ULTRASONOGRAPHY - A SUPERIOR DIAGNOSTIC TECHNIQUE IN CHRONIC MAXILLARY SINUSITIS

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The symptoms of chronic maxillary sinusitis are varied and common to those of any other upper respiratory tract inflammation. Radiography is commonly used as a diagnostic aid but for it to be accurate it is time consuming, expensive and a health hazard. We found A-mode ultrasonography to be superior in accuracy in differentiating mucosal thickening from normal sinuses and in identifying the pathology underlying a radiologically opaque sinus. Besides it is very cost effective and less time consuming.

The signs and symptoms of chronic maxillary sinus inflammation resemble greatly with those of upper respiratory tract infections. Hardly any symptom can be considered typical enough to be diagnostic and even the signs can be confusing. This demands an accurate screening and if possible a diagnostic aid to correctly identify cases of chronic maxillary sinus inflammation. Radiology though of great help is costly, time consuming and with harmful effects.

Ultrasonography is now being increasingly used as an alternative tool to radiography in many specialities. The aim of this study was to investigate the usefulness of A-mode ultrasound in the diagnosis of chronic inflammatory disease of the maxillary sinus and to compare the results with radiography, using antral puncture and antrostomy as an invasive control.

Fig. 1(a). Echosine - 1000 in use. Patient is sitting on the left and examiner to the right holding the probe and examining the left maxillary sinus.

Fig. 1(b) – Anatomical reference points for scanning the maxillary sinus.
(a) The lowest point for scanning is in line with the edge of the nostril.
(b) The most lateral point is the zygomatic arch.
(c) The upper limit should be the lower orbit of the eye.
(d) The inferior limit is the crease of the nose.
The area to be probed is shown as a stippled area.
Material and Methods

This study was carried out over a two year period on 114 maxillary sinuses in 89 patients (59 men and 30 women, aged 20-40 years mean 30 years) attending the E.N.T., O.P.D. of J.N. Medical College Hospital A.M.U. Aligarh, with a clinical picture or history suggestive of chronic maxillary sinusitis. Immediately after the routine clinical ENT examination all patients were investigated by the A-mode echoscope. (Echosine TM Model 1000).

Echosine is an A-mode echoscope, which presents the echoes from acoustic discontinuities. At the frequency utilized in the echosine TM1000 (3.5 mHZ nominal) ultrasound waves are strongly attenuated in air and conducted relatively well in fluid. When the probe is applied to a sinus cavity that is well pneumatized, the ultrasound wave is almost completely attenuated at the front wall mucosa/air interface, thus no echo from the back wall of the sinus cavity is observed. If, however the sinus cavity contains fluid, the ultrasound wave can be transmitted through this liquid and echoes from structures within the sinus cavity, i.e. polyps, cysts or tumors, as well as from the back wall of the sinus cavity can be observed. The position of these echoes (or the time lapse between the burst and the echo) is an indication of the depth of such structures and their nature. The reflections are recorded in the Y-axis and the depth of the sinus on the X-axis.

Technique of Scanning (Berger, 1986):

1) Patient Preparation

Dental prostheses and eyeglasses should be removed. The patient should be seated during the examination—head tilted slightly forward.

2) Examination Technique

A) Coat the surface of the probe head with an ample supply of Echosine TM gel.

B) Adjust the examination depth so that 8 cm deflections are visible on the screen.

Definition of Echo Types (Jennert, 1982):

Fig. 3 shows the different types of echoes which are defined as follows:

1) Transducer pulse — The initial pulse wave within a depth of 1 cm read on the time scale (X-axis).

2) Air-mucosa echo (AME) — The first real echo in an air filled sinus.

Radiologic Findings

All the X-ray are in the occipitomental view with the patient sitting and are arranged in left (L) to right (R) position.

Fig. 2 (a) The L maxillary sinus shows a clear cut mucosal thickening.

Fig. 2(b) also show mucosal thickening of both maxillary sinuses but not as clearly as in 2a-L.