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**Case Report**

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# A panoramic view of type 4 Kuhn cells, only one of its kind

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## ABSTRACT

There are different type of pneumatizing air cells in the frontoethmoidal region, as described by Kuhn el all, in this type IV Kuhn cell is that kind of cell which is completely isolated within the frontal sinus, or as Wormald described it as, fronto-ethmoidal cells extending more than 50% of its vertical height of the frontal sinus. In this study we would like to show a macroscopic or panoramic view of type IV Kuhn cell, which was a glorious view while performing an external approach, as there is no literature on type IV Kuhn cell with a panoramic view. Possibly this could be the first of its kind in medical literature. And therefore, this image can be incorporated in various studies for further references.

**Keywords:** Panoramic view, Type IV Kuhn cells, Kuhn classification

## INTRODUCTION

By adapting FESS understanding the anatomy of the nose and paranasal sinuses have become much easier. Before the endoscopic era the frontal recess region due to its narrow area and variable anatomy was confusing the endoscopic surgeons.[1] Van Alyea used the name "frontal cells" to refer to the different types of ethmoidal cells pneumatizing in this area, which included the frontal cells (sometimes called the frontoethmoidal cells), as described by Kuhn et al into 4 types.[2]

Type I is a single frontal cell above an agger nasi cell. Type II is a tier of cells in the frontal recess above the agger nasi cell. Type III is a large cell pneumatizing from the frontal recess into the frontal sinus. Type IV is a cell totally isolated within the frontal sinusand according to Wormald classification fronto-ethmoidal type 4 Kuhn cells are described as fronto-ethmoidal cells extending more than 50% of its vertical height of the frontal sinus. Frontal cells have been reported to occur in 20–41% of paranasal sinuses.[3] In this study we would like to exhibit that there are no articles or literature showing panoramic view of the intrafrontal cell within the frontal sinus and thus this image will be helpful for further references.

In this study we would like to bring to the notice of the medical fraternity that we are reporting the type-IV Kuhn cells whose macroscopic appearance or the panoramic view of type IV Kuhn cells is indeed a rarity. Even after a meticulous search in medical literature, online search and text books we could not find macroscopic or panoramic view of Type 4 frontal cells, which were only seen in CT scan or endoscopy. Possibly, this could be the first of its kind, the naked eye picture in medical literature.

## CASE REPORT

A middle-aged man presented to the ENT Department with proptosis of the left eye and nasal block over the last 3 years. He has been complaining about a nasal block for several years and his past history revealed that he had

undergone two nasal surgeries in nine years for the same complaints.

On examination there was a left eye proptosis and downward displacement of eye globe, diagnostic endoscopic findings showed expansive lesions involving the upper part of the nasal cavity with multiple adhesions in the left nasal cavity. Contrast Enhanced Computerized tomography of paranasal sinuses showed left supraorbital isodense mass causing gross downwards and outward displacement of globe and frontal recess appeared to be patent. And therefore, patient was diagnosed to have unilateral left frontal ethmoidal mucocele so we had to open endoscopic assisted external approach. After all relevant investigations and pre-anesthetic evaluation we planned for external assisted Draf-IIb procedure. By providing aspectacle incision and after elevating the anterior plate of frontal sinus as in osteoplastic frontal sinus procedure, we noticed an isolated intrafrontal cell, and itself as the type-IV Kuhn-Cells in each frontal sinus.

By exposing the frontal sinuses, we were able to see two isolated intrafrontal sinus cells, one in each frontal sinus, which were almost triangular in shape and peripheries of the frontal cell were attached to the posterior table of the frontal sinus.

The entire structure looked like two glistening rocks placed carefully within a crevice so as to deceive the naked eye and become an integral part of the frontal sinus**.**

Each intra frontal cell in our case was glistening, firm in consistency, difficult to fracture with thumb pressure, which denotes that it is not so fragile as it looks in the CT-Scan.

