



CALDWELL LUC APPROACH IN ERA OF ENDOSCOPIC SINUS SURGERY

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ABSTRACT Endoscopic sinus surgery has been widely used for many years, but the Caldwell-Luc procedure remains valuable for ENT surgeons, particularly for accessing the maxillary sinus. [1] The Caldwell-Luc technique has well-documented indications, including severe midfacial injuries, oro-antral fistulae, malignant exophthalmos, foreign body removal, and access to various areas such as the pterygomaxillary space, pterygopalatine fossa, orbital floor, infraorbital nerve infratemporal fossa, and nasopharynx. [2] However, the traditional Caldwell-Luc approach had drawbacks like numbness of the teeth, flap dehiscence, and recurrent sinusitis. Functional endoscopic sinus surgery has gained popularity due to its minimal invasiveness and physiological approach. This study aims to evaluate the indications and surgical procedure of Caldwell-Luc surgery, showcasing its versatility in an era dominated by endoscopic sinus surgery.

KEYWORDS :**INTRODUCTION**

The Caldwell-Luc procedure, described by Caldwell and Luc over a century ago, was an early surgical therapy for maxillary sinus disease. [1, 3, 4] It involved accessing the sinus through the canine fossa and performing intranasal drainage. With the advent of functional endoscopic sinus surgery, the Caldwell-Luc operation has been largely replaced as the primary surgical method for maxillary sinus disease. [2]

However, the Caldwell-Luc approach still has well-documented indications for various maxillary sinus disorders and is often used in conjunction with endoscopic sinus surgery. The history of maxillary sinus disease dates back to Nathaniel Highmore, who first characterized its clinicopathology and practiced sinus drainage through tooth sockets. In subsequent years, the canine fossa technique was favored by Lamorier in 1743 and Desault in 1798. [5, 6]

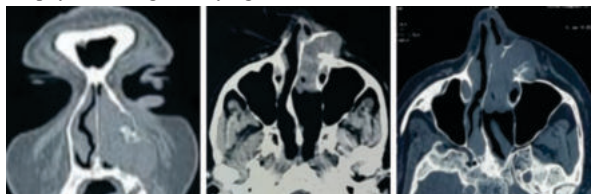
As our understanding of sinusitis improved, surgeons developed more conservative approaches such as functional endoscopic sinus surgery, mini functional endoscopic sinus surgery, and balloon sinuplasty. These procedures are now commonly employed, and the Caldwell-Luc surgery is reserved as a last resort when other treatments have been unsuccessful. However, the Caldwell-Luc operation still offers extensive exposure to the maxillary sinus, orbital floor, and pterygopalatine fossa, leading to expanded indications in recent times. [7].

Case Report

A 58 year female presented with complaints of left sided swelling in the nasolabial region since 6 months.

On Examination a 1*1*1.5cm swelling was present on left nasolabial fold, and a mass was visualized in left nasal cavity arising from left lateral wall of nose, abutting the septum

A Contrast enhanced CT scan revealed a large expansile mass arising from left inferior turbinate. The lesion was an ill-defined heterogeneous enhancing lesion. The left nasolabial fold extending along the medial wall of the left maxillary antrum. The lesion was exophytic causing underlying bone destruction.

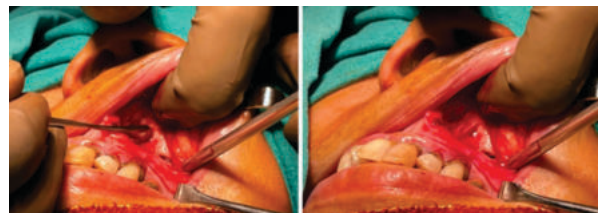


FNAC of the Mass was inconclusive and 4.5 cc of dark brown fluid was aspirated.

A Left anterior Fess with Caldwell luc biopsy was planned to establish its final diagnosis.

The patient was posted for surgery under general anesthesia.

A left sided sublabial incision was taken.

