

World Journal of *Clinical Cases*

World J Clin Cases 2023 March 26; 11(9): 1888-2122



REVIEW

- 1888 Endoscopic transluminal drainage and necrosectomy for infected necrotizing pancreatitis: Progress and challenges
Zeng Y, Yang J, Zhang JW

MINIREVIEWS

- 1903 Functional role of frontal electroencephalogram alpha asymmetry in the resting state in patients with depression: A review
Xie YH, Zhang YM, Fan FF, Song XY, Liu L
- 1918 COVID-19 related liver injuries in pregnancy
Sekulovski M, Bogdanova-Petrova S, Peshevska-Sekulovska M, Velikova T, Georgiev T
- 1930 Examined lymph node count for gastric cancer patients after curative surgery
Zeng Y, Chen LC, Ye ZS, Deng JY
- 1939 Laparoscopic common bile duct exploration to treat choledocholithiasis in situs inversus patients: A technical review
Chiu BY, Chuang SH, Chuang SC, Kuo KK
- 1951 Airway ultrasound for patients anticipated to have a difficult airway: Perspective for personalized medicine
Nakazawa H, Uzawa K, Tokumine J, Lefor AK, Motoyasu A, Yorozu T

ORIGINAL ARTICLE**Observational Study**

- 1963 Clinicopathological features and expression of regulatory mechanism of the Wnt signaling pathway in colorectal sessile serrated adenomas/polyps with different syndrome types
Qiao D, Liu XY, Zheng L, Zhang YL, Que RY, Ge BJ, Cao HY, Dai YC

Randomized Controlled Trial

- 1974 Effects of individual shock wave therapy *vs* celecoxib on hip pain caused by femoral head necrosis
Zhu JY, Yan J, Xiao J, Jia HG, Liang HJ, Xing GY

CASE REPORT

- 1985 Very low calorie ketogenic diet and common rheumatic disorders: A case report
Rondanelli M, Patelli Z, Gasparri C, Mansueto F, Ferraris C, Nichetti M, Alalwan TA, Sajoux I, Maugeri R, Perna S
- 1992 Delayed versus immediate intervention of ruptured brain arteriovenous malformations: A case report
Bintang AK, Bahar A, Akbar M, Soraya GV, Gunawan A, Hammado N, Rachman ME, Ulhaq ZS

- 2002** Children with infectious pneumonia caused by *Ralstonia insidiosa*: A case report
Lin SZ, Qian MJ, Wang YW, Chen QD, Wang WQ, Li JY, Yang RT, Wang XY, Mu CY, Jiang K
- 2009** Transient ischemic attack induced by pulmonary arteriovenous fistula in a child: A case report
Zheng J, Wu QY, Zeng X, Zhang DF
- 2015** Motor cortex transcranial magnetic stimulation to reduce intractable postherpetic neuralgia with poor response to other therapies: Report of two cases
Wang H, Hu YZ, Che XW, Yu L
- 2021** Small bowel adenocarcinoma in neoterminal ileum in setting of stricturing Crohn's disease: A case report and review of literature
Karthikeyan S, Shen J, Keyashian K, Gubatan J
- 2029** Novel combined endoscopic and laparoscopic surgery for advanced T2 gastric cancer: Two case reports
Dai JH, Qian F, Chen L, Xu SL, Feng XF, Wu HB, Chen Y, Peng ZH, Yu PW, Peng GY
- 2036** Acromicric dysplasia caused by a mutation of fibrillin 1 in a family: A case report
Shen R, Feng JH, Yang SP
- 2043** Ultrasound-guided intra-articular corticosteroid injection in a patient with manubriosternal joint involvement of ankylosing spondylitis: A case report
Choi MH, Yoon IY, Kim WJ
- 2051** Granulomatous prostatitis after bacille Calmette-Guérin instillation resembles prostate carcinoma: A case report and review of the literature
Yao Y, Ji JJ, Wang HY, Sun LJ, Zhang GM
- 2060** Unusual capitate fracture with dorsal shearing pattern and concomitant carpometacarpal dislocation with a 6-year follow-up: A case report
Lai CC, Fang HW, Chang CH, Pao JL, Chang CC, Chen YJ
- 2067** Live births from *in vitro* fertilization-embryo transfer following the administration of gonadotropin-releasing hormone agonist without gonadotropins: Two case reports
Li M, Su P, Zhou LM
- 2074** Spontaneous conus infarction with "snake-eye appearance" on magnetic resonance imaging: A case report and literature review
Zhang QY, Xu LY, Wang ML, Cao H, Ji XF
- 2084** Transseptal approach for catheter ablation of left-sided accessory pathways in children with Marfan syndrome: A case report
Dong ZY, Shao W, Yuan Y, Lin L, Yu X, Cui L, Zhen Z, Gao L
- 2091** Occipital artery bypass importance in unsuitable superficial temporal artery: Two case reports
Hong JH, Jung SC, Ryu HS, Kim TS, Joo SP

