



# CHRONIC RHINOSINUSITIS WITH NASAL POLYPS IN WISTAR RAT IN INTERVENTIONAL STUDY

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## Background

Chronic rhinosinusitis is a chronic inflammation of the sinonasal mucosa and contributes to massive alterations in the formation of nasal polyps and pathophysiological changes such as epithelial thickening. Nasal polyps are more frequently associated with the chronic rhinosinusitis subset better known as chronic rhinosinusitis with nasal polyps (CRSwNP)

## Objective

Elucidating the causative factors and developmental trajectory of chronic rhinosinusitis, along with the formation of nasal polyps, is undertaken through an examination of the pathophysiological processes inherent in Wistar rat, categorized into negative control and positive control.

## Methods

This study employs a comparative study. Wistar rat (*Rattus norvegicus*, sp) are used to model CRSwNP. The samples are divided into negative control and positive control. Negative control induced by Phosphate-Buffered Saline (PBS) and positive control induced by Ovalbumin and *Staphylococcus aureus*.

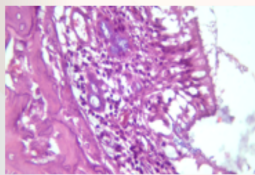
## Result

Histological findings were observed at days 14, 21, 28, 35, and 42. In the negative control on day 14, normal tissue was seen without inflammation, while the positive control showed edema. On day 21, the negative control displayed swollen columnar epithelial cells with lymphocytes, whereas the positive control exhibited these cells along with goblet cells and ciliary cells in swollen fibrous connective tissue. Day 28 showed thicker basal membranes and swollen stroma with various inflammatory cells in both negative and positive controls but in positive control founded A stroma with fibrous connective tissue, looks swollen, with presence of lymphocyte, eosinophil, neutrophils, and new vessels. Day 35 showed significant edema in the negative control and polyp-like structures in the positive control, both with swollen stroma and inflammatory cells. Finally, on day 42, the negative control displayed layered to single-layered cells with goblet cells and ciliary cells, while the positive control showed single to multi-layered columnar epithelial cells with a thick basal membrane and polyp-like structures, alongside swollen stroma and inflammatory cells.

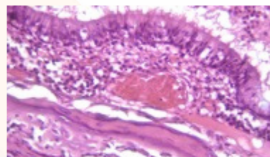


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Day 14



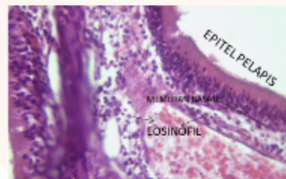
Day 28



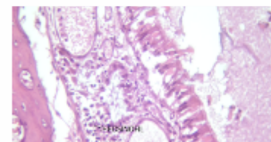
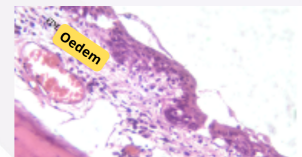
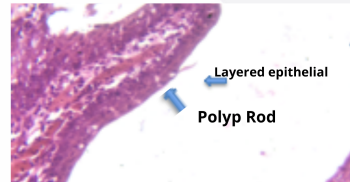
Day 21



Day 35



Day 42



## Discussion

This study uses Wistar rats to explore CRSwNP, considering them as an excellent animal model. It takes over 42 days to induce nasal polyps formation. Edema was observed by day 14, indicating acute swelling in the connective tissues of the stroma without an increase in cell or fiber numbers. This swelling contributes to the growth of polyp lesions. Apart from Edema, eosinophils are also found however eosinophils were initially scarce on days 14 and 21, they became more noticeable by day 28. Eosinophils are abundant cells characterizing chronic inflammatory processes and late-phase allergic responses. Nasal polyp formation is linked to B cell activations and antibody secretion. The early weeks show increased levels of specific autoantibodies and signs of inflammation. Elevated IgA and levels resulting from B cell activation also contribute to nasal polyp formation, classifying it as a type 2 inflammatory response.

## Conclusion

Using animal models to determine the cause and development process of CRSwNP is a great choice because this method can analyze the pathophysiologic processes of the CRSwNP. This experiment confirms that the histological appearance in the wistar rat is similar to humans, such as the early inflammatory response found in chronic rhinosinusitis.

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