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Successfully Treating an Odontogenic Keratocyst with Surgery and Carnoy's Solution: A Case Study

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Abstract. Odontogenic keratocyst (OKC) is a type of cyst found in the jaw that has sparked debate on whether it should be classified as a cyst or a tumor. While it was briefly categorized as a tumor (KCOT) due to its aggressive behavior and unique microscopic appearance, it has since been reclassified as a cyst in the latest World Health Organization guidelines. (1) This study presents the case of an 18-year-old male who underwent successful surgical removal of a large OKC in his lower jaw. The procedure involved carefully removing the cyst, trimming surrounding bone, and applying a solution to minimize recurrence. After six months, the patient showed no signs of the cyst returning.
This case highlights the effectiveness of a conservative surgical approach in treating OKC, leading to minimal complications, quick healing, and restored jaw function

Highlights:

1. Classification: OKC is reclassified as a cyst by WHO guidelines.
2. Case: Successful surgical removal of OKC in an 18-year-old male.
3. Outcome: Conservative surgery ensured minimal complications and no recurrence after six months

Keywords: Bone Cysts. Odontogenic keratocyst. Enucleation. Bone healing.

Introduction

Odontogenic keratocysts (OKCs) are most commonly found in specific areas of the jaw, particularly the posterior region near the molars. (2)

On X-rays, they show up as dark areas (radiolucency) with either a single or multiple compartments, outlined by a lighter border (radiopaque). These cysts can push aside teeth that haven't emerged yet and even affect the inferior alveolar nerve canal running through the lower jaw. (3)

Currently, there's no single "best" way to treat OKCs. The most common approach involves surgically removing the cyst and scraping the surrounding area clean. (4)

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Case Report

In August 2024, an 18-year-old male patient in Baghdad, Iraq sought treatment for pain, swelling, and pus discharge from his lower right jaw.

Examinations, including X-rays and 3D imaging, revealed a large, multi-compartment cyst extending from lower right molars area to the sigmoid notch involving the right angle and ascending ramus of mandible. (Fig.1)

The cyst, along with an impacted wisdom tooth, was surgically removed under local anesthesia. To minimize the chance of recurrence, the surrounding bone also smoothed and a special solution (Carnoy's solution) applied to a bony defect for three minutes folowed by copious irigation with normal saline. (5)

The surgical site was stitched up, and a week later, the sutures were removed. (Fig.2)

The biopsy confirmed the diagnosis of an odontogenic keratocyst.

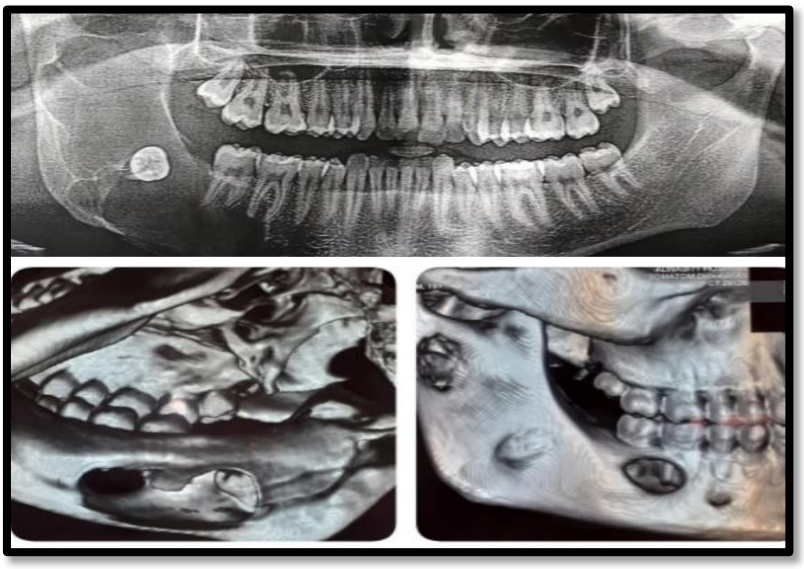

Fig. 1- The initial X-ray and 3D scan showed a multi-compartment cyst, appearing as a dark area with well-defined borders and evidence of bone erosion.

