patient provided written consent for the use of his images.

AUTHOR CONTRIBUTIONS

Conceptualization: Fesenko II. Data acquisition: Savchuk LA. Data analysis, interpretation, and drafting of the manuscript: Fesenko II. Critical revision of the manuscript: Savchuk LA, Fesenko II. Approval of the final version of the manuscript: both authors.

ACKNOWLEDGEMENTS

We would like to thank Professor Henry T. Hoffman, MD, Iowa City, Iowa, United States for the kind support in preparing the manuscript.

REFERENCES (35)

1. Koch M, Sievert M, Iro H, Mantsopoulos K, Schapher M. Ultrasound in inflammatory and obstructive salivary gland diseases: own experiences and a review of the literature. *J Clin Med* **2021**;10(16):3547. https://doi.org/10.3390/jcm10163547
2. Cartwright KAV, Hardingham M. Abscess formation by Haemophilus paraphrophilus secondary to a submandibular salivary calculus. *J Infect* **1983**;6(1):101–2. https://doi.org/10.1016/s0163-4453(83)96266
3. Bridwell RE, Oliver JJ, Griffiths SA, Long B. Sialolithiasis with abscess: an uncommon presentation of a Ludwig's angina mimic. *Am J Emerg Med* **2020**;38(6):1295.e1–1295.e2. https://doi.org/10.1016/j.ajem.2020.01.010
4. Kusunoki T, Homma H, Kidokoro Y, Yanai A, Hara S, Kobayashi Y, To M, Wada R, Ikeda K. Cervical fistula caused by submandibular sialolithiasis. *Clin Pract* **2017**;7(4):985. https://doi.org/10.4081/cp.2017.985
5. Saha S, Jha A, Navneet Kaur N. Unusual cause of orocutaneous fistula in the neck. *Case Rep Surg* **2012**;2012:658536. https://doi.org/10.1155/2012/658536
6. Kishore Kumar RV, Devireddy SK, Gali RS, Chaithanyaa N, Chakravarthy C, Kumarvelu C. Cutaneous sinuses of cervicofacial region: a clinical study of 200 cases. *J Maxillofac Oral Surg* **2012**;11(4):411–5. https://doi.org/10.1007/s12663-012-0353-y
7. Wakoh M, Goto TK, Matsuzaka K, Shibahara T, Kamio T. Sialo-cutaneous fistula with ectopic submandibular gland sialolith, revealing a hidden ipsilateral enlarged and elongated styloid process: a consideration based on CT findings. *Oral Radiol* **2021**;37(2):336–44. https://doi.org/10.1007/s11282-020-00481-8
8. Hoffman HT, editor. Iowa head and neck protocols "submandibular abscess from stone (sialolithiasis, neck abscess)" [document on the internet]; 10 Dec **2018** [cited 23 Oct 2021]. Available from: https://medicine.uiowa.edu/iowaprotocols/submandibular-abscess-stone-sialolithiasis-neck-abscess.
9. Knopf A. Sonography of the major salivary glands. In: Ultrasonography of the head and neck. Welkoborsky HJ, Jecker P, editors. 1st ed. Cham, Switzerland: Springer Nature; **2019**:235–57. https://doi.org/10.1007/978-3-030-12641-4_11
10. Tymofieiev OO, Cherniak OS. Ultrasound in the detection of floating sialoliths. *J Diagn Treat Oral Maxillofac Pathol* **2019**;3(8):196–7. https://doi.org/10.23999/j.dtomp.2019.8.2
11. Stegmann A, Iro H, Koch M. Pediatric submandibular gland sialolithiasis with salivary–cutaneous fistula: case report on gland–preserving treatment with combined endoscopic–transcutaneous surgery. *Am J Otolaryngol Head Neck Surg* **2018**;1(1):1003.
12. Abe H, Kuroda K, Toma H, Takeyama K, Oka M.

