

A prospective audit to look at the number of plain sinus x-rays requested via the radiology department*

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SUMMARY

Chronic rhinosinusitis is currently diagnosed on history-taking with nasendoscopic confirmation. Sinus x-rays are insensitive and non-specific but are still requested, particularly by primary care physicians. The rate of sinus x-rays can be reduced by informing GPs of current best practice guidelines.

Key words: sinusitis, X-rays, benchmarking, diagnosis, primary care

INTRODUCTION

Chronic rhinosinusitis is a common disease with a prevalence of up to 16%⁽¹⁾. It is defined as inflammation of the nose and the paranasal sinuses characterised by two or more symptoms (nasal blockage, discharge, anosmia, facial pain) and accompanied by either endoscopic signs⁽²⁾ or CT changes⁽³⁾. In the past the diagnosis of sinusitis relied upon plain film radiographs - the presence of opacification in the sinuses was taken to imply the presence of inflammatory mucosal change and hence the diagnosis was made. This imaging modality has now been shown to be insensitive⁽⁴⁻⁶⁾ and has limited use in diagnosis⁽⁷⁾. The development of the nasendoscope in the 1980s⁽⁸⁾ has allowed for direct visualisation of the sinus ostia and nasal mucosa and sinus disease to be quantified⁽⁹⁾. Primary treatment involves nasal douching and intra-nasal steroids⁽¹⁰⁾. Some cases may benefit from surgical intervention, usually aimed at improving maxillary sinus ventilation and drainage⁽¹¹⁾.

Chronic rhinosinusitis is frequently treated in a primary care setting⁽¹²⁾. Guidelines suggest treatment with analgesics and topical steroids⁽¹³⁾ with referral to an ENT surgeon in cases of treatment failure⁽³⁾. The same guidelines specifically state that plain X-ray is not recommended⁽³⁾. The impetus behind this audit was the realisation that a number of patients referred to an ENT department had already had plain X-rays requested by their general practitioner (GP).

MATERIALS AND METHOD

Standards

We examined the current guidelines and evidence regarding appropriate imaging in suspected sinusitis. Guidelines from the Royal College of Radiologists discourage the use of plain facial x-rays in suspected cases of sinusitis⁽¹⁴⁾. Plain X-rays have been shown to have low sensitivity and specificity for sinusitis⁽¹⁵⁾ and

will also expose patients to radiation. Imaging is indicated in chronic sinusitis if operative intervention is being considered and in these cases computed tomography will define preoperative anatomy and in addition has high diagnostic sensitivity⁽¹⁶⁾. The guidelines produced by radiologists⁽¹⁴⁾ and otolaryngologists are clear-cut⁽³⁾. We therefore concluded that no patient referred from primary care should have had a plain X-ray.

Methodology

During a six-month period from March 2005 – August 2005, all plain sinus X-rays requested from the radiology department were recorded. The source of the referral was noted. The radiologist's report was collected and a note was made as to whether the patient was ultimately referred for an ENT opinion.

Evaluation and comparison of practice

Fifty-four plain sinus X-rays were requested during a 6-month period. General practitioners requested 48 of these. Three were requested by the accident and emergency department; and in all cases were requested following facial trauma to exclude facial fractures. The ENT department requested one X-ray. Thirty-four of the X-rays were reported as normal, 16 had radiological evidence of mucosal thickening, 4 reports were unavailable at the time of the study.

Fourteen of the patients who had X-rays taken were referred to the ENT department, only 7 of these had 'abnormal' X-rays. The ultimate diagnosis of these 14 patients (as made in the ENT clinic) is as follows: 5 had chronic rhinosinusitis, 5 had nasal obstruction secondary to septal deformity, 4 had atypical facial pain. Of the referred patients, 7 were treated satisfactorily with topical steroids, 2 underwent septal surgery and 5 were discharged with no further treatment necessary.

Footnote: This paper was presented as a poster at the British Rhinological Society meeting on May 25th, 2007

RESULTS

Change of Practice

The results of this audit were presented at a departmental meeting. Because most of the X-rays had been requested from a primary care setting, we felt it appropriate to inform our primary care colleagues of this. A letter was sent to all local GPs informing them of the audit and highlighting the European position paper guidelines on sinus imaging⁽³⁾. In addition, a letter was sent to a primary care journal⁽¹⁷⁾ and this was reviewed in another publication popular among GPs⁽¹⁸⁾.

Re-evaluation

The second cycle of this audit was performed one year later. This was done in order to minimise the effect of seasonal variation on our data. Data were collected and analysed in the same manner as above.

Twenty-six patients had sinus X-rays during the six month period from March 2006 to August 2006. One of these was requested from the accident and emergency department, the remainder were requested by GPs.

Some assumptions have been made in the analysis of this data. The most recent census figures show that the ENT department serves a potential referral population of approximately 170,000⁽¹⁹⁾. If one uses the aforementioned prevalence figures, this equates to an adult population suffering from chronic rhinosinusitis of 27,509. A Chi-squared test was used to assess these data and indicates that the reduction of X-rays requested from 54 to 26 was significant ($p < 0.01$).

The radiation dose of a plain sinus X-ray is approximately 40 centigrays/cm² (for comparison a chest X-ray (CXR) is approximately 10 centigrays/cm²). The cost of a sinus x-ray at our institution is £ 72 (€ 90) and although we have reduced the spending on this unnecessary procedure from £ 3,888 (€ 4,907) to £ 1,872 (€ 2,363) (along with a proportional decrease in radiation exposure) we have not been able to eliminate it completely.

CONCLUSION

'Plain radiographs have no place in the routine management of chronic rhinosinusitis'⁽²⁰⁾. Their unnecessary use incurs a financial burden as well as unnecessary exposure of patients to ionizing radiation. The Ionizing Radiation Regulations (IRMER) were enacted in the United Kingdom in 2000⁽²¹⁾ and incorporate the majority of the provisions of the European Medical Exposures Directive⁽²²⁾. These Europe-wide directives are designed to protect people undergoing medical exposure to ionizing radiation for diagnosis or treatment. They introduce an explicit requirement for the justification of radiological referrals and arguably imply that a radiological investigation should not be performed if this justification is absent⁽²³⁾.

This audit has shown a reduction in the number of plain sinus X-rays of over 50% following a simple intervention. The results of the first cycle of this audit have already been communicated to colleagues in primary care^(17,18). The purpose of this article is to illustrate to our colleagues in secondary care that simply informing and educating GPs can result in a substantial reduction in unnecessary X-rays.

The majority of X-rays requested in the first cycle were normal and although the authors realize that a 'normal' X-ray may allow the clinician to reassure the patient that they do not have an underlying sinogenic pathology, the number of false positives reported with plain sinus X-rays makes this practice hard to recommend.

We are unaware of the ultimate diagnoses of the patients who were not referred for an ENT opinion - because the majority of referrals came from primary care and because of concerns about patient confidentiality it was very difficult to obtain diagnostic data from GPs about patients who had not been formally referred to our service. Of those that were referred, less than half had chronic rhinosinusitis. The equipment available to us in the ENT clinic simplifies the task of diagnosis, and we would like to recommend that all patients with symptoms suggestive of sinus disease recalcitrant to topical steroid therapy be referred to an ENT department for further assessment.

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