CASE REPORT

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A case report of chronic dacryocystitis caused by nasal stones



Yandi Huo $^{1\dagger},$ Luoxiang Li $^{2\dagger},$ Ya Mo $^{1,3^{\ast}}$ and Sirui Guo 1

Abstract

Background This paper reports a case of chronic dacryocystitis due to nasal stones.

Case presentation An 84-year-old male patient was admitted to the hospital with chronic dacryocystitis of the right eye due to tearing and purulent discharge from the right eye for more than 1 month. Antibiotic treatments such as gatifloxacin eye drops were given at other hospitals but did not relieve the symptoms. A computed tomography(CT) scan of the lacrimal duct in our department showed a high-density shadow in the right lacrimal sac area, hypertrophy of the right inferior turbinate, and many nasal calculi in the nasal cavity. The patient was transferred to our otolaryngology department for further treatment, and nasal stones were removed under nasal endoscopy. Three days after surgery, the symptoms affecting the patient's right eye gradually resolved. One month after surgery, the patient underwent a follow-up examination in the ophthalmology clinic; there was no lacrimal purulent discharge from the right eye, and the lacrimal duct could be flushed smoothly.

Conclusion Chronic dacryocystitis is often caused by primary nasolacrimal duct obstruction. Cases of chronic dacryocystitis caused by secondary nasolacrimal duct obstruction due to nasal stones are rare in the clinic. This case can serve as a reference for the clinical diagnosis and treatment of chronic dacryocystitis.

Keywords Nasal calculi, Chronic dacryocystitis, Lacrimal CT angiography, Maxillary osteonecrosis, Case report

Background

Chronic dacryocystitis is a microbial infectious disease secondary to nasolacrimal duct stenosis or obstruction [1]; lacrimal discharge is the main symptom and is usually accompanied by congestion of the conjunctiva of the

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inner canthus and discharge of mucus or purulent secretions from lacrimal puncta in the compressed area of dacryocystitis. Chronic dacryocystitis is mostly caused by Gram-positive bacteria, mostly *Staphylococcus aureus* [2–4], which can induce serious complications such as keratitis and orbital cellulitis [5, 6]. Rhinitis, inferior turbinate hypertrophy, nasal septum aberrations, nasal polyps, and lacrimal duct trauma are common causes of chronic dacryocystitis. However, chronic dacryocystitis caused by nasal stones is rare in clinical practice. This paper reports a case of chronic dacryocystitis caused by nasal stones.

Case presentation

An 84-year-old male patient presented with lacrimal discharge and purulent discharge in his right eye for more than 1 month without any obvious cause. Later, the patient came to our hospital for treatment due to



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aggravation of the symptoms and was admitted to the hospital with chronic dacryocystitis of the right eye. On admission, the patient showed persistent tearing and purulent discharge from the right eye with a localized cystic bulge in the lacrimal sac area. The patient underwent lacrimal duct irrigation and inserted the needle from the upper lacrimal punctum of the right eye. The flushing liquid flowed back from the lower lacrimal punctum, accompanied by a large amount of purulent secretions. Lacrimal duct CT angiography showed the following a high-density shadow in the right lacrimal sac area and a soft-tissue-density shadow in the right nasal cavity, including a high-density shadow. Nasal endoscopy revealed many yellow-white nasal calculus-like foreign bodies in the right common and inferior nasal meatus (Fig. 1).

Inquiring about the patient's medical history revealed that the patient had received 17 intravenous infusions of zoledronic acid at the other hospital from June 2017 to September 2021 due to severe osteoporosis. In September 2021, the patient was diagnosed at the other hospital with drug-related right maxillary osteonecrosis due to pain and pus in the right maxillary first molar. Then, the zoledronic acid infusions were discontinued, and normal saline was used for daily irrigation. In December 2021, nasal CT at the other hospital showed bone destruction on the right side of the maxilla with soft tissue mass formation and right maxillary sinusitis. Conservative treatment was continued due to the unclear boundary of the bone mass. In June 2022, the patient complained of right nasal obstruction with increased purulent nasal secretion, and in December, he gradually developed chronic dacryocystitis, mainly presenting as lacrimal and purulent discharge from the right eye, and came to our hospital for further diagnosis and treatment. At that time, the patient was transferred to our otolaryngology department for further treatment, and nasal stones were removed under nasal endoscopy. During the operation, it was found that the nasal septum deviated to the right, and there was a large amount of silt-like material in the right inferior meatus and common meatus; the boundary with the surrounding mucosa was clear. Mucosal edema and thickening in the maxillary sinus were found. The pathological results showed the following (D2023-00352): degeneration of bone cells, coagulation necrosis of the stroma, and a small amount of nasal mucosa at the edge of the tissue (Fig. 2). After the operation, ceftizoxime was given for anti-infection therapy, dexamethasone for anti-inflammation therapy, and aminocaproic acid sodium chloride for hemostasis.

