

Original Article

Comparison of Temporal Bone Tomography Findings of Chronic Otitis Media with Intraoperative FindingsYalda Jabbari Moghaddam^{1*}, Farnaz Chalabianloo²¹Associate professor of Otolaryngology of Iran-Tabriz University of Medical Sciences, Tabriz children hospital, Iran²Medical doctor Iran-Tabriz University of Medical Sciences, Iran**Corresponding Author:** Yalda Jabbari Moghaddam, E-mail: yj_moghaddam@yahoo.com**ARTICLE INFO***Article history*

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Key words:Chronic Otitis Media,
CT Scan,
Ossicular Chain Erosion**ABSTRACT**

Background and Objectives: Chronic otitis media is considered a common disease in our region. There are various methods for evaluation of chronic suppurative otitis media including otoscopy, CT scan, X-ray, and MRI. Nowadays, computed tomography or CT scan is used as the selected method to investigate the temporal bone. This study aims to collect the intraoperative findings and compare them with preoperative reports of temporal bone CT scans. **Materials and Methods:** The patients' data with chronic otitis media who were reviewed tomographically, hospitalized and operated between 2012 and 2014 in Tabriz Sina Hospital by only one otolaryngologist included in this study collected. **Results:** The most common lesion based on the highest frequency and percentage is Tympanosclerosis. 21.4 percent of patients whom Tympanosclerosis were not diagnosed preoperatively, found during the surgery. 78.9 And 21.1 percent of bone erosions have been diagnosed by CT scan and by direct vision, respectively. **Conclusion:** Although preoperative CT of Middle ear lesions is useful for surgery planning but some lesion may not be completely diagnosed by CT scan and intraoperative assessment of surgical field is crucial.

INTRODUCTION

Chronic otitis media is considered a common disease in our region. In COM irreversible changes happen in the ear which present as chronic otorrhea and tympanic membrane perforation and require surgical treatment to be controlled. CSOM can occur congenitally or acquisitively. (1,2,3,4) Cholesteatoma can grow, migrate and cause bone erosion, thereby leading to localized damage. It also requires surgical treatment and needs to be removed from involved patients. (5)

Pathologic findings in temporal bone of patients with chronic otitis media include granulation tissue, bone deformities, Tympanotomy sclerosis, granuloma and Cholesteatoma. (2,3)

There are various methods for evaluation of chronic otitis media including otoscopy, MRI, CT scan and X-ray. Nowadays, spiral computed tomography or CT scan is used as the selected method to investigate the temporal bone. (2,6)

Some indications of preoperative CT scan in patients with chronic otitis media are as follows:

1. Difficulty in otoscopic examination
2. Suspicion of Petrus bone cholesteatoma

3. Suspicion of malformations
4. Reassessment of those patients who have previously underwent Mastoidectomy
5. Suspicion of intracranial complications or Meningoencephalic herniation (MEH) Uncertainty in diagnosis
6. Temporal bone pathologic findings in patients with chronic otitis media include granulation tissue, bone deformities, Tympanosclerosis, cholesterol granuloma and Cholesteatoma (4)

Considering the value of CT scan for preoperative diagnosis of temporal bone lesions in patients with chronic otitis media, it seems that intraoperative direct observation is still the most valuable method for identifying a variety of complications. Preoperative CT scan can be used by the surgeon as a helpful tool in selecting surgical techniques and providing the necessary information on the patient. (2,4,5) As a result, the surgeries performed in the operating room are applied on patients according to the extent of lesions diagnosed by CT scan. The aim of this study was first to evaluate the frequency of various lesions visible on the CT scan of patients with chronic otitis media. Meanwhile, this study aims to collect the intraoperative findings on patients and compare them with preoperative CT scan reports on temporal bone of the same patient. (4,6)

MATERIALS AND METHODS

The research method is cross sectional survey. In this study, purposeful non-probability sampling was performed at a specific time interval.

The sample size consisted of all patients who were referred to undergo operation in the ear, nose and throat clinic of Sina hospital in Tabriz, Iran, between 2013 and 2015. This study compared the patients' preoperative and intraoperative middle ear findings. All patients assessed in this study were visited by a surgeon who was fellowship of otolaryngology. Their intraoperative findings were recorded by the same surgeon. All CT scans investigated in this study were performed by in the radiology department of Tabriz Sina Hospital Center and were reported by a radiologist.

Complications of chronic otitis media diagnosed by CT scan and intraoperative direct observation were recorded in checklist and compared. Quantitative data were shown as mean and standard deviation. Qualitative data were shown as frequency (percentage). Chi-square test was used to compare qualitative data.

In all cases, $p > 0.05$ was considered statistically significant.

Spiral CT scan device in Sina Hospital has the following characteristics;

Siemens Brand
Version 2009
Multi-slice

In this device, 1-2 mm slices were used to check the inner ear and its components. Bone window is the routine view used to check the ears by this device.

Contrast agent is not used for imaging of the inner ear by this device.

Findings

According to the results, 65.8% of the patients were male and 34.2% were female.

Minimum age of the patients with chronic otitis media was 18; and maximum age was 67 with a mean of 39.3.

