

ROENTGEN EXAMINATION OF MAXILLARY SINUS, ANTRAL PUNCTURE AND IRRIGATION – A COMPARATIVE STUDY

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ABSTRACT

The various radiological findings of maxillary sinus were compared to those at antral puncture and irrigation in patients with chronic maxillary sinusitis. It was noted that roentgen findings of opacity and fluid level of the maxillary sinus are definite evidences of sinus infection and a mucosal thickening is not an indication of sinus infection.

Keywords: Maxillary sinus, Roentgenogram, Puncture, Irrigation.

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INTRODUCTION

Roentgen examination is generally used in the diagnosis of maxillary antral disease especially in chronic sinusitis (1). There have been various studies carried out to assess its accuracy. Comparisons of roentgen examination with antral puncture and irrigation (2,3), with transillumination and lavage (4) and with operative findings (5) have been done. The purpose of this prospective study was to reassess the accuracy of the findings of Waters' view with those of antral puncture and irrigation.

Waters' view was developed by Waters and Waldron in 1915 as a modification of occipito-frontal projection (6). It is essentially designed to provide a view of maxillary sinus unobstructed by petrous apex. It has been regarded as the single best view for maxillary sinus.

MATERIALS AND METHODS

This study included patients attending the E.N.T. Department of our hospital. There were 60 patients of various age groups. The age, sex and number distribution are given in Table I. These patients were examined clinically and diagnosed to have chronic sinusitis. They were then subjected to an x-ray of the paranasal sinuses. (Waters' view). In the positive cases, an antral puncture and irrigation was done within a period of 3 days and prior to any antibiotic therapy.

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Roentgen examination and evaluation of the films:

The view used was Waters' method (Parieto-acanthial Projection) with an open mouth modification. The patient was placed in posterior anterior position, seated erect, centering the midsagittal plane of the body to the midline of the grid device or table. The patient's head is extended, the head rests on the chin, centering the cassette to the anterior nasal spine (acanthion), so that the midsagittal plane is perpendicular to the plane of the film. The head is then adjusted (with a protractor as a guide) so that orbitomeatal line forms an angle of 37 degrees from the plane of the film. The central ray then enters the vertex, emerges at the anterior nasal spine directed perpendicularly to the midpoint of the film (6).

Table I
AGE AND SEX DISTRIBUTION OF THE PATIENTS

Age in years	Female	Male	Total
10-19	2	2	4
20-29	10	16	26
30-39	3	15	18
40-49	3	7	10
50 and above	1	1	2
	19	41	60

The roentgen findings of the maxillary antrum were classified as:

- well aerated antrum
- + mucosal thickening with or without polyp formation
- ++ Fluid level
- +++ haziness i.e. loss of translucency of most of the maxillary antrum
- ++++ Completely opaque antrum

All the patients with a positive sinus findings on the x-ray were subjected to antral puncture and irrigation under local anaesthesia.

The returns on antral lavage were classified as:

- Clear return
- + Mucoid discharge in the irrigation fluid
- ++ Mucopurulent or straw coloured secretions in the irrigation fluid
- +++ Frank purulent secretions with bad odour mixed with the irrigation fluid.

RESULTS

98 maxillary antra were thus analysed. The roentgen findings were compared with those of antral puncture and irrigation and tabulated (Table II).

The quantitative correlation between roentgen findings and the findings at irrigation is shown in Table III.

It was seen that when the roentgen findings of the maxillary sinus were

- Completely opaque — 100% cases were purulent returns on antral irrigation.
- Hazy — 40% cases were purulent. 40% cases were clear and 20% were mucoid returns on antral irrigation.
- Fluid level — 73% cases were purulent, 15.8% were mucoid and 10.5% were clear returns on antral irrigation.
- Mucosal thickening — 50% were mucoid and 50% were clear returns on antral irrigation.

Table II
COMPARISON OF THE ROENTGEN FINDINGS AND THOSE OF ANTRAL PUNCTURE AND IRRIGATION

Roentgen findings No. of sinuses		Result of irrigation				Total No. of sinuses
		+++	++	+	—	
++++	19	19	—	—	—	19
+++	40	10	6	8	16	40
++	19	11	3	3	2	19
+	20	—	—	10	10	20
Total : 98		40	9	21	28	98

Table III
THE QUANTITATIVE CORRELATION BETWEEN THE ROENTGEN FINDINGS AND THE FINDINGS AT IRRIGATION

Roentgen findings	No. of sinus	Irrigation findings Pathologic state (pus/ mucopus)	Non Pathologic state Mucoid/ clear	% of reliability for a positive antral puncture
++++	19	19	—	100.0
+++	40	16	24	40.0
++	19	14	5	73.7
+	20	—	20	—

DISCUSSION

In our study, when total or intense opacity were seen in the x-rays, the antral puncture returns were either frank purulent or mucopurulent in all cases i.e. 100% reliability for sinus infection. This finding was in agreement with the work of various authors. Vourinen et al (2) in their study of 272 maxillary sinus showed 86% agreement of a positive antral lavage when x-ray showed total opacity. McNeil (4) in his study of 242 sinuses of 150 patients compared opacity with sinus lavage and found an agreement of 81%. Sammy Elwamy et al (5)

in the comparison of x-rays with operative findings showed total opacity with intra sinus pathology in 75% cases.

In cases where x-rays showed loss of translucency or haziness only 40% cases had purulent returns on antral lavage in our study. Samy Elwamy et al in their study revealed a 12.5% cases of correct prediction in cases of haziness or reduced translucency.

In cases where the x-rays showed fluid level, 73.7% cases were purulent returns on antral lavage. Various other workers have also shown a high level of correct prediction in the case of fluid level i.e. 73.6% by Vourinen et al and 100% by Samy Elwamy.

In the case of mucosal thickening in 50% cases the returns were clear and in 50% cases the returns were mucoid. No sinus had purulent returns. Thus 100% were negative for sinus infection. McNeil in their study showed that only 37% cases were positive on antral lavage when x-ray showed mucosal thickening. Vourinen et al showed that in case of mucosal thickening, only 36.4% showed evidence of sinus infection. However Samy Elwamy et al showed 62.5% cases with evidence of sinus pathology in case of mucosal thickening.

CONCLUSION:

The results of the roentgen examination were compared with those of irrigation after antral puncture in a

series of 98 maxillary antra. In cases where the roentgen examination of the maxillary antra showed opacity, 100% cases had sinus infection, in cases of haziness only 40% cases showed purulent returns and in mucosal thickening no case showed evidence of sinus infection.

From the above study it is evident that a roentgen finding of maxillary sinus opacity is the most reliable evidence of sinus infection, followed by fluid level. A mucosal thickening as shown on roentgen examination is not an indication of sinus infection.

We can thus conclude that Waters' view undoubtedly yields valuable information regarding sinus pathology. It should not be accepted as a diagnosis in itself, but considered in the light of patients' history and clinical findings.

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