- 2098 Anesthetic management of a patient with preoperative R-on-T phenomenon undergoing laparoscopic-assisted sigmoid colon resection: A case report
Li XX, Yao YF, Tan HY
- 2104 Pembrolizumab combined with axitinib in the treatment of skin metastasis of renal clear cell carcinoma to nasal ala: A case report
Dong S, Xu YC, Zhang YC, Xia JX, Mou Y
- 2110 Successful treatment of a rare subcutaneous emphysema after a blow-out fracture surgery using needle aspiration: A case report
Nam HJ, Wee SY

LETTER TO THE EDITOR

- 2116 Are biopsies during endoscopic ultrasonography necessary for a suspected esophageal leiomyoma? Is laparoscopy always feasible?
Beji H, Chtourou MF, Zribi S, Kallel Y, Bouassida M, Touinsi H
- 2119 Vaginal microbes confounders and implications on women's health
Nori W, H-Hameed B

ABOUT COVER

Editorial Board Member of *World Journal of Clinical Cases*, Marilia Carabotti, MD, PhD, Academic Research, Medical-Surgical Department of Clinical Sciences and Translational Medicine, University Sapienza Rome, Rome 00189, Italy. mariliacarabotti@gmail.com

AIMS AND SCOPE

The primary aim of *World Journal of Clinical Cases* (*WJCC*, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The *WJCC* is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Journal Citation Reports/Science Edition, Current Contents®/Clinical Medicine, PubMed, PubMed Central, Scopus, Reference Citation Analysis, China National Knowledge Infrastructure, China Science and Technology Journal Database, and Superstar Journals Database. The 2022 Edition of Journal Citation Reports® cites the 2021 impact factor (IF) for *WJCC* as 1.534; IF without journal self cites: 1.491; 5-year IF: 1.599; Journal Citation Indicator: 0.28; Ranking: 135 among 172 journals in medicine, general and internal; and Quartile category: Q4. The *WJCC*'s CiteScore for 2021 is 1.2 and Scopus CiteScore rank 2021: General Medicine is 443/826.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: *Ying-Yi Yuan*; Production Department Director: *Xiang Li*; Editorial Office Director: *Jin-Lei Wang*.

NAME OF JOURNAL

World Journal of Clinical Cases

ISSN

ISSN 2307-8960 (online)

LAUNCH DATE

April 16, 2013

FREQUENCY

Thrice Monthly

EDITORS-IN-CHIEF

Bao-Gan Peng, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati, Ja Hyeon Ku

EDITORIAL BOARD MEMBERS

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

PUBLICATION DATE

March 26, 2023

COPYRIGHT

© 2023 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/GerInfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>

Successful treatment of a rare subcutaneous emphysema after a blow-out fracture surgery using needle aspiration: A case report

Ha-Jong Nam, Syeo-Young Wee

Specialty type: Surgery

Provenance and peer review:

Unsolicited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): 0

Grade B (Very good): B, B

Grade C (Good): C

Grade D (Fair): 0

Grade E (Poor): 0

P-Reviewer: Fan L, China; Jian X, China; Sultana N, Bangladesh

Received: January 13, 2023

Peer-review started: January 13, 2023

First decision: January 30, 2023

Revised: February 1, 2023

Accepted: February 27, 2023

Article in press: February 27, 2023

Published online: March 26, 2023



Ha-Jong Nam, Syeo-Young Wee, Department of Plastic and Reconstructive Surgery, Soonchunhyang University Gumi Hospital, Gumi-si 39371, Gyeonsangbuk-do, South Korea

