

## ORIGINAL RESEARCH

# ASSESSMENT OF FACTORS AFFECTING THE SURGICAL OUTCOME IN TYMPANOPLASTY IN CHILDREN

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### **ABSTRACT:**

**Background:** Chronic suppurative otitis media (CSOM) is a chronic inflammation of the middle ear and mastoid cavity, which presents with recurrent ear discharges or otorrhoea through a tympanic perforation. The present study was conducted to assess factors affecting the surgical outcome in tympanoplasty in children.

**Materials & Methods:** 54 pediatric patients of persistent perforation of the tympanic membrane of both genders were enrolled. Age at time of surgery, state of contralateral ear, previous adenoidectomy, cause of perforation, size of perforation, infection at the time of surgery, state of mucosa, age at first occurrence of perforation, presence of craniofacial dysmorphism, and surgical technique were recorded.

**Results:** Out of 54 patients, boys were 34 and girls were 20. Success rate was seen in 30 and failure in 24 cases. Contralateral ear normal in 22 and 18 and CME in 8 and 6. Cause of perforation was infection in 24 and 19, previous adenoidectomy was not done in 17 and 14 and done in 13 and 10, size of perforation was <50% in 16 and 16 and >50% in 14 and 8, state of mucosa was normal in 25 and 17, surgical technique was onlay in 24 and 18, otorrhea at time of surgery was absent in 28 and 20 and present in 2 and 4 in success and failure cases respectively. The difference was significant ( $P < 0.05$ ). Closure of perforation was seen in 50. Hearing gain was seen in 32 and no gain in 22. Air-filled space was adequate in 46, otitis media with effusion in 6 and partial atelectasis in 2 cases. The difference was significant ( $P < 0.05$ ).

**Conclusion:** Study mitigates against delaying tympanoplasty type I in paediatric patients.

**Key words:** Paediatric, Perforation, Tympanoplasty

## INTRODUCTION:

Chronic otitis media (COM) is defined as an inflammation of the middle ear with signs of infection lasting three months or longer.<sup>1</sup> Chronic suppurative otitis media (CSOM) is defined as a chronic inflammation of the middle ear and mastoid cavity, which presents with recurrent ear discharges or otorrhoea through a tympanic perforation. The presence of a persistent tympanic perforation and middle ear discharge differentiates CSOM from other forms of chronic otitis media.<sup>2</sup>

Tympanoplasty is a procedure that is used for COM treatment. It aims to rebuild the perforated ear drum and restore the function of the middle ear. Surgical approach for tympanoplasty can be endaural or transmeatal, postauricular, and supermeatal. The most common technique of grafting is underlay (medial) and overlay (lateral). Temporalis muscle fascia and targa cartilage's perichondrium are the most popular materials as a graft.<sup>3</sup>

It seems to be that children have poorer success rate. As a rule, the basic teaching is to delay myringoplasty in a child as late as possible in view of poor graft uptake attributed to repeated bouts of upper respiratory tract infection leading to discharging ear and eustachian tube (ET) dysfunction in paediatric population.<sup>4</sup> In addition, with a pediatric patient, the surgery itself may be considered as being more difficult technically, due to the narrowness of the external ear canal and the generally smaller size of the ear, thus contributing to a poor result, but of a functional type.<sup>5</sup> The present study was conducted to assess factors affecting the surgical outcome in tympanoplasty in children.

## MATERIALS & METHODS:

The present study comprised of 54 pediatric patients of persistent perforation of the tympanic membrane of both genders. The consent was obtained from all enrolled patients' parents.

Data such as name, age, gender etc. was recorded. Age at time of surgery, state of contralateral ear, previous adenoidectomy, cause of perforation, size of perforation, infection at the time of surgery, state of mucosa, age at first occurrence of perforation, presence of craniofacial dysmorphism, and surgical technique were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