Three days after surgery, the symptoms affecting the patient's right eye gradually resolved, the lacrimal purulence decreased, and routine blood tests showed the following: white blood cells, $6.06 \times 10^{9}/L$ (normal range, $3.5-9.5 \times 10^{9}/L$); neutrophils, $4.01 \times 10^{9}/L$ (normal range, $1.8-6.3 \times 10^{9}/L$); and lymphocytes, $1.56 \times 10^{9}/L$ (normal range, $1.1-3.2 \times 10^{9}/L$). Other indicators were normal. One month after surgery, the patient underwent a follow-up examination in the ophthalmology clinic; there was no lacrimal purulent discharge from the right eye, and the lacrimal duct could be flushed smoothly. A CT scan of the nasolacrimal duct showed that the right nasolacrimal duct was patent (Fig. 3), and there was no soft-tissue-like shadow or high-density shadow in the right nasal cavity.

Discussion and conclusions

Nasal calculi are mainly composed of foreign bodies and blood clots in the nasal cavity; calcium phosphate, calcium carbonate, and other tear substances in nasal secretions and tears are deposited around the core, and stones are formed over time. A study by Seyhun et al. found



Fig. 1 The patient's preoperative eye appearance, CT images of the sinuses, and nasal endoscopic images. A The patient showed obvious tearing and purulent discharge in the right eye on admission. B Horizontal CT images showed high-density signals of the right dacryocyst and part of the nasolacrimal duct (blue arrowhead). C Horizontal CT images showed bone discontinuities in the right mandible (yellow arrowhead) and a soft-tissue-density shadow in the right nasal cavity with a high-density shadow (red arrowhead). D nasal endoscopy shows many yellow and white nasal stone-like foreign bodies filled the right common and inferior nasal passages (black arrowhead)



Fig. 2 Postoperative pathological images. A (panoramic view), B (enlarged \times 100), and C (enlarged \times 400) Pathology showed osteocyte degeneration (yellow arrowheads), coagulative necrosis of the interstitium (black triangles), and a small amount of nasal mucosa at the edge of the tissue (red arrowheads)



Fig. 3 The patient's eye appearance and sinus CT images at 1 month after surgery. A The patient showed no symptoms of lacrimation or purulence in the right eye. B Horizontal CT images showed that the right sinus and nasolacrimal duct had a uniform density and that the nasolacrimal duct was patent. C Horizontal CT images showed no high-density or soft-tissue-density shadows in the right nasal cavity

that the most common symptoms of nasal stones were unilateral nasal obstruction and unilateral suppurative rhinorrhea, and between the inferior turbinate and nasal septum was the most common site of stone production (67.7%) [7]. Sinonasal CT examination is the first choice for the diagnosis of rhino lithiasis and usually shows a uniform high-density mass in the center of the lesion with an irregular contour, which can sometimes cause changes such as nasal septum perforations, destruction of the medial wall of the maxillary sinus with recurrent sinusitis, palatal perforations, and oral fistulas [8]. In this case, due to drug-related maxillary osteonecrosis [9] accompanied by soft tissue mass formation and surrounding deposition of inflammatory secretions of the nasal cavity, nasal stones were generated in the inferior nasal meatus, which obstructed the nasolacrimal duct and finally produced chronic dacryocystitis with lacrimal discharge as the main manifestation.

Chronic dacryocystitis is more common in middleaged and elderly women, and clinical case reports of dacryocystitis in male patients are rare (28.7%, 23.1%, and 32.4%, respectively) [10–12]; additionally, only 1.35% of male patients with dacryocystitis are over 60 years old [12], which may be due to the narrowness of the nasolacrimal duct in the female anatomy [13]. Nasolacrimal duct obstruction is the most important cause of dacryocystitis [14]. Obstruction of the lower lacrimal system causes tear discharge disorders that allow bacteria to multiply, leading to lacrimal sac inflammation, which further aggravates nasolacrimal duct obstruction, creating a vicious cycle [15-17]. An epidemiological survey of dacryocystitis by Khatoon et al. showed that secondary nasolacrimal duct obstruction accounted for approximately 3.78% of cases, much less than primary nasolacrimal duct obstruction (96.23%) [18]. Nasalrelated diseases account for approximately 28.6% of dacryocystitis, and the most common causes are deviation of the nasal septum, rhinitis, and hypertrophy of the inferior turbinate on the same side as the infection [14]. Cases related to nasal stones are rarely reported. In clinical practice, chronic dacryocystitis usually has a long onset time, which can be several years. In this case, the patient had right nasal obstruction with increased nasal secretion since June 2022, but the symptoms were ignored because of the long-term pain and purulent discharge in the right posterior maxilla due to maxillary necrosis on the right side.

We report this case because such cases are rare in the clinic, and chronic dacryocystitis caused by nasal calculi can easily be missed.

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Authors' contributions

HYD and LLX conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript.HYD, LLX, GSR and MY designed the data collection instruments collected data, carried out the initial analyses, and reviewed and revised the manuscript.MY coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the declaration of Helsinki. This study was conducted with approval from the Ethics Committee of the Hospital of Chengdu University of Traditional Chinese Medicine. Written informed consent was obtained from all participants.

Consent for publication

Written informed consent was obtained from the patient for publication of this Case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Competing interests

The authors declare no competing interests.

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