Corresponding author: Syeo-Young Wee, MD, PhD, Doctor, Professor, Department of Plastic and Reconstructive Surgery, Soonchunhyang University Gumi Hospital, 1 Gongdan-ro 179, Gumi-si 39371, Gyeonsangbuk-do, South Korea. 94061@schmc.ac.kr

Abstract

BACKGROUND

Many cases of emphysema associated with blow-out fractures occur before surgery due to trauma. However, emphysema can occur even after surgery, and most of such cases are managed conservatively and allowed to resolve. Swelling in the periorbital area due to emphysema that occurs after surgery can make early recovery difficult.

CASE SUMMARY

Herein, we describe a case of postoperative subcutaneous emphysema that was treated using a simple needle aspiration method. A 48-year-old male patient visited the hospital with a blow-out fracture of the left medial orbital wall and nasal bone fracture. One day postoperatively, swelling and crepitus in the left periorbital area were observed, and follow-up computed tomography showed emphysema in the left periorbital subcutaneous area. Needle aspiration using an 18-gauge needle and syringe was used to relieve the emphysema. The symptoms of sudden swelling improved immediately, and no recurrence was observed.

CONCLUSION

We conclude that needle aspiration is a useful method that could help in relieving symptom, resolving discomfort, and enabling early return to daily life in patients with postoperative subcutaneous emphysema.

Key Words: Blow out fracture; Subcutaneous emphysemas; Mechanical aspiration; Case report

©The Author(s) 2023. Published by Baishideng Publishing Group Inc. All rights reserved.

Core Tip: A cases of postoperative subcutaneous emphysema is relatively rare. Though orbital emphysema is usually self-limited, we report a case report of postoperative subcutaneous emphysema that treated with a simple method using immediate needle aspiration to relieve discomfort and enable recovery to daily life.

Citation: Nam HJ, Wee SY. Successful treatment of a rare subcutaneous emphysema after a blow-out fracture surgery using needle aspiration: A case report. *World J Clin Cases* 2023; 11(9): 2110-2115

URL: <https://www.wjgnet.com/2307-8960/full/v11/i9/2110.htm>

DOI: <https://dx.doi.org/10.12998/wjcc.v11.i9.2110>

INTRODUCTION

The orbit is highly exposed to physical facial injuries because of its anatomical location and the lack of protective tissues. Isolated orbital fractures account for in 4%-16% of all facial fractures, and orbital fracture combined with any other type of fracture occurs in 30%-55% of zygomatic complex fractures and naso-orbital-ethmoid fractures[1,2].

Orbital emphysema, which is the abnormal presence of air within the orbit, is a typical finding in blow-out fractures owing to its communication with the paranasal sinus[3]. In the setting of trauma, the presence of orbital emphysema significantly increases the likelihood of an orbital fracture, with up to 75% of patients having medial orbital wall fractures with some degree of orbital emphysema[4]. Orbital emphysema can also occur after surgery as a complication that causes postoperative discomfort and delays recovery to daily life. In previous literature, case reports and treatment of preoperative emphysema have been reported; however, there is a tendency to rely on conservative treatment for subcutaneous emphysema that occur postoperatively because the symptoms in such cases are often not severe. However, this may be time-consuming and cause discomfort to the patient until spontaneous resolution is achieved.

Herein, we describe a case of postoperative subcutaneous emphysema that was treated with a simple method using immediate needle aspiration to relieve discomfort and enable recovery to daily life.

CASE PRESENTATION

Chief complaints

A 48-year-old male patient visited the hospital after experiencing direct trauma to the nose and periorbital area 9 d prior.

History of present illness

He had mild swelling and tenderness in nose and periorbital area due to the direct trauma. The day after hospitalization, orbital wall reconstruction using a bioresorbable polycaprolactone mesh implant (Osteomesh, Osteopore International, Singapore) and closed reduction of the nasal bone were performed. One day after the operation, the patient complained of difficulty in opening his left eye, and severe swelling in the left periorbital area was observed.