## RESULTS:

**Table I Distribution of patients**

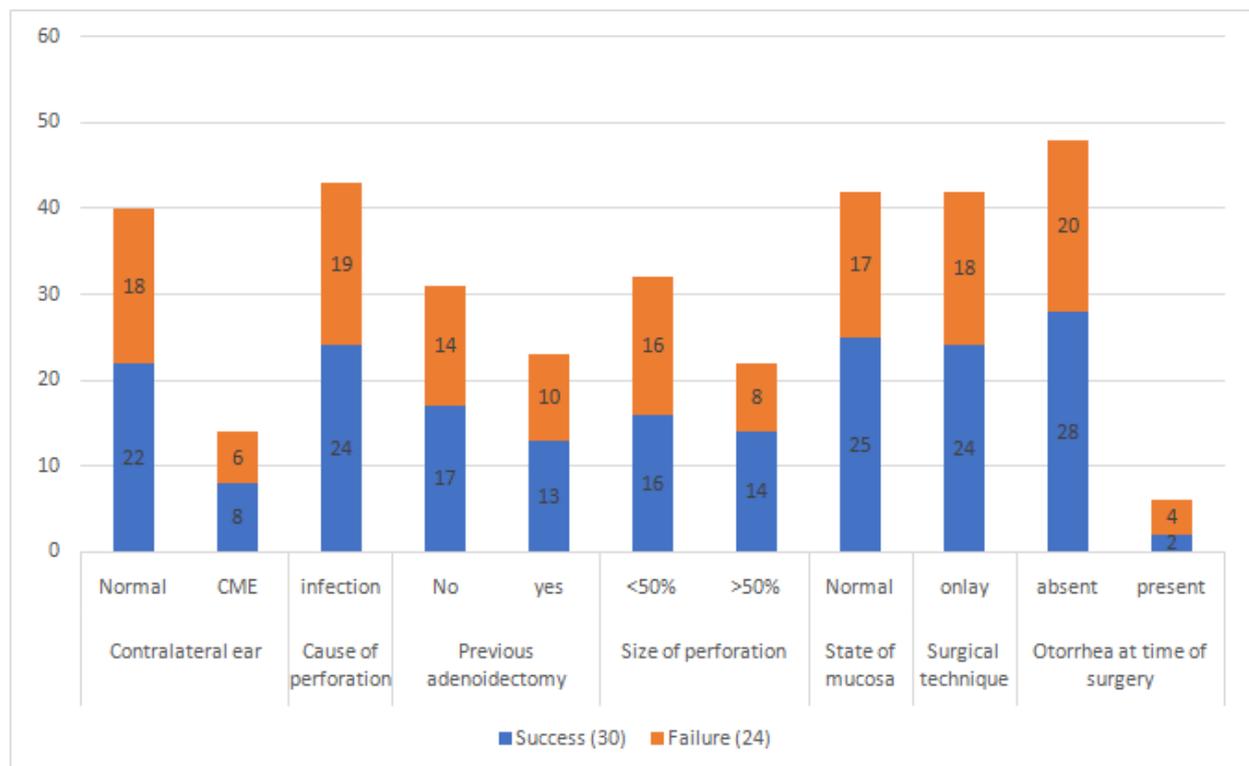
| Total- 54 |      |       |
|-----------|------|-------|
| Gender    | Boys | Girls |
| Number    | 34   | 20    |

Table I shows that out of 54 patients, boys were 34 and girls were 20.

**Table II Factors affecting the surgical outcome**

| Parameters                  | Variables | Success (30) | Failure (24) | P value |
|-----------------------------|-----------|--------------|--------------|---------|
| Contralateral ear           | Normal    | 22           | 18           | 0.03    |
|                             | CME       | 8            | 6            |         |
| Cause of perforation        | infection | 24           | 19           | 0.07    |
| Previous adenoidectomy      | No        | 17           | 14           | 0.09    |
|                             | yes       | 13           | 10           |         |
| Size of perforation         | <50%      | 16           | 16           | 0.21    |
|                             | >50%      | 14           | 8            |         |
| State of mucosa             | Normal    | 25           | 17           | 0.05    |
| Surgical technique          | onlay     | 24           | 18           | 0.05    |
| Otorrhea at time of surgery | absent    | 28           | 20           | 0.04    |
|                             | present   | 2            | 4            |         |

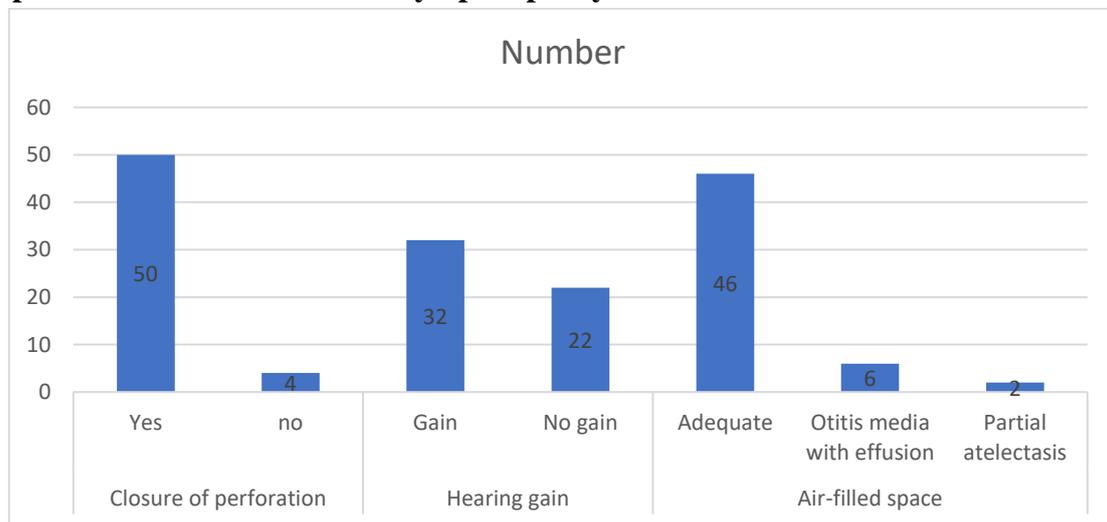
Table II, graph I shows that success rate was seen in 30 and failure in 24 cases. Contralateral ear normal in 22 and 18 and CME in 8 and 6. Cause of perforation was infection in 24 and 19, previous adenoidectomy was not done in 17 and 14 and done in 13 and 10, size of perforation was <50% in 16 and 16 and >50% in 14 and 8, state of mucosa was normal in 25 and 17, surgical technique was onlay in 24 and 18, otorrhea at time of surgery was absent in 28 and 20 and present in 2 and 4 in success and failure cases respectively. The difference was significant ( $P < 0.05$ ).

