

Pattern of Tympanic Membrane Abnormalities Detected Using Video Otoscopy at Reggie Ear, Nose and Throat (ENT) Enugu, South East Nigeria

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Received: 18 Jun 2026; **Accepted:** 22 Jul 2026; **Published:** 03 Aug 2026

Citation: Anekpo Chijioke Chinedu, Nwosa Chukwuma Nnamdi, Amadi Anthony Chinedum. Pattern of Tympanic Membrane Abnormalities Detected Using Video Otoscopy at Reggie Ear, Nose and Throat (ENT) Enugu, South East Nigeria. Surg Res. 2026; 8(4): 1-5.

ABSTRACT

Background: The examination of the tympanic membrane remains a fundamental component of ear evaluation in clinical practice. Advances in digital technology have introduced video otoscopy, which provides magnified visualization and allows documentation of ear findings. This technology improves the identification of subtle tympanic membrane abnormalities compared to conventional otoscopy.

Objective: To determine the pattern of tympanic membrane abnormalities detected using video otoscopy among patients attending Reggie ENT clinic Enugu, south-east, Nigeria.

Methods: A retrospective descriptive study was conducted using video otoscope images and clinical records of patients examined at Reggie ENT clinic.

Relevant patient data including age, sex, presenting symptoms and tympanic membrane findings were extracted and analyzed using descriptive statistics.

Results: A total of 420 patients consisting of 300 males and 120 females were included in the study. The most common tympanic membrane abnormalities observed were tympanic membrane perforation, followed by tyranosclerosis, retracted tympanic membrane, hyperamnic and dull tympanic membrane. Video otoscopy enabled detailed visualization of the tympanic membrane structures including the malleus handle and light reflex.

Conclusion: Video otoscopy is a valuable diagnostic tool for identifying tympanic membrane abnormalities. Its ability to capture high resolution images, facilitates accurate diagnosis, documentation and teaching in ENT practice.

Keywords

Video otoscopy, Tympanic membrane abnormalities, Ear diseases, Nigeria.

Introduction

Diseases of the ear remains a major cause of morbidity globally and are important contributors to hearing impairment [1]. Accurate

examination of the tympanic membrane is essential for diagnosing middle ear diseases such as otitis media, chronic suppurative otitis media, and tympanic membrane perforation [2,3].

Otoscopy is traditionally performed using hand held otoscopes. However this technique may have limitations including poor visualization and inability to record findings for later review.

Video otoscopy has emerged as an important diagnostic tool that allows magnified visualization and digital recording of external auditory canal and tympanic membrane.

Several studies have demonstrated the usefulness of video otoscopy in diagnosing ear diseases and improving patient understanding of their condition [4]. One diagnostic study analysing 352 tympanic membrane showed that video otoscopy demonstrated sensitivity of 85.2% specificity of 98.1% in detecting tympanic membrane perforation [5,6].

Video otoscopy also provides valuable documentation for clinical research and medical education.

Quantitative analysis of tympanic membrane diseases using video otoscopic images has been shown to assist in evaluating pathological involvement of the membrane [7].

Despite these advantages, there is limited published data on patterns of tympanic membrane abnormalities detected using video otoscopy in Nigeria.

This study therefore aimed to determine the pattern of tympanic membrane abnormalities identified using video otoscopy in at Reggie, ENT clinic in Enugu south east Nigeria.

Method

This was a major retrospective descriptive study conducted at Reggie, ENT clinic in Enugu southeast Nigeria.

The study population consists of patients who underwent ear examination following various ear problems using video otoscope at the clinic within a period of one year Jan 2022 – December 2023.

Inclusion criteria

Patients with available video otoscopic images and patients with complete clinical records.

Exclusion criteria

Poor-quality images and patients with incomplete clinical data.

Data collection

Data were obtained from archived videos otoscope images and patients record. The following variables were collected.

- Age
- Sex
- Presenting symptoms
- Ear examined (right/left)
- Tympanic membrane findings

Data analysis

Data were analysed using statistical software such as SPSS version 27 Descriptive statistics were used to summarise data.

Ethical consideration

Ethical approval was obtained from Reggie ENT clinic review board. Patients identifiers were removed to maintain confidentiality.

Result

A total of 420 patients were included in the study with 300 males and 120 females in a ratio of 2•5:1

The most common presenting symptoms were hearing loss, ear discharge, ear pain and tinnitus.