History of past illness

He had no remarkable medical history or chronic illness.

Personal and family history

There was no significant personal or family history.

Physical examination

At the time of admission, periorbital swelling was not significant (Figure 1). Extraocular movement was normal, and the patient did not complain of other visual symptoms including blurred vision or diplopia. One day after the operation, crepitus was observed during skin palpations.

Laboratory examinations

The blood results were within normal limit; a white blood cell count of $7.2 \times 10^3/\text{mL}$; a red blood cell count of $4.3 \times 10^6/\text{mL}$; a platelet count of $192 \times 10^3/\text{mL}$; a hemoglobin count of 12.9 g/dL; a blood urea nitrogen value of 11 mg/dL; serum creatinine value of 0.63 mg/dL; potassium, 3.3 mmol/L; sodium, 141 mmol/L; albumin, 35 g/L; total bilirubin of 3 $\mu\text{mol/L}$; alanine aminotransferase, 17 IU/L; aspartate aminotransferase, 15 IU/L; and alkaline phosphatase, 65 IU/L.



DOI: 10.12998/wjcc.v11.i9.2110 Copyright ©The Author(s) 2023.

Figure 1 A facial photograph taken at the moment of admission. The swelling around the periorbital area was not significant.

Imaging examinations

The size of the blow-out fracture was 25 mm × 20 mm accompanied by a nasal bone fracture on computed tomography that was performed after visiting the hospital.

Further diagnostic work-up

Postoperatively, follow-up computed tomography was done and revealed emphysema in the form of scattered air bubbles in the left periorbital subcutaneous area (Figure 2).

FINAL DIAGNOSIS

The patient was diagnosed as postoperative subcutaneous emphysema.

TREATMENT

Negative pressure was applied using the needle and syringe pull-back method at three points above the eyelid crease with an 18-gauge needle, and approximately 2 mL of air was removed at each point (Figure 3). The symptoms of sudden swelling immediately improved (Figure 4). Simple foam dressing and mild compression after aspiration were performed.

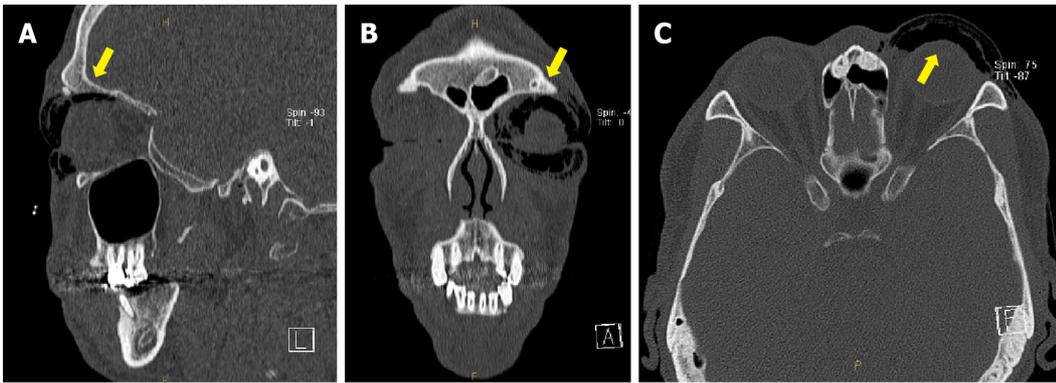
OUTCOME AND FOLLOW-UP

No symptoms, such as bleeding or hematoma, were observed in the upper eyelid. On the fourth day postoperatively, there was no recurrence of swelling, the patient was discharged, and could immediately return to his daily activities (Figure 5). During outpatient follow-up, recurrence of emphysema was not observed.