**Graph I Factors affecting the surgical outcome**

**Table III Outcome variables for tympanoplasty**

| Parameters             | Variables                  | Number | P value |
|------------------------|----------------------------|--------|---------|
| Closure of perforation | Yes                        | 50     | 0.01    |
|                        | no                         | 4      |         |
| Hearing gain           | Gain                       | 32     | 0.05    |
|                        | No gain                    | 22     |         |
| Air-filled space       | Adequate                   | 46     | 0.01    |
|                        | Otitis media with effusion | 6      |         |
|                        | Partial atelectasis        | 2      |         |

Table III, graph II shows that closure of perforation was seen in 50. Hearing gain was seen in 32 and no gain in 22. Air-filled space was adequate in 46, otitis media with effusion in 6 and partial atelectasis in 2 cases. The difference was significant ( $P < 0.05$ ).

**Graph II Outcome variables for tympanoplasty****DISCUSSION:**

Many factors have been investigated to determine their effect on the tympanic membrane closure rate and hearing improvement. Various studies on tympanoplasty have been conducted, which show that success rate and criteria for success vary from author to author.<sup>6,7</sup> Some studies demonstrated that surgical outcome depends on several factors including size and location of the perforation, ossicular status, type of surgical technique, graft type and function of the eustachian tube.<sup>8,9</sup> The present study was conducted to assess factors affecting the surgical outcome in tympanoplasty in children.

We found that out of 54 patients, boys were 34 and girls were 20. Singh et al<sup>10</sup> evaluated the success rate of paediatric tympanoplasty type I. Patients were divided into two groups of 20 cases each, one comprising of paediatric patients (8—14 years) and other comprising of adult patients (more than 14 years of age). All the patients underwent tympanoplasty type I by post auricular inlay technique. An intact graft at the end of 6th month was considered a success and a minimum hearing improvement of 10 db in two consecutive frequencies was regarded as an audiological success. A success rate of 80% in terms of graft uptake and hearing improvement of 61% was seen in paediatric cases, compared to 85% graft uptake and 65%

hearing improvement in adult cases.  $P$  is  $>0.05$  which is insignificant was obtained, indicating that age does not influence paediatric tympanoplasty type I. Also, the data for evaluating the correlation between Eustachian tube and paediatric tympanoplasty type I showed no statistical significance.

We found that success rate was seen in 30 and failure in 24 cases. Contralateral ear normal in 22 and 18 and CME in 8 and 6. Cause of perforation was infection in 24 and 19, previous adenoidectomy was not done in 17 and 14 and done in 13 and 10, size of perforation was  $<50\%$  in 16 and 16 and  $>50\%$  in 14 and 8, state of mucosa was normal in 25 and 17, surgical technique was onlay in 24 and 18, otorrhea at time of surgery was absent in 28 and 20 and present in 2 and 4 in success and failure cases respectively. Nadepour et al<sup>11</sup> evaluated the results of tympanoplasty (hearing improvement and tympanic membrane closure rate) in patients suffering from chronic perforation of the tympanic membrane by considering the prognostic factors. The rate of surgical success- integration of the graft- was 93.3%. Improvement of hearing, as demonstrated through audiometry, occurred in 93% of cases. They did not find any factors to be statistically significant to affect surgical outcome.

We observed that closure of perforation was seen in 50. Hearing gain was seen in 32 and no gain in 22. Air-filled space was adequate in 46, otitis media with effusion in 6 and partial atelectasis in 2 cases. Zhang and colleagues<sup>12</sup> demonstrated that after myringoplasty for small perforation of the tympanic membrane (less than 50%) ABG is minimum (average 5.5dB) and most ABG (average 10.5 dB) was after closure of large perforations (more than 50%). Lee and et al<sup>13</sup> reported that the recovery air threshold after myringoplasty is directly associated with the preoperative size of the tympanic membrane.

Yung et al.'s<sup>14</sup> study concluded that a large central, central maleolar, and central posterior perforation show the most hearing loss and that posterior inferior perforations cause greater hearing loss than anterior inferior perforations.

## CONCLUSION:

Authors found that study mitigates against delaying tympanoplasty type I in paediatric patients.

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