INTRODUCTION

Of all the sinuses, the maxillary sinus stands the most diseased. This can be attributed to its pyramidal shape which makes access to its anterior and medial wall difficult, thereby leading to residual disease. Inverted papillomas, although relatively uncommon, are diagnosed in about 0.5%–4% of operated nasal tumours [1]. Among these, the most common site of origin of tumour remains the maxillary sinus [2]. Their high rate of recurrence is a harrowing problem for surgeons which makes drilling out diseased bone necessary. Although several advanced techniques have been developed to clear maxillary sinus disease, the efficacy of these remain questionable. This can be attributed to the difficulty in access that most techniques accompany, leading to suboptimal clearance. The current gold standard for the treatment of maxillary sinus inverted papillomas remains to be endoscopic medial maxillectomy. Recent modifications to this technique such as the prelacral recess approach have provided improved access to the different recesses of the maxillary sinus [3]. When the sinus pathologies extend anteromedially, usage of angled instruments and endoscopes becomes imperative. However, these pose a problem of not providing adequate space and reach within a single nostril for manipulation and sharp dissection. Our technique is an easy modification to the transseptal approach that is a useful tool to access hidden areas of the maxillary sinus without associated morbidity.

CASE REPORT

A 54-year-old male presented with right sided nasal block and facial pain. He had similar complaints in the past and was diagnosed to have inverted papilloma for which he had undergone two previous operations. This method provides complete access to the maxillary sinus, particularly the anterior wall, to provide adequate reach and ensure complete removal of tumours. We describe a technique modifying the existing transseptal approach used as an adjunct to prelacral recess approach, wherein a hemitransfixation incision placed in the contralateral nasal cavity along the septum provides access to the maxillary sinus with angled instruments. This modified transseptal approach provided better reach and access to the maxillary sinus. Postoperatively, there was no evidence of septal scarring or perforation and no evidence of lesion recurrence. Our technique is an easy modification to the transseptal approach that is a useful tool to access hidden areas of the maxillary sinus without associated morbidity.

Keywords: Nasal septum; Inverted papilloma; Maxillary sinus; Sinusitis.
Surgical Technique: Surgery was performed under general anesthesia. Merocel® (Medtronic Xomed Inc., Jacksonville, FL, USA) soaked in adrenaline solution (1:1000) was used for local vasoconstriction. On the right side, minimal remnant of uncinate was removed. Following maxillary antrostomy, an incision was made anterior to the inferior turbinate and extended along the floor of the nose posteriorly (Fig. 3). The flap was then elevated exposing the entire lateral wall of the nose (Fig. 4). A 3 mm gouge was used to excise bone anterior to the nasolacrimal duct in a careful manner so as to avoid injury to the duct. The nasolacrimal duct was identified and transposed medially. This provided access to the anterior part of the maxillary sinus where the tumour remained hidden. Utilizing burrs (Sinus Burr 35k, Karl Storz, Tuttingen, Germany), the bone was drilled opening up the medial wall of the maxillary sinus. The visualised part of the tumour was removed using angled instruments (Heuweiser Forceps, Karl Storz, Tuttingen, Germany). To gain access to the anteromedial wall and medial buttress, a hemitransfixation incision is made in the contralateral nasal cavity (left side) at the mucocutaneous junction. This incision was extended posteriorly, horizontal along the superior part of nasal septum beneath the nasal roof (Fig. 5). Mucoperichondrial and mucoperiosteal flaps were elevated on the contralateral side and folded posterior-inferiorly.

Fig. 1. Preoperative diagnostic nasal endoscopy.

Fig. 2. Contrast enhanced magnetic resonance imaging of paranasal sinuses. (A) Axial and (B) coronal cut.

Fig. 3. Incision made anterior to right inferior turbinate and extended along the floor of nose, posteriorly (star indicates inverted papilloma and arrow indicates remnant of inferior turbinate).
ly. The flap falls downwards, allowing space for instrumentation. From the ipsilateral side, a needle (Ethilon 3-0, Ethicon, Johnson and Johnson, Piscataway, NJ, USA) was passed through the septum, corresponding to the opening made on the medial wall of maxillary sinus (Fig. 6). Once the needle pierced beyond the septum on the contralateral side, a cruciate incision was made on the cartilage (0.3 cm × 0.3 cm) (Fig. 7). Curved instruments (Rad Blades 15, 40 and 60 degree, Medtronic Xomed Inc., Jacksonville, FL, USA) of the powered debrider (Medtronic Xomed Inc., Jacksonville, FL, USA) were introduced through this incision providing access to the entire anterior wall of the maxillary sinus on the diseased side (Fig. 8). After tumour removal, the bone underneath its attachments was also drilled using a variety of angled burrs (The DrillCut-X® II-35 Handpiece with 35k Sinus Burrs, Karl Storz, Tuttingen, Germany) in the range of 15°, 40° and 60° (Fig. 9). 3-0 Vicryl
Rapide™ (Vicryl Rapide, Ethicon, Johnson and Johnson, Piscataway, NJ, USA) with a knot at one end was used for septal suturing after replacing the mucoperichondrial and mucoperiosteal flaps (Figs. 10 and 11). The lateral wall flap was repositioned and the inferior turbinate was sutured anteriorly. Follow up period showed no crusting, perforation or epiphora. There were no signs of recurrence after a follow up period of one, three and six months. Due to drilling of bone, some degree of maxillary contracture was observed.

**DISCUSSION**

In conditions such as inverted papilloma, it remains crucial to remove the tumour completely along with its underlying bone, as it houses microscopic cell rests that can lead to tumour progression [6]. However, it is the anatomy of the maxillary
The morbidity associated with this technique remains minimal. Our experience shows that this modification of transseptal technique is a useful tool in adjunct to endoscopic medial maxillectomy and prelacrimal approach to access hidden areas of the maxillary sinus. It appears to provide similar access as that of an open access approach without the associated morbidity such as alar retraction and facial numbness.

**Ethics Statement**
Informed consent was taken. The ethical approval was obtained as per institution regulations.

**Availability of Data and Material**
All data generated or analyzed during the study are included in this published article.

**Conflicts of Interest**
The authors have no potential conflicts of interest to disclose.

**Author Contributions**
Conceptualization: George Varghese. Resources: George Varghese. Supervision: George Varghese. Visualization: George Varghese. Writing—original draft: all authors. Writing—review & editing: George Varghese.

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**REFERENCES**