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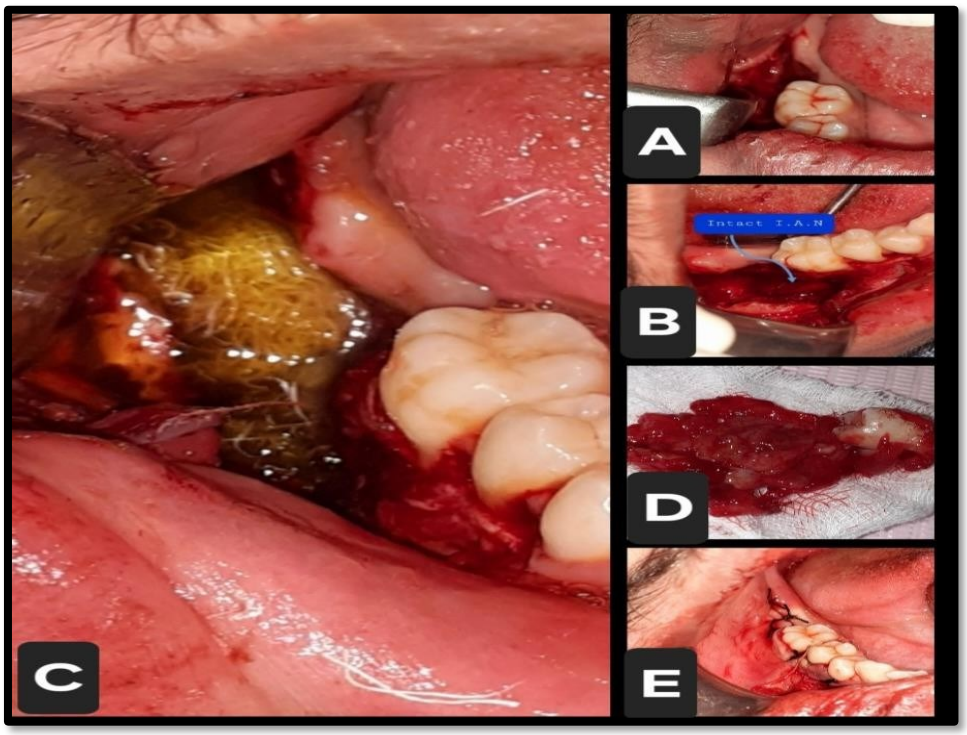

Fig. 2 - This description outlines the surgical steps taken to remove the cyst:

A. Flap creation : To access the cyst, carefully reflected to expose the bone underneath
B. Protecting the important nerve supplying sensation to the lower jaw.
C. Chemical treatment: A gauze soaked in Carnoy's solution was applied to the bony cavity left by the cyst to eliminate any remaining cyst cells.
D. The cyst lining was completely removed along with the impacted wisdom tooth.
E. Closure : The flap was then stitched back into place.

Follow-up

The Six months after surgery, the patient returned for a follow-up appointment and X-ray. The surgical site had healed completely, with healthy soft tissue. The X-ray showed new bone formation around the edges of where the cyst had been, and the area was smaller in size. Importantly, there were no signs that the cyst had returned. (Fig 3)

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Fig. 3- The X-ray showed new bone growth around the edges of where the cyst had been. This new bone growth has shrunk the size of the area and there is no sign of the cyst returning.

Discussion

Odontogenic keratocysts (OKCs) are benign but have a tendency to grow back after removal. This has led to debate over the best treatment approach, as high recurrence rates are a concern.

While simply removing the cyst (enucleation) is common, it's not always enough to prevent recurrence. (6)

Therefore, using an additional techniques to reduce recurrence. These include:

A. Chemical treatment: Applying Carnoy's solution to the area before or after cyst removal to destroy any remaining cyst cells. However, application time needs to be carefully controlled, especially near nerves, to avoid damage.

   Carnoy's solution is typically applied for 10-15 minutes. However, if the treatment area is near the nerve responsible for lower jaw sensation, the application time is limited to a maximum of 3 minutes to prevent nerve injury. (7)

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B. Other methods: Options like creating a pouch to allow drainage (marsupialization), slowly reducing pressure in the cyst (decompression), freezing the area (cryotherapy), or removing a section of the jawbone (resection) are also considered in certain cases.

Finding the best way to treat OKCs remains a challenge, and the chosen approach often depends on the individual patient and the characteristics of their cyst.

Conclusion

The best way to treat an odontogenic keratocyst varies depending on factors like the patient's age, the size and behavior of the cyst, and its specific characteristics.

In this case, the chosen approach involved carefully removing the cyst, trimming the surrounding bone, and applying Carnoy's solution to discourage returning. This strategy proved successful, as there has been no sign of the cyst recurrence since the surgery

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