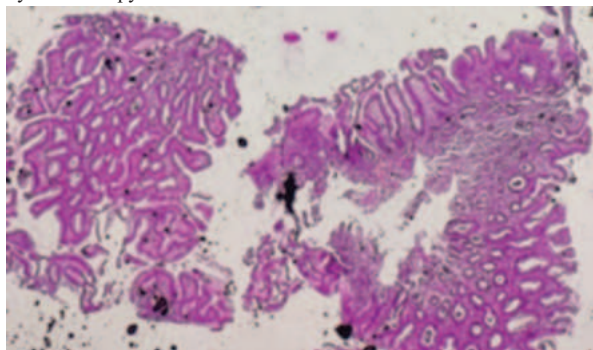


A bony window was created above the canine fossa. The entire cyst wall along with the maxillary sinus mucosa was enucleated and was sent for Histopathological Examination. The maxillary sinus was opened endoscopically and its Ostia was widened.



The histopathological examination revealed evidence of an Adenoid Cystic carcinoma

Following which Medial Maxillectomy was done and then followed by radiotherapy.



The report showed: Subepithelium with few mucinous glands and a biphasic tumor composed of ductal and myoepithelial cells (basaloid cells) arranged in cribriform pattern and focally as tubular pattern. Many of the cribriform spaces were filled with eosinophilic material. Stroma was edematous and hyalinised at places with lymphoplasmacytic infiltrate and sheets of hemosiderin laden macrophages. Also seen were necrotic bony trabeculae involved by tumor. Solid component was 5%. Perineural invasion was not seen. No features of high grade transformation were seen.

Features were suggestive of adenoid cystic carcinoma (solid component -5%).

DISCUSSION

The Caldwell-Luc surgery was initially reported by George Caldwell in 1893 and Henri Luc in 1897 [1] as a surgical treatment for maxillary sinus disease. However, with advancements in medical and endoscopic sinus surgery, the primary approach for treating inflammatory maxillary sinus illness has shifted to antibiotics and endoscopic procedures [2, 8, 9]. The Caldwell-Luc surgery is now considered a last resort when other treatments have failed.

Despite its reduced use, there are still uncommon indications where Caldwell-Luc surgery remains effective. It can be employed for sinusitis with irreversible mucosal damage, neoplastic lesions, oroantral fistulas, odontogenic lesions, evaluation and stabilization of orbital floor fractures, orbital floor removal in decompression, and management of benign and malignant neoplasms in various areas. [2, 10]

In certain cases, functional endoscopic sinus surgery may not provide complete access to the maxillary sinus, requiring the use of the Caldwell-Luc technique as a complement. A mini-antrostomy is used to facilitate maneuvering of instruments, allowing collaboration between endoscopes and surgical tools. [15]

Research has shown that inferior antrostomy, a component of Caldwell-Luc surgery, does not provide a functioning drainage pathway and is prone to stenosis. Additionally, a study found necrotic bone debris in post-Caldwell-Luc surgery samples, emphasizing the importance of considering it as a last option when all other alternatives have been exhausted [8, 13, 14].

A comparative analysis revealed that patients who underwent Caldwell-Luc surgery had a lower occurrence of revision procedures compared to functional endoscopic sinus surgery antrostomy. [17] Furthermore, a combined approach of endoscopic sinus surgery and endoscopic-assisted Caldwell technique has been used to remove aneurysmal bone cysts in the maxillary sinus. [18]

The foundational concepts of functional endoscopic sinus surgery were established through research on mucociliary clearance patterns and endoscopic changes in the ostiomeatal complex, along with the use of computed tomography for imaging the ethmoid sinuses. [19]

The Caldwell-Luc surgery provides extensive access to the maxillary sinus, orbital floor, and pterygopalatine fossa, which has led to expanded indications in recent years. [20]

Overall, while the Caldwell-Luc surgery has been phased out as the initial option for treating chronic sinusitis, it still holds value in specific cases and as a complementary procedure to functional endoscopic sinus surgery. [20]

CONCLUSION

In our situation, the initially suspected cyst located within the left maxillary sinus was actually identified as a malignancy (Adenoid Cystic Carcinoma). This diagnosis could have been overlooked if we had solely relied on the Endoscopic Approach.

While Endoscopic Sinus Surgery provides benefits in managing chronic rhinosinusitis, there are instances where its approach might be limited, and the utilization of open methods like the Caldwell Luc's Approach might be warranted. This is particularly true when an extensive approach to the maxillary sinus is deemed.

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