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CASE REPORT

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Isolated Fracture of Lateral Pterygoid Plate by Penetrating Foreign Body – A Rarity Indeed

Mukesh Surya[1ABDEF], Pawan Soni[1ACE], Ramesh Bharti[2ADE], Ira Jamwal[1ABE]

[1] Department of Radiodiagnosis, Dr. Rajendra Prasad Government Medical College, Kangra at Tanda, Himachal Pradesh, India
[2] Department of General Surgery, Dr. Rajendra Prasad Government Medical College, Kangra at Tanda, Himachal Pradesh, India

Author's address: Mukesh Surya, Department of Radiodiagnosis, Dr. Rajendra Prasad Government Medical College, Kangra at Tanda, Himachal Pradesh, India, e-mail: mukeshsurya27@yahoo.com

Summary

Background: Fractures of mid-face were first described by Le Fort and are classified into three categories – Le Fort I, Le Fort II and Le Fort III. The pterygoid processes of the sphenoid bone are fractured in all the three categories of Le Fort fractures as the sphenoid bone connects the cranium vault to the facial bones. Fractures of the pterygoid processes without associated Le Fort fractures are rare and are usually associated with fractures of the mandible, temporal bone or other facial bones. An isolated fracture of pterygoid plates without associated Le Fort fractures or fractures of other mid-face bones are exceedingly rare.

Case Report: We present a case of an isolated fracture of the right lateral pterygoid plate by a penetrating foreign body (wooden twig) in an adult male who presented with discharging sinus in the oropharynx. The presence of the foreign body was confirmed on computed tomography and was removed under general anesthesia via submandibular incision. The patient had an uneventful postoperative hospital stay and was asymptomatic on a follow-up five months later.

Conclusions: This article emphasizes the fact that pterygoid plates may be fractured without an associated Le Fort fracture or a fracture of the mandible. This is the first case of an isolated pterygoid plate fracture in the literature.

MeSH Keywords: Foreign Bodies • Multidetector Computed Tomography • Pterygoid Muscles

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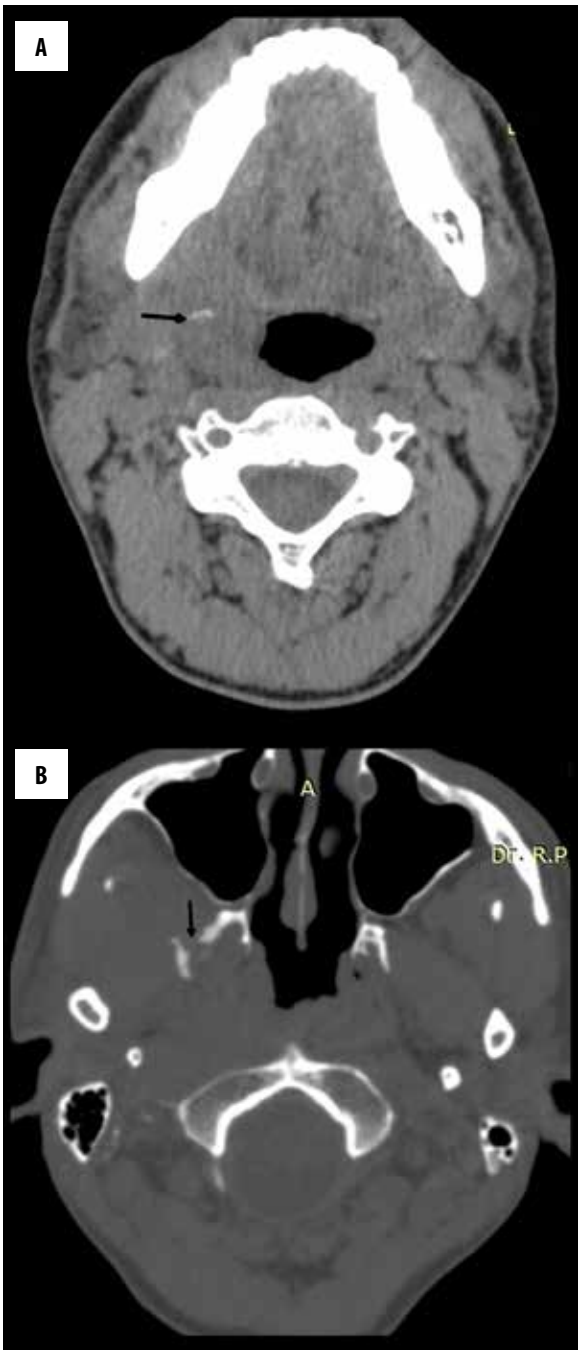
Background

