

## Delayed Facial Nerve Palsy after tympano-mastoid Surgery

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### Abstract

**Aim:** Data on delayed facial nerve palsy (DFNP) following tympanomastoid surgery are limited. We conducted a retrospective chart review to determine the incidence, possible predisposing factors, treatment, and prognosis of DFNP in such cases.

**Materials and Method:** We reviewed 430 cases of tympano mastoid surgeries performed in rural tertiary centre over a period of 5 years from Jan 2012 to Dec 2016. In all patients who developed delayed facial palsy, the dates of onset and subsidence of facial palsy, the duration, severity and prognosis of the DFNP were recorded. The House – Brackmann grading system was used to evaluate the facial function.

**Results:** Delayed onset facial palsy occurred in 5 out of 430 tympanomastoid surgeries. The onset of DFNP occurred between 7 and 18 days postoperatively (mean: 9). The palsy was incomplete in all 5 cases. One patient showed a facial palsy H-B grade II, 2 a grade III, and 2 a grade IV. The all 5 patients had been treated with a steroid with an antiviral, and all 5 experienced a complete recovery of facial nerve function within 8 weeks of the onset of their paralysis.

It is difficult to delineate the exact aetiology of DFNP following tympanomastoid surgery, but we speculate that factors such as physical injury to the nerve and/or a viral reactivation might have played a role.

**Conclusion:** The incidence of delayed facial nerve palsy following tympano-mastoid surgery is low. Thus delayed facial nerve palsy remains an under reported and consequently not very known phenomenon in the otological practice and literature.

Because of the favourable rate of recovery, patients should be reassured in the interim and should not undergo any corrective surgical procedures to improve facial nerve function.

**Keywords:** Tympanomastoid, delayed onset, Facial nerve palsy

### Introduction

Facial nerve palsy is a well-recognized complication after tympano mastoid surgery. Its onset may be immediate or delayed by several days. Ipsilateral facial nerve palsy generally occurs immediately after surgery and usually caused by direct injury to facial nerve during procedure. Immediate post-operative temporal palsy may also be due to local anaesthetics effect and regress completely within a few hours.<sup>(1)</sup>

Facial nerve palsy can be delayed by several days after surgery and occurs despite no direct contact with the facial nerve during operative procedures.<sup>(2,3)</sup> It may vary from several hours to several days. Vrabec and Bonkowski et al. defined delayed facial palsy as a facial nerve palsy occurring at least 72 and 48 hours after surgery respectively.<sup>(2)</sup>

Delayed facial nerve palsy (DFNP) was reported to actually occur after otological and neurotological surgeries including tympanoplasty with mastoidectomy, stapes surgery, and cochlear implant.<sup>(2-15)</sup> DFNP only occurs on the same side as that operated ear, and is rare following other types of ENT surgery such as to the head and neck, suggesting a direct role of temporal bone surgery procedures. However, the underlying cause of DFP remains unclear. Herein, we report a case

series of DFP after tympano-mastoid surgery and outcome of treatment of DFNP after tympano mastoid surgeries.

The prognosis of DFNP after otological surgeries is excellent with complete recovery in almost in all cases and partial dysfunction only in few cases.<sup>(2)</sup>

Delayed facial nerve palsy, although usually reversible is a cause of dissatisfaction and worries for the patient and surgeon.

### Materials and Method

We reviewed 430 cases of tympano-mastoid surgeries performed in rural tertiary centre over a period of 5 years from Jan 2012 to Dec 2016.

All the cases were reviewed for the presence of post-operative delayed facial nerve palsy. In this study, DFNP was defined as a dysfunction of the facial nerve with onset more than 3 days following tympano-mastoid surgery in a patient whose facial function had been normal immediately following surgery.

Determination of onset of DFNP, severity, recovery and duration of paralysis was retrospectively recorded. The House-Brackmann facial nerve grading system 11 was used to evaluate the facial function in patients with DFNP and during the functional recovery period.<sup>(17)</sup>

## Results

S. No	Age/sex	ONSET DFNP	H-B Grade	Time to recovery	Facial palsy recovery grade
1	45y/M	9 days	IV	5wks	I
2	38y/F	18 days	III	4wks	I
3	23y/F	3 days	III	6wks	I
4	28y/M	11 days	II	8wks	I
5	53y/M	5 days	IV	4wks	I

Delayed onset facial palsy occurred in 5 out of 430 tympano-mastoid surgeries. The onset of DFNP had occurred between 7 and 18 days postoperatively (mean: 9). The 5 patients included 3 men and 2 women, aged 23 to 53 years. The tympano-mastoid surgeries had been performed in the standard manner on all the patients

The palsy was incomplete in all 5 cases. The initial grading of facial function was as follows: 1 patient had grade II palsy, 2 patients had House-Brackmann grade III palsy and 2 patients had grade IV palsy.