According to the results, the sensitivity of CT scan in diagnosing Tympanosclerosis is 0.93 and its specificity is 0.95.

According to the results, positive predictive value of CT scan in diagnosing chronic otitis media complications was determined 0.89. Thus, it could be said that positive predictive value of CT scan in diagnosing chronic otitis media complications is not so high (Table 1-5).

DISCUSSION

Chronic suppurative otitis media is one of the most common ear diseases in which tympanic membrane is perforated and its major symptom is non otorrhea suppurative discharge that can smell bad. Dangerous and deadly complications of the disease including meningitis, brain abscess, extracranial abscess, suppurative labyrinthitis and facial paralysis are caused by the spread of infectious foci to other organs. Therefore, controlling the infection is very important. (3,7)

Table 1. Frequency of various lesions visible on CT scan in patients with chronic otitis media

Lesion	Frequency	Percentage
Granulation tissue	10	2.13
Bony erosion	16	1.21
Tympanosclerosis	28	8.36
Cholesterol granuloma	12	8.15
Cholesteatoma	10	2.13
Total	76	100

Table 2. Frequency of Tympanosclerosis diagnosis on CT scan and during surgery in patients with chronic otitis media

Statistical indicators	CT scan	During surgery
	Tympanosclerosis diagnosis	Tympanosclerosis diagnosis
Frequency	56	32

Table 3. Estimation of sensitivity and specificity of Tympanosclerosis diagnosis by CT scan and surgery

	CT scan		During surgery	
	Correct	False	Correct	False
Positive	28	0	30	2
Negative	48	0	42	2

Table 4. Frequency of the complications diagnosed on CT scan

Statistical indicators	CT scan		
	Diagnosed	Undiagnosed	total
Frequency	56	20	76
Percentage	73.7	26.3	100

Table 5. Frequency of bony erosion diagnosis on CT scan and surgery

Statistical indicators	CT scan	During surgery
	Bony erosion diagnosis	Bony erosion diagnosis
Frequency	16	22

In most cases, surgery is the absolute treatment of the disease. (4) There are various methods for evaluation of chronic otitis media including otoscopy, MRI, CT scan and Xray. Nowadays, computed tomography or CT scan is used as the method selected to investigate the temporal bone. (2,8,9)

In 2010, a study entitled "Comparison between radiological and surgical findings in patients with chronic otitis media" was conducted in Diadema Hospital in Sao Paulo,

In this study, the patients were diagnosed with chronic otitis media and were not improved by proper clinical treatment. They also experienced complications such as tympanic mem-

brane perforation, middle ear polyps, Tympanic membrane retraction or cholesteatoma visible by otoscopy. Meanwhile, all the patients underwent CT scan and were on the surgery list. Actually, some of these patients were excluded because they previously underwent Mastoidectomy. In fact, only 87 patients diagnosed with chronic suppurative otitis media who were operated for the first time during the last one year and seven months were included in the study. (1)

The study in fact compares the clinical findings obtained from otoscopy and temporal tomography and intraoperative findings during surgery and came to the conclusion that the Cholesteatoma cases diagnosed by otoscopy are mostly the same as intraoperative findings. (1,5) Meanwhile, CT scan has an acceptable sensitivity to diagnose cholesteatoma and semicircular canal erosion in patients and to diagnose ossicular chain erosion with an acceptable sensitivity, but it is not able to diagnose isolated erosions. Therefore, the clinical and radiological evaluations together are important to select the surgical technique. The results obtained in this study, like our own study, has emphasized the continuity of the clinical and radiological evaluations. Meanwhile, CT scan played a prominent role in diagnosing complications of chronic otitis media, which could also be due to the complexity of this tool. (1,4,5)

In 2009, a study was conducted to evaluate the role of preoperative CT scan of mastoiditis and evaluating its accuracy to determine the extent and type of the disease and whether or not it is affected by a history of previous surgery, as well as to determine CT scan accuracy in identifying the complications and their impact on patients. In this study, 50 patients with chronic otitis media who were candidate for surgery within five years were studied, among whom 25 cases were diagnosed with cholesteatoma during the surgery (50%), while in 33 patients (66%) CT scan reported cholesteatoma. In 20 patients (40%) cholesteatoma was correctly diagnosed by CT scan and in 12 cases (24%), it was rejected by mistake while it was there. CT scan sensitivity in diagnosing cholesteatoma was 80%, and its specificity was 48%. Its positive predictive value, negative predictive value and efficiency were 60.6%, 70.6% and 64%, respectively. (5)

According to our results, there is a significant difference between diagnosis of various complications of chronic otitis media by CT scan and intraoperative direct observation, middle ear bone erosion caused by chronic otitis media may not be completely diagnosed by CT scan. (5) Therefore it may be concluded that bone erosions are the complications of chronic otitis media which were mostly missed by preoperative CT scan and Intraoperative direct observation is considered the most valuable method of identifying a variety of complications of chronic otitis media.

CONCLUSION

This study shows although CT is useful in the estimation of expansion of disease and differential diagnosis but still intraoperative assessment of surgical field is crucial.

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