Table 1: Socio - demographic Characteristics of Patients.

Variable	Frequency	Percentage (%)
Male	300	71.40%
Female	120	28.50%
Age group (years)		
0-10	31	7.40%
11-20	105	25.00%
21-30	162	38.60%
31-40	72	17.00%
>50	50	11.90%

MEAN AGE 29.4 +- 12.6 YEARS

Table 2: Presenting symptoms of patients.

Symptoms	Frequency	Percentage%
Ear discharge	78	18.5%
Ear Blockage	114	27.1%
Ear pain	74	17.6%
Hearing loss	96	28.8%
Tinnitus	58	13.8%

Table 3: Pattern of tympanic membrane findings Tympanic membrane (T/M).

Finding	Frequency	Percentage
Normal	160	38%
Retracted T/M	23	5.4%
Dull/opaque T/M	40	9.5%
T/M perforation	100	23.8%
Tympanosclerosis	50	11.9%
Hyperemic T/M	47	11.1%

Table 4: Laterality of ear pathology.

Ear affected	Frequency	percentage
Right ear	145	34.5%
Left ear	135	32.1%
Bilateral	140	33.3%

Captions for otoscope images

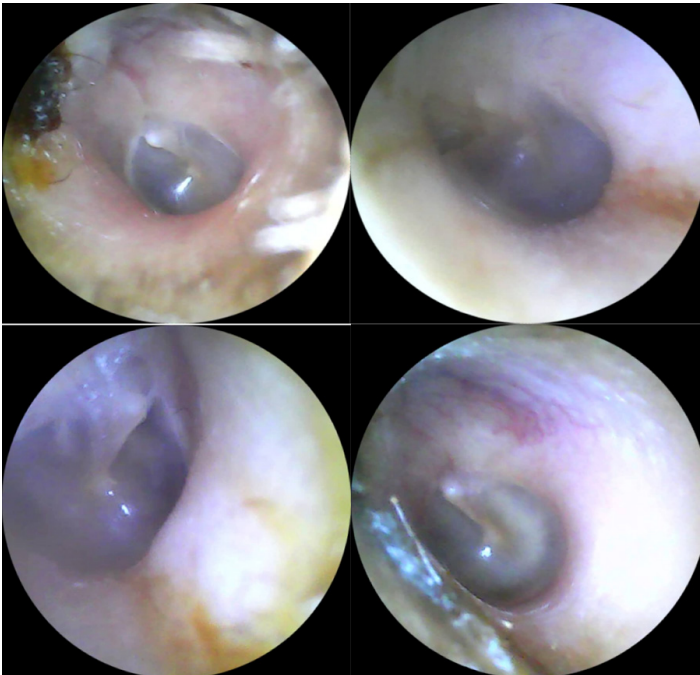


Figure 1: Normal T/M visualized using video otoscopy showing intact membrane visible handle of malleolus and intact cone of light.

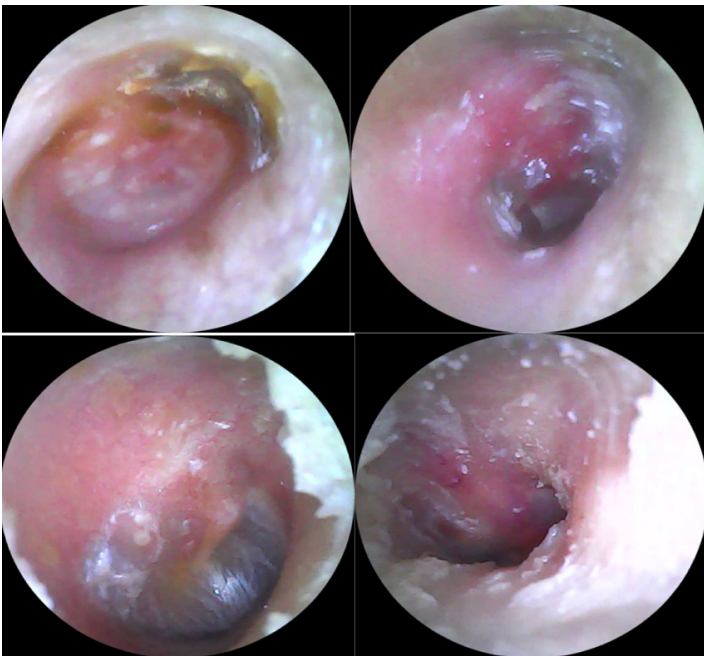


Figure 3: Hyperemic tympanic membrane in acute middle ear inflammation consistent with acute otitis media.