Subsequent to the onset of DFNP, all 5 patients had been treated with an oral steroid prednisolone 1mg/kg/wt in tapering dose and in addition, patients also received an oral antiviral medication (Acyclovir 650 mg 5 times a day).

Full recovery (House-Brackmann grade I) was achieved in all 5 cases within 8 weeks of the onset of their paralysis.

## Discussion

Delayed facial nerve palsy (DFNP) has been reported as a complication of various otologic and neurotologic surgeries. Its incidence varies on the specific type of procedure and it has been found to be significantly higher i.e. 10-30% in neurotologic surgeries like acoustic neuroma and vestibular neurectomy which involves a more intervention of the facial nerve.<sup>(11-14)</sup>

Conversely, in otological surgeries like stapedectomy where there is less manipulation of the facial nerve, the incidence of DFNP has been less than 1%.<sup>(2,8,18)</sup> The incidence of DFNP was 1.7%.4 following cochlear implantation in various studies.<sup>(5-7)</sup>

Similarly, the incidence of DFNP after tympanomastoid surgery was reported as 1.4% by Vrabec, 0.38% by Bonkowsky et al and 0.9% in Safdar et al.<sup>(19)</sup>

In our case series the incidence of Delayed facial palsy following tympano mastoid surgery is 1.1%. The slight variation in the incidence of DFNP with other studies may be attributed to determination of onset of DFNP. However incidence is less compared to DFNP following vestibular surgeries.

The onset of DFP are bimodal with two peaks, early and late onset.<sup>(14,15)</sup> The early onset DFNP occurs around 3 to 5 days and most likely due to neural edema, especially in the meatal foramen. It was suggested that

generation of heat and/or inflammation by drilling of the temporal bone during the mastoidectomy procedure might indirectly produce 'intratubal facial nerve edema'.<sup>(12,13)</sup>

By contrast, exposing the facial nerve and/or chorda tympani nerves in the operative field may induce herpes virus reactivation, which may account for a relatively late post-operative onset.<sup>(3,20)</sup>

We have observed 2 cases of early onset DFNP which can be attributed to neural edema and 5 cases of late onset DFNP for reactivation of viruses HSV and VZV exposure of nerve following nerve exposure during the procedure.

Is the development of DFNP after surgery coincidental? This seems unlikely. Vrabec studied complications of different otologic and neurotologic surgeries and found that the incidence of postoperative DFNP was well above the overall incidence of Bell palsy, which is approximately 1 in 5,000 persons per year (0.02%).<sup>(2)</sup>

Although many reports described full recovery without treatment, management options include use of steroids and antivirals with the onset of the facial weakness.

The use of steroids and antivirals in the treatment of idiopathic facial nerve palsy is well proven and is evident in various studies. The good results were achieved when patients were started with prednisone and acyclovir within three days of onset.<sup>(19)</sup>

From our patients, based on the complete recovery of facial nerve function, the combined use of acyclovir and prednisone proved to be an effective treatment in the management of DFNP.

As an alternative, it is highly likely that prophylactic antiviral treatment would prevent most cases of DFP. When used in surgery for trigeminal neuralgia, prophylactic antivirals significantly reduced the incidence of postoperative orolabial herpes simplex virus.<sup>(21)</sup>

The facial canal decompression – mainly labyrinthine segment has also been suggested as a method for preventing DFP in vestibular surgeries.<sup>(22)</sup> In general, the prognosis for patients who develop DFNP is excellent and approximately 88% will recover to their initial grade or better.<sup>(16)</sup> In our study all the five DFNP patients irrespective of the onset and severity (HB grading) recovered to normal function i.e. HB grade I from one to two months of onset of DFNP. Based on

the experience with DFNP following acoustic neuroma surgery, it may be reasonable to suggest that DFNP following tympano-mastoid surgery may have a better prognosis. Recovery of facial nerve function is better in patients with DFP compared with those with immediate onset paralysis, and incomplete paralysis has a higher rate of normal recovery.

### Conclusion

From our experience, the risk of delayed facial nerve palsy after tympano-mastoid surgery is very rare. The pathogenesis of post stapedectomy-delayed facial palsy is still unknown; the viral origin and neural oedema remains the most proposed one. Further clinical studies are needed to elucidate the mechanisms of DFNP onset. Because of the excellent rate of recovery, patients should be reassured in