A case of submandibular sialolithiasis with the fistula in the lateral neck. *Jpn J Oral Maxillof Surg* **1990**;36(12):2790–3. https://doi.org/10.5794/jjoms.36.2790

13. Drage NA, Brown JE, Makdissi J, Townend J. Migrating salivary stones: report of three cases. *Br J Oral Maxillofac Surg* **2005**;43(2):180–2. https://doi.org/10.1016/j.bjoms.2004.02.002
14. Ha DL, Ryu HS, Kim GW, Kim BS, Ko HC, Kim MB, Lee HJ. Fistula of the submandibular gland presenting as a painful mass in the neck: a rare case. *Ann Dermatol* **2020**;32(1):81–3. https://doi.org/10.5021/ad.2020.32.1.81
15. Ballal R, Banu K, Pandya K. A Submandibular sialolith of an unusual size presenting with a cervical fistula mimicking a branchial fistula: a case report. *J Health Allied Sci* **2016**;6(2):66–8. https://doi.org/10.1055/s-0040-1708644
16. Singh R, Bhagat S, Bhagat R and Singh B. Submandibular gland sialolithiasis presenting as fistula in the neck–a case report. *Austin J Otolaryngol* **2015**;2(4):1040.
17. Rangappa VB, Soumya MS, Sreenivas V. Salivary fistula with a calculus!! *Int J Head Neck Surg* **2014**;5(2):96–8 https://doi.org/10.5005/jp-journals-10001-1191
18. Jayachandran S, Bakyalakshmi K, Singh K. Giant submandibular sialolith presenting with sialocutaneous and sialo-oral fistula: a case report and review of literature. *J Indian Acad Oral Med Radiol* **2011**;23(5):491–4. https://doi.org/10.5005/jp-journals-10011-1207
19. Salilkumar K, Gopakumar KP, Divya GM, Sindhu BS. An unusual sequel of submandibular gland calculus-A case report. *Indian J Otolaryngol Head Neck Surg* **2006**;58(3):303–4. https://doi.org/10.1007/BF03050851
20. Almasri MA. Management of giant intraglandular submandibular sialolith with neck fistula. *Annal Dent Univ Malaya* **2005**;12(1):41–5. https://doi.org/10.22452/adum.vol12no1.7
21. Karengera D, Yousefpour A, Reychler H. Unusual elimination of a salivary calculus. A case report. *Int J Oral Maxillofac Surg* **1998**;27(3):224–5. https://doi.org/10.1016/s0901-5027(98)80017-9
22. Paul D, Chauhan SR. Salivary megalith with a sialo-cutaneous and a sialo-oral fistula: a case report. *J Laryngol Otol* **1995**;109(8):767–9. https://doi.org/10.1017/s0022215100131263
23. Asfar SK, Steitiyeh MR, Abdul-Amir R. Giant salivary calculi: an orocervical fistula caused by a submandibular gland calculus. *Can J Surg* **1989**;32(4):295–6.
24. Druez W, De Wolf JP, Tant L. Cutaneous fistula caused by submandibular lithiasis [in French]. *Acta Stomatol Belg* **1982**;79(4):269–71.
25. Citing the Iowa protocols (use as a reference) [document on the internet]; 20 Feb **2020** [cited 23 Oct 2021]. Available from: https://medicine.uiowa.edu/iowaprotocols/citing-iowa-protocols
26. Szalma J, Orsi E, Nyárády Z, Szabó G, Olasz L. Submandibular sialolith: case report and review of the literature [in Hungarian]. *Fogorv Sz* **2008**;101(6):219–23.
27. Panuganti BA, Baldassarre RL, Bykowski J, Husseman J. Chronic sialadenitis with sialolithiasis associated with parapharyngeal fistula and tonsillolith. *Radiol Case Rep* **2017**;12(3):519–22. https://doi.org/10.1016/j.radcr.2017.06.002
28. Chandak R, Degwekar S, Chandak M, Rawlani S. Acute submandibular sialadenitis—a case report. *Case Rep Dent* **2012**;2012:615375. https://doi.org/10.1155/2012/615375
29. Novosel T, Jecker P. Ultrasound of the thyroid gland. In: Welkoborsky H, Jecker P, editors. Ultrasonography of the head and neck. 1st ed. Cham, Switzerland: Springer Nature; **2019**:259–78. https://doi.org/10.1007/978-3-030-12641-4_12
30. Tymofieiev OO, Ushko NO, Fesenko II, Tymofieiev OO, Yarifa MO, Cherniak OS. Suppurative mastoid lymphadenitis mimicking mastoiditis: a case report. *J Korean Assoc Oral Maxillofac Surg* **2021**;47:398–402. https://doi.org/10.5125/jkaoms.2021.47.5.398
31. Cherniak OS, Fesenko II. Effectiveness of ultrasound in verification of the mucus plugs and sialoliths of the Wharton`s duct. *J Diagn Treat Oral Maxillofac Pathol* **2019**;3(5):144–53. https://doi.org/10.23999/j.dtomp.2019.5.3
32. Katz P, Hartl DM, Guerre A. Clinical ultrasound of the salivary glands. *Otolaryngol Clin North Am* **2009**;42(6):973–1000. https://doi.org/10.1016/j.otc.2009.08.009
33. Mandel L. Tuberculous cervical node calcifications mimicking sialolithiasis: a case report. *J Oral Maxillofac Surg* **2006**;64(9):1439–42. https://doi.org/10.1016/j.joms.2006.03.024
34. Wong S, Dai E, Tang E, Ahuja AT. Neck abscess. In: Essential radiology for medical students, interns and residents. Ahuja AT, Antonio GE, Nung RC, Sitt JC, Yu JW, Wong SS, Dai EY, Law EK, Tang EW, Yuen BT, editors. Kyiv, Ukraine: OMF Publishing; **2017**:3–6.
35. Tymofieiev OO. Maxillofacial surgery and surgical dentistry [Russian]. Volume 1. 1st ed. Kyiv: All-Ukrainian Specialized Publishing House "Medicine"; **2020**.