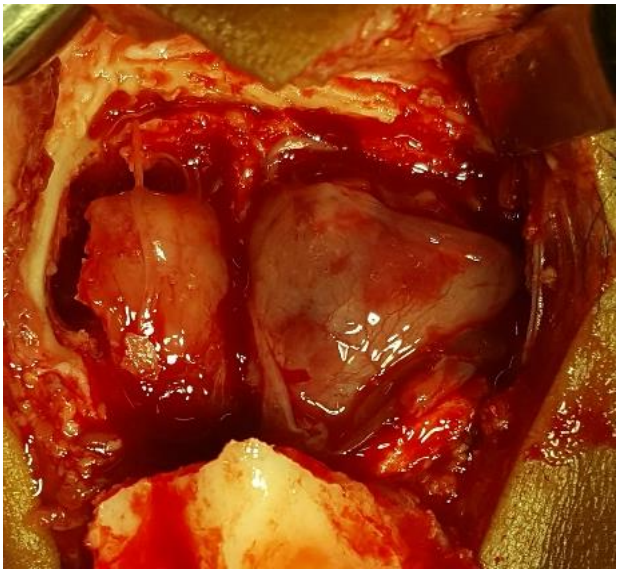

**Figure 1: Naked eye appearance of type IV Kuhn cell occupying individual frontal sinus after exposing the sinus, note anterior table of frontal sinus reflected inferiorly.**

Though the wall of the intrafrontal sinus cell looks very thin, it was not easily fracturable (Figure 1).

**Figure 2: CT-Scan showing frontal sinus with type IV Kuhn cell.**

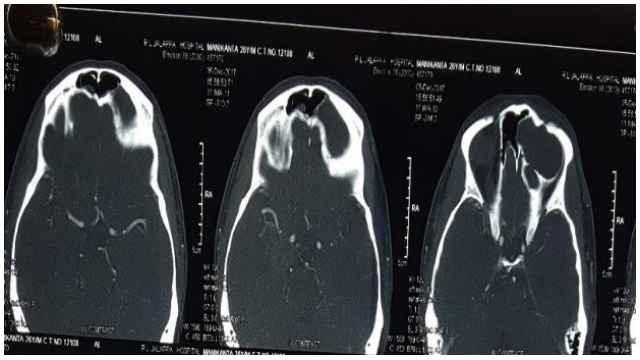

**Figure 3: Axial section of frontal sinus.**

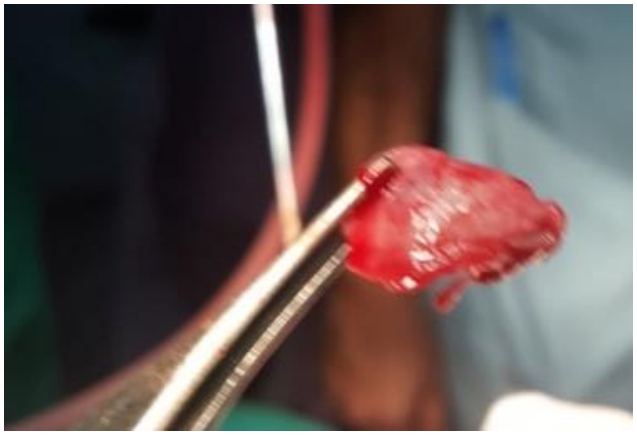

**Figure 4: Glistening wall of type IV Kuhn cell after removal from frontal sinus.**

## DISCUSSION

The concept of the frontal recess was first introduced by Killian in 1903.[4] In 1941 Van Alyea wrote more about the pneumatization of the frontal recess but could not define the air cells in the frontal recess accurately.[5] As discussed, the classification of the frontal cells and the suprabullar pneumatization could be categorized into four types in a similar pattern as discussed before. The parameters used for the classification were for extension

of the air cell into the frontal sinus and also for the multiplicity of the air cell.

One study conducted in Egypt showed that out of 70 patients the Coronal and axial CT scans of paranasal sinuses of the 70 patients were admitted for functional endoscopic sinus surgeries. They were reviewed to identify the agger nasi, frontal cells and frontal sinus disease and the Type IV frontal cells were found in 12 of the studied sides (8.571%).[3] In 1914 Lothrop`s described that intranasal ethmoidectomy followed by external lynch- type approach with resection of the medial frontal sinus floor, superior nasal septum & inter-sinus septum forms a large frontonasal communication. Recently, Wormald et al published an article suggesting a sensible classification that has value in both understanding the anatomy and in planning the surgical approach to the frontal sinus.[6]

## CONCLUSION

The naked eye appearance of the type-IV Kuhn-Cell (intra frontal sinus cell) is not described in any of the medical literature. Even after extensive search in text books and online publications we could not find the macroscopic or the panoramic view of the intrafrontal sinus cells, though we find such cells in the CT-scan on PNS or the endoscopic pictures of the intra-frontal sinus cells. This is due to the rarity of external procedures on the frontal sinuses namely osteoplastic techniques in the current era of endoscopic sinus surgery. In this study we found a macroscopic naked eye appearance of the intra frontal sinus cell as an uncommon finding. Possibly this could be the first of its kind in medical literature. And therefore, this image can be incorporated in various studies for further references.

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