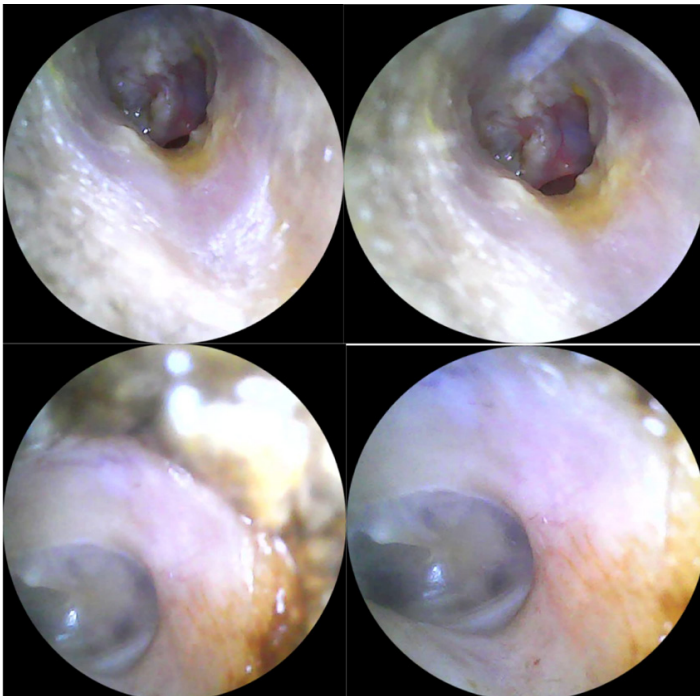


Figure 2: Retracted T/M demonstrating inward displacement of the membrane due to Eustachian tube dysfunction.

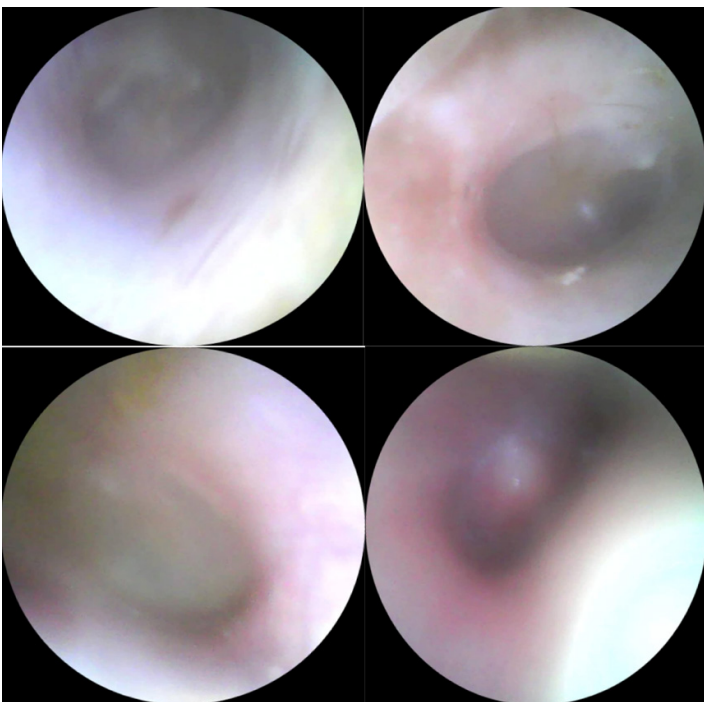


Figure 4: Dull Opaque T/M suggesting middle ear effusion during video otoscopic evaluation.