DISCUSSION

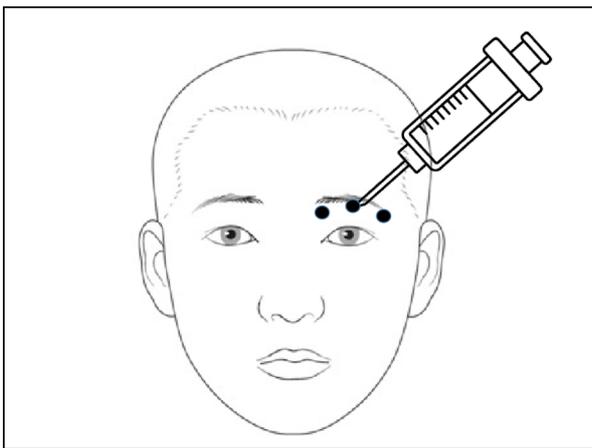
Orbital emphysema is commonly observed in orbital fractures[5]. A large retrospective study spanning 10 years concluded that clinically apparent orbital emphysema had a specificity of 99.6% and a positive predictive value of 98.4% for orbital fracture[6]. In cases of orbital emphysema related to orbital fractures, there is often a history of post-traumatic sneezing, coughing or nose blowing precipitating orbital emphysema[7-11]. An acute incident resulting in increased intranasal pressure, such as sneezing or nose blowing, usually promote the episode[12].

The clinical presentation of orbital emphysema varies, depending on its severity. Patients often experience tenderness, pain or pressure sensation and may complain of changes in visual acuity or field. Signs of orbital emphysema include periorbital subcutaneous crepitus, proptosis, decreased vision, relative afferent pupillary defect, and subconjunctival emphysema[5]. Given the tendency of air to localize superiorly, a crescent-shaped area of radiolucency in the superior aspect of the orbit demonstrated on a radiograph termed the “black eyebrow sign” is highly suggestive of orbital emphysema[13,14].



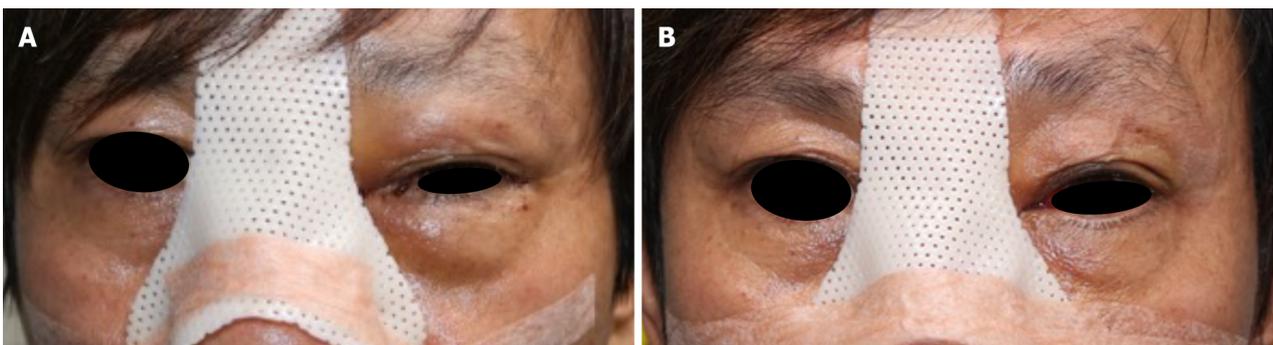
DOI: 10.12998/wjcc.v11.i9.2110 Copyright ©The Author(s) 2023.

Figure 2 A Follow up computed tomography scan 2 d postoperatively. The emphysema is seen in the form of scattered air bubbles in the left periorbital subcutaneous area (yellow arrow), indicating the “black eyebrow sign”. A: Sagittal view; B: Coronal view; C: Axial view.



DOI: 10.12998/wjcc.v11.i9.2110 Copyright ©The Author(s) 2023.

Figure 3 A schematic drawing of needle injection point (black circles). Above the upper eyelid, the needle was inserted at points where air was most palpable and negative pressure was applied using the pull-back method.



DOI: 10.12998/wjcc.v11.i9.2110 Copyright ©The Author(s) 2023.

Figure 4 A facial photograph taken after the procedure. A: One day postoperatively, swelling in the left periorbital area was observed; B: The swelling improved immediately after needle aspiration decompression.

Most cases of orbital emphysema are self-limited and typically resolve within 7-10 d[15-18]. Moon *et al*[7] reviewed 348 orbits with isolated medial wall fractures and concluded that the majority of these patients recovered spontaneously without the need for surgical intervention. Patients who underwent needle aspiration and decompression tended to have a moderately decreased visual acuity. Those who underwent orbital decompression were more likely to have additional signs of optic nerve compression, indicated by the presence of a relative afferent pupillary defect and more severe impairment in visual acuity[10,19].



