Chronic Rhinosinusitis: Role of CT scans in the evaluation of paranasal sinuses

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Abstract

Rhinosinusitis is a common condition seen in the United Kingdom and many other countries. Presenting symptoms can be varied and often vague. This review article aims to discuss the use of CT scanning in the investigation and assessment of patients presenting with these features.

INTRODUCTION

Chronic rhinosinusitis is a commonly seen condition in the United Kingdom. A classification of rhinosinusitis symptoms has been described by The Task Force on Rhinosinusitis of the American Academy of Otolaryngology- Head and Neck Surgery. The major symptoms included facial pain or pressure, nasal obstruction, congestion, purulent rhinorrhoea and post nasal catarrh. The minor symptoms were headache, halitosis, fatigue, dental pain, cough and ear pain ([1], [2]).

Although rhinosinusitis is frequently encountered, its diagnosis relies on clinical judgment based on a number of often vague physical complaints and symptoms such as facial pain, headache, postnasal catarrh and fatigue. Because of the inherent uncertainty associated with its diagnosis, more objective tools have been sought. Since the introduction of the rigid endoscope and computed tomography (CT) scan, a more objective data is obtained regarding the condition of the nasal mucosa and the presence of fluid or polyps.

The Royal College of Radiologist Working Party ([3]) said that plain radiographs have no place in the routine management of rhinosinusitis due to the low specificity and sensitivity compared to clinical and surgical findings. When comparing the forms of imaging, CT scan is the investigation of choice as it provides detailed information about the ostial anatomy. It is indicated when maximal medical treatment has failed, complications of rhinosinusitis or if malignancy was suspected.

Currently, CT scanning is the standard imaging in the evaluation of the paranasal sinuses. It is also used as a tool to establish the severity of disease and response to treatment and surgery. Furthermore CT findings are an integral part of several severity staging systems mat are used for chronic rhinosinusitis ([4]). Despite the widespread use of CT scans, their true accuracy in the diagnosing of chronic rhinosinusitis is less clear. We would like to discuss some of the controversies on its role in diagnosing rhinosinusitis.

DISCUSSION

Stammberger ([5]) and Kopp ([6]) postulated that variations in the anatomy of the nasal cavity result in obstruction and mucous stasis that can lead to infection. Other authors have also proposed these concepts to explain how anatomical variants such as concha bullosa ([7]) and pneumatized superior turbinate ([8]) might produce similar symptoms.

Therefore, are these anatomical variations found on CT scans significant?

Many surgeons would recognize that sinus disease is often associated with an anatomical variation such as a concha bullosa or a large agger nasi cell but these are also seen in healthy individuals .Numerous comparative studies have been done over the last few years. For example one study ([9]) reports a higher prevalence of concha bullosa in the symptomatic group compared to the asymptomatic group. However other studies ([10],[11],[12]) have found the prevalence of concha bullosa to be the same in both the diseased and control groups. Another study ([13]) also assessed the anatomical parameters of women's sinuses, airways and ostia and found that despite been smaller than those of men, there

is no difference in the prevalence of rhinosinusitis in both sexes. Overall, with the current findings, anatomical variations have shown no consistent, correlation with the pathogenesis of rhinosinusitis.

Because of the importance of symptoms in the evaluation of chronic rhinosinusitis, a quantification of these symptoms would be useful in its diagnosis and management. Currently several scoring systems have been clinically validated ([14]) and other systems have quantified the disease seen on CT scans findings ([4]). Because these two sets of information are the primary modes of rhinosinusitis evaluation, it is important to define the relationship between the two. Unfortunately due to the lack of uniformity between the scoring systems, this has made it difficult to compare the results of different surgical techniques.

Hence which scoring systems should be used?

The classification and scoring system proposed by Lund and MacKay ([15]) is the most widely used because it is the most straightforward and can be done more easily compared to the others. This scoring system also includes symptoms, endoscopic appearance, anatomical variations and a surgical score.

Studies analyzing CT scans of asymptomatic patients have shown rates of incidental opacification as high as 40%. This has also been noted in studies performed in the paediatric population ([16],[17],[18],[19]). The worry is that if this specialist investigation is over prescribed, the diagnosis of rhinosinusitis will be inappropriately made to many patients with incidental changes.

However, even when a patient has symptoms and CT scans shows signs of disease, the extent of the mucosal changes did not correlate with the extent of their symptoms. This was described by Bhattacharyya el al ([20]). CT has also not been shown to correlate to surgical findings ([21]).

Another cohort study looked at 973 consecutive patients of whom 101 patients had symptoms of facial pain but no endoscopic or CT evidence of disease. The 101 patients were followed up for a mean period of 2 years and 2 months. At the end of that period, after various treatment strategies, none of these patients were found to have pain attributable to sinus disease ([22]), Shields et al ([23]) also did not find any correlation between facial pain and sinus disease severity by CT scans

It is also worthwhile mentioning that patients with facial pain are commonly diagnosed to have “sinusitis”. This belief can be very misleading for the patients as there are non sinogenic causes for facial pain. In the same study ([22]), the author highlights the need for the surgeon to consider the neurological causes of facial pain especially if there is lack of evidence of sinus disease.

Apart from the controversies mentioned, CT scans of the paranasal sinuses do have an important role in the management of chronic rhinosinusitis. It is extremely useful in providing the “road map” prior to endoscopic sinus surgery ([24]). It also helps to diagnose atypical infections and malignancy ([25]). It also assists in managing complications of sinusitis with regards to whether there is intracranial or orbital involvement ([26]).

CONCLUSION

The diagnosis and management of chronic rhinosinusitis continue to pose a great challenge to clinicians even though it is a relative common disease. The problem lies in the fact that we have to frequently rely on the patient's subjective symptoms, which can often be very vague, and only a few objective criteria. The effective management of rhinosinusitis is based on a thorough history, examination including a nasal endoscopy and aggressive medical treatment. Despite the evidence, CT scans of the paranasal sinuses will continue to be use as an adjunct in the diagnosis and management of this disease and its complications.

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