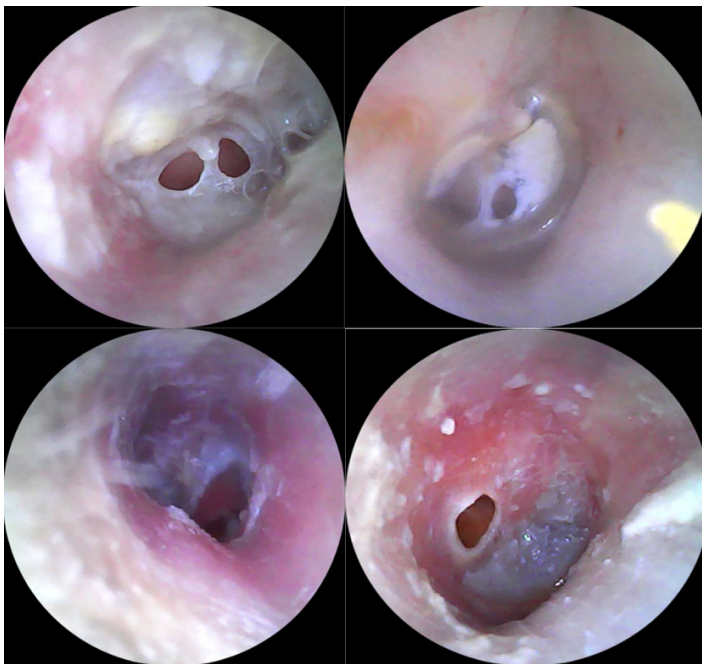


Figure 5: T/M perforation detected using video otoscopy in a patient with chronic ear discharge consistent with chronic suppurative otitis media.

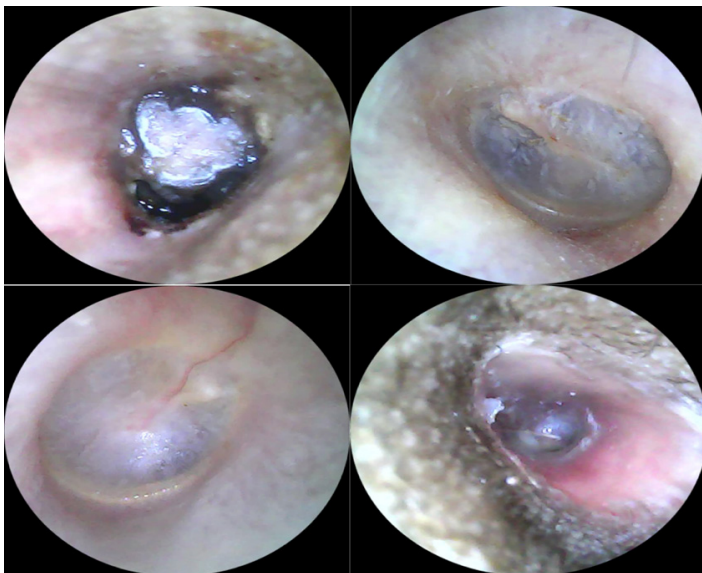


Figure 6: Tympanosclerosis observed as whitish calcified plaques on the T/M during video otoscopic examination.

Discussion

The study evaluated the pattern of tympanic membrane abnormalities detected using video otoscopy among patients attending Reggie, ENT clinic in Enugu, Southeast, Nigeria. Video otoscopy enabled detailed visualization of the tympanic membrane and facilitated the documentation of pathologic findings [8].

The most common abnormality observed in this study was tympanic membrane perforation accounting for 38.8% of the

cases. This finding is consistent with studies in developing countries where chronic middle ear infections remain prevalent. Previous research has shown that tympanic membrane perforation is commonly associated with suppurative otitis media a major cause of preventable hearing loss [9-13].

The second most frequent abnormality observed was tympanosclerosis which represented 11.9% of the cases. Tympanosclerosis often results from previous episodes of middle ear infection and may be associated with scarring of the tympanic membrane [14].

Retracted tympanic membrane was identified in 5.4% of patients in this study. Retracted pockets are commonly associated with otitis media with effusion and Eustachian tube dysfunction seen mostly in patient suffering from allergy [15-20].

Dull or opaque T/M (9.5%) hyperemic T/M (11.1%), were also identified in the study.

The use of video otoscopy provided several advantages compared with conventional otoscope. The ability to magnify and record images, improves diagnostic accuracy and allows clinician to review findings over time. Additionally video otoscopic images can be used for telemedicine consultations and teaching purposes [7].

Similar studies conducted in Europe and North America have demonstrated that video otoscopy enhances the detection of subtle tympanic membrane abnormalities and improves inter observers diagnostic agreement among clinicians [8].

The finding of this study highlights the usefulness of video otoscope in clinical practice particularly in resource limited settings where digital documentation can facilitate better diagnosis and follow up.

Conclusion

Video otoscopy is valuable tool for detecting tympanic membrane abnormalities in clinical practice. It enhances visualization, documentation and diagnosis of ear disease. The use of video otoscopy should be encouraged in ENT clinics for enhanced patient care and medical education.

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