DOI: 10.12998/wjcc.v11.i9.2110 Copyright ©The Author(s) 2023.

Figure 5 A facial photograph 4 d postoperatively. No recurrence of swelling was observed.

In our case, a sudden increase in swelling was observed, and follow-up computed tomography revealed a black eyebrow sign. As shown in the literature, orbital emphysema is often caused by trauma or soft tissue injury. However, in this case, it occurred postoperatively after reconstruction of the orbital blow-out fracture, and it is different from reports in the literature of cases, as this case was caused by an increase in intranasal pressure during sneezing. The patient experienced spontaneous sneezing, which prompted him to blow his nose the night prior to the onset of symptoms. The patient also had a nasal bone fracture, suggesting that an increase in intranasal pressure caused air to enter the surrounding subcutaneous tissue. In this case, the method of needle aspiration was used. Although it is highly likely that the emphysema would have resolved gradually, this method allowed immediate and dramatic resolution, enabling quick recovery to daily life. In addition, it has the advantage of being more comfortable and less burdensome to the patient than removal through surgical intervention.

The limitation of the method used in this case is that it was not possible to target the exact air collection area, and the procedure was performed based on palpation. In addition, resolution of emphysema after the procedure was not confirmed by follow-up imaging. As a point for improvement, we suggest that if additional diagnostic devices, such as handheld sonography are used during the procedure, needle aspiration would be a useful treatment option for orbital emphysema. Moreover, because our study represents only a single case, further investigations are required to validate our method as a viable treatment option for postoperative subcutaneous emphysema.

CONCLUSION

Orbital emphysema is a rare complication that can occur after blow-out surgery. Although orbital emphysema is often self-limiting, needle aspiration is a useful treatment method that could relieve symptoms, resolve discomfort, and enable early return to daily life in patients with postoperative subcutaneous emphysema.

FOOTNOTES

Author contributions: Nam HJ contributed to manuscript writing and visualization and data collection; Wee SY contributed to conceptualization and methodology and project administration and manuscript review and editing, and supervision; all authors have read and approved the final manuscript.

Supported by Soonchunhyang research fund, No. 2023-0024.

Informed consent statement: Informed written consent was obtained from the patient for publication of this report and any accompanying images.

Conflict-of-interest statement: The authors declare that they have no conflict of interest to disclose.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license

their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>

Country/Territory of origin: South Korea

ORCID number: Ha-Jong Nam 0000-0002-2494-0991; Syeo-Young Wee 0000-0002-1787-9715.