TANTUM VERDE®

QUICK RELIEF FROM PAIN AND INFLAMMATION IN THE MOUTH AND THROAT[1]

AN INTEGRAL COMPONENT OF THE TREATMENT OF PAIN AND INFLAMMATION IN THE ORAL CAVITY IN 60 COUNTRIES WORLDWIDE![2]

- **JAWS FRACTURES[3]**
- **IMPLANTS PLACEMENT[4]**
- **WOUNDS OF ORAL CAVITY[5]**

Reg. № UA/3920/01/01

LOCAL ANESTHETIC AND ANTI-INFLAMMATORY EFFECT[1]

SUMMARY OF PRODUCT CHARACTERISTICS

NAME OF THE MEDICINAL PRODUCT. Tantum Verde 0.15% mouthwash. QUALITATIVE AND QUANTITATIVE COMPOSITION. Each 100 ml contains: active ingredient: benzydamine hydrochloride 0.15 g (equivalent to 0.134 g of benzydamine). **Therapeutic indications.** Treatment of symptoms such as irritation/inflammation including those associated with pain in the oropharyngeal cavity (e.g. gingivitis, stomatitis and pharyngitis), including those resulting from conservative or extractive dental therapy. **Posology and method of administration.** Pour 15 ml of Tantum Verde mouthwash into the measuring cup, 2-3 times per day, using it either at full concentration or diluted. If diluted, add 15 ml of water to the graduated cup. Do not exceed the recommended dosage. **Contraindications.** Hypersensitivity to benzydamine or to any of the excipient. **PHARMACOLOGICAL PROPERTIES. Pharmacodynamic properties.** Pharmacotherapeutic group: Stomatologic drugs: other agents for local oral treatment, ATC code: A01AD02. Clinical studies demonstrate that benzydamine is effective in relieving suffering from localised irritation of the mouth and pharynx. In addition, benzydamine possesses a moderate local anaesthetic effect. **Pharmacokinetic properties.** Absorption. Absorption through the oropharyngeal mucosa is demonstrated by the presence of measurable quantities of benzydamine in human plasma. These levels are insufficient to produce systemic effects. Distribution. When applied locally, benzydamine has been shown to accumulate in inflamed tissues where it reaches effective concentrations because of its capacity to penetrate the epithelial lining.

Information about medicines. Information for health care professionals for use in professional activities.

1. Інструкція для медичного застосування лікарського засобу Тантум Верде®, розчин для ротової порожнини, РП № UA/3920/01/01, затверджено Наказом Міністерства охорони здоров'я України № 636 від 01.10.2015.
2. http://www.angelinipharma.com/wps/wcm/connect/com/home/Angelini+Pharma+in+the+world/
3. Тимофеев А.А. и др. "Особенности гигиены полости рта для профилактики воспалительных осложнений при переломах нижней челюсти". Современная стоматология 2015;1(75):52–8.
4. 4,5. Tymofieiev O.O. et al"Prevention of inflammatory complications upon surgeries in maxillofacial region". J Diagn Treat Oral Maxillofac Pathol. 2017;1:105–12.

Clinical and CT images are courtesy of: Ievgen Fesenko (Department of Oral & Maxillofacial Surgery, PHEI "Kyiv Medical University", Kyiv, Ukraine), Oleg Mastakov ("SCIEDECE—Scientific Center of Dentistry & Ultrasound Surgery" Kyiv, Ukraine)

ANGELINI

04119, Kiev, Melnikova str. 83D, of. 404.
Tel.: (044) 538-01-26
Fax: (044) 538-01-27

Dileo FARMA