Le Fort classified mid-face fractures into three categories – Le Fort I, II and III; according to the plane of injury. The pterygoid processes are fractured in all three classes of Le Fort fractures. Isolated fractures of the pterygoid processes are extremely rare. We present a case of a penetrating foreign body causing an isolated fracture of the right lateral pterygoid process in an adult male.

Case Report

A 30-year-old male presented to the emergency department with complaints of a suppurative discharge into the oral cavity since the previous day. Three months before, he fell from a tree, which caused a penetrating injury of the right submandibular region by a hard wooden twig. He visited a local hospital and received treatment. The wooden twig was pulled out by the attending general physician, the wound was cleaned and stitched. His external wound healed well within weeks and was normal since then. A few days before admission, he experienced pain and discomfort around the right cheek and ear. He felt a trickling of pus into the oral cavity since the previous day.

His general physical examination was unremarkable. On the local examination, a discharging sinus opening was seen in the right side of the oropharyngeal wall. An active pus discharge was observed at the time of examination. The patient was referred to the radiology department for contrast-enhanced computed tomography (CT). CT was done on a 16-slice scanner (Philips Achieva Brilliance 16). Non-contrast and contrast-enhanced scans were obtained. The CT revealed a hyperdense structure in the right masticator space extending from the level of the mandibular angle to the level of pterygoid fossa superiorly (Figure 1).



The average CT attenuation value of the structure was 88 H.U. and it contained foci of air (arrow in Figure 2B). There was an obliteration of fat in the inter-muscular planes. The right lateral pterygoid plate was found to be fractured and displaced laterally (Figure 1B, 1C, 2A). A mild peripheral enhancement was noticed in the soft tissue surrounding the foreign body. Multiple enlarged lymph nodes were seen in the right submandibular region measuring up to 20 mm in diameter (Figure 2A). Based on the imaging findings and history, a diagnosis of impacted foreign body in the right masticator space leading to a fracture of the right lateral pterygoid plate was made.

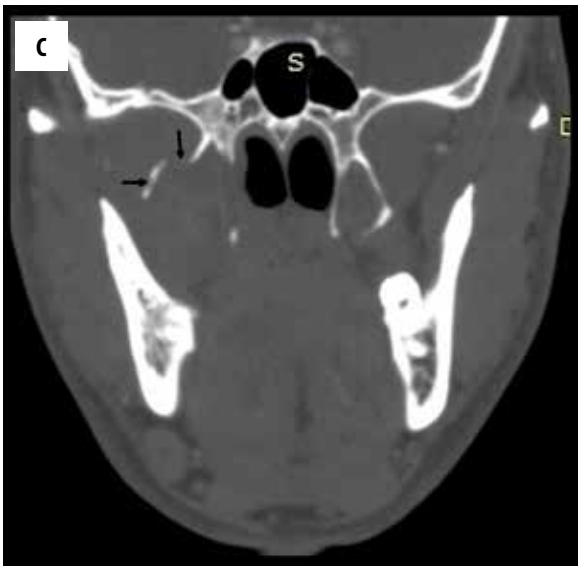


Figure 1. (**A**) Non-contrast axial CT (WW 350, WL 60) showing a hyper-dense foreign body in the right masticator space (arrow). (**B**) Axial and (**C**) coronal reformatted CT images (WW 1500, WL 300) showing a fracture of the right lateral pterygoid plate (vertical arrow). The fractured bony fragment is displaced laterally (horizontal arrow).