S-Editor: Yan JP

L-Editor: A

P-Editor: Yan JP

REFERENCES

- 1 **Nakamura T**, Gross CW. Facial fractures. Analysis of five years of experience. *Arch Otolaryngol* 1973; **97**: 288-290 [PMID: 4696044 DOI: 10.1001/archoto.1973.00780010296016]
- 2 **Khojastepour L**, Moannaei M, Eftekharian HR, Khaghaninejad MS, Mahjoori-Ghasrodashti M, Tavanafar S. Prevalence and severity of orbital blowout fractures. *Br J Oral Maxillofac Surg* 2020; **58**: e93-e97 [PMID: 32680725 DOI: 10.1016/j.bjoms.2020.07.001]
- 3 **Sarbajna T**, Valencia MRP, Kakizaki H, Takahashi Y. Orbital Blowout Fracture and Orbital Emphysema caused by Nose Blowing. *J Craniofac Surg* 2020; **31**: e82-e84 [PMID: 31634313 DOI: 10.1097/SCS.0000000000005941]
- 4 **Shinohara H**, Shirota Y, Fujita K. Implication of differences in the incidence of orbital emphysema in ethmoidal and maxillary sinus fractures. *Ann Plast Surg* 2004; **53**: 565-569 [PMID: 15602254 DOI: 10.1097/01.sap.0000134538.44898.1f]
- 5 **Rubinstein TJ**, Sires BS. Re: "Orbital Emphysema: A Case Report and Comprehensive Review of the Literature". *Ophthalmic Plast Reconstr Surg* 2019; **35**: 300 [PMID: 31793923 DOI: 10.1097/IOP.0000000000001348]
- 6 **Büttner M**, Schlittler FL, Michel C, Exadaktylos AK, Iizuka T. Is a black eye a useful sign of facial fractures in patients with minor head injuries? *Br J Oral Maxillofac Surg* 2014; **52**: 518-522 [PMID: 24793410 DOI: 10.1016/j.bjoms.2014.03.018]
- 7 **Moon H**, Kim Y, Wi JM, Chi M. Morphological characteristics and clinical manifestations of orbital emphysema caused by isolated medial orbital wall fractures. *Eye (Lond)* 2016; **30**: 582-587 [PMID: 26795415 DOI: 10.1038/eye.2015.285]
- 8 **Tomasetti P**, Jacobsen C, Gander T, Zemann W. Emergency decompression of tension retrobulbar emphysema secondary to orbital floor fracture. *J Surg Case Rep* 2013; **2013** [PMID: 24964422 DOI: 10.1093/jscr/tjt011]
- 9 **Ababneh OH**. Orbital, subconjunctival, and subcutaneous emphysema after an orbital floor fracture. *Clin Ophthalmol* 2013; **7**: 1077-1079 [PMID: 23766631 DOI: 10.2147/OPHTH.S44649]
- 10 **Jordan DR**, White GL Jr, Anderson RL, Thiese SM. Orbital emphysema: a potentially blinding complication following orbital fractures. *Ann Emerg Med* 1988; **17**: 853-855 [PMID: 3394993 DOI: 10.1016/s0196-0644(88)80571-7]
- 11 **Gauguet JM**, Lindquist PA, Shaffer K. Orbital Emphysema Following Ocular Trauma and Sneezing. *Radiol Case Rep* 2008; **3**: 124 [PMID: 27303505 DOI: 10.2484/rcr.v3i1.124]
- 12 **Gonzalez F**, Cal V, Elhendi W. Orbital emphysema after sneezing. *Ophthalmic Plast Reconstr Surg* 2005; **21**: 309-311 [PMID: 16052149 DOI: 10.1097/01.iop.0000170415.93858.6f]
- 13 **Feyaerts F**, Hermans R. The black eyebrow sign in orbital blowout fracture. *JBR-BTR* 2009; **92**: 251-252 [PMID: 19999329]
- 14 **Sawicki WK**, Hunter G. Eyebrow sign in facial trauma. *Emerg Med J* 2011; **28**: 962 [PMID: 21285280 DOI: 10.1136/emj.2010.110403]
- 15 **Ozdemir O**. Orbital Emphysema Occurring During Weight Lifting. *Semin Ophthalmol* 2015; **30**: 426-428 [PMID: 24475915 DOI: 10.3109/08820538.2013.874469]
- 16 **Chiu WC**, Lih M, Huang TY, Ku WC, Wang W. Spontaneous orbital subcutaneous emphysema after sneezing. *Am J Emerg Med* 2008; **26**: 381.e1-381.e2 [PMID: 18358968 DOI: 10.1016/j.ajem.2007.05.021]
- 17 **Tseng WS**, Lee HC, Kang BH. Periorbital emphysema after a wet chamber dive. *Diving Hyperb Med* 2017; **47**: 198-200 [PMID: 28868601 DOI: 10.28920/dhm47.3.198-200]
- 18 **van Issum C**, Courvoisier DS, Scolozzi P. Posttraumatic orbital emphysema: incidence, topographic classification and possible pathophysiologic mechanisms. A retrospective study of 137 patients. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2013; **115**: 737-742 [PMID: 23332507 DOI: 10.1016/j.oooo.2012.10.021]
- 19 **Chaudhry IA**, Al-Amri A, Shamsi FA, Al-Rashed W. Visual recovery after evacuation of orbital emphysema. *Orbit* 2007; **26**: 283-285 [PMID: 18097969 DOI: 10.1080/01676830600987391]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-3991568
E-mail: bpgoffice@wjgnet.com
Help Desk: <https://www.f6publishing.com/helpdesk>
<https://www.wjgnet.com>