The foreign body was removed via incision in the right submandibular region by identifying the distal end of the foreign body and pulling it out through the incision. A hard twig was pulled out, measuring approximately 42 mm in length and 10 mm in thickness (Figure 3). Haemostasis was ensured. The wound was irrigated with saline and stitched. The patient made an uneventful recovery and was discharged on the 5th postoperative day. The patient was normal on a follow-up examination 5 months later.

Discussion

Injury of the facial bones is very common in everyday clinical practice. Motor vehicle accidents are the most common cause of facial injuries followed by direct force caused by assault. Other causes of facial trauma include falls, sports injuries, gun-shot injuries etc. [1,2].

In 1901, Le fort described typical planes of injury resulting from trauma to the mid face [3]. Le Fort I fracture is a fracture involving the antero-lateral margin of the nasal fossa. In Le Fort II fractures, the fracture line extends up to the inferior orbital margins. In Le Fort III fractures, there is an involvement of the zygomatic arch. It is a general rule that if pterygoid plates are fractured a Le Fort fracture is always present, because isolated fractures of the pterygoid plates are exceedingly rare [4]. This rule holds true to a great extent, as very few cases of isolated fractures of the pterygoid plates have been encountered.

In 2014, Anh Q. Truong et al. described an association between lateral pterygoid plate fractures and mandibular fractures [5]. They retrospectively analyzed computed tomographs of seven patients with facial trauma who had fractures of the pterygoid plates without a Le Fort fracture. They found that mandibular fractures were present in all

Figure 2. (**A**) Contrast-enhanced coronal reformatted CT image (WW 350, WL 60) showing a fracture (vertical arrow) and lateral displacement (horizontal arrow) of the right lateral pterygoid plate. A hyper-dense foreign body (white arrow) is also seen in the pterygoid fossa. An enlarged, peripherally enhancing lymph node is also seen in the right submadibular region (double arrow). (**B**) Contrast-enhanced sagittal reformatted CT image (WW 350, WL 60) showing a hyperdense foreign body (black arrow) containing foci of air (white arrow).

Figure 3. Photograph of the removed foreign body.

seven patients. An ipsilateral subcondylar fracture was seen in all seven patients, symphyseal fractures in two, mandibular body fracture in one, parasymphyseal fracture in one and coronoid fracture in one patient. They proposed that the transduction of force displacing the mandible and causing pterygoid muscle contraction may lead to a pterygoid plate fracture.

In another retrospective study with a 5-year period of observation, Ravi K. Garg et al. found that out of 209 patients with pterygoid plate fractures, 78 patients did not have Le Fort fractures. Sphenotemporal buttress fractures, temporal bone fractures, zygomatico-maxillary complex fractures and displaced mandible fractures were found in these patients [6].

In our patient, the penetrating foreign body pierced through the skin and subcutaneous tissue into the right submandibular region, entered the masticator space and reached the pterygoid fossa. The foreign body hit the lateral pterygoid plate leading to its fracture and lateral displacement. The patient was lucky not to have sustained an injury of the major blood vessels. The part of the wooden twig outside the skin was removed by the attending doctor and the patient was sent back home. Neither the patient nor the attending doctor were aware of the impacted foreign body until a CT scan was performed to look for the cause of a discharging sinus in the oropharynx in our hospital.

Since a penetrating foreign body is an uncommon cause of facial injury, we could not find even a single case report of an isolated fracture of the pterygoid plates without an associated Le Fort fracture or a fracture of other mid-face bones. Thus, our case is a rare exception to the general rule that an isolated fracture of the lateral pterygoid plate is not seen without an associated Le Fort or mandibular fractures.

Conclusions

1. Pterygoid processes are fractured in all types of Le Fort fractures.
2. In patients having pterygoid fractures, unrelated to Le Fort fractures, associated mandibular fractures may be seen.
3. Penetrating foreign body, which is an uncommon case of facial injury, may lead to isolated pterygoid plate fracture without associated Le Fort or mandibular fractures.

Conflict of interest

Authors have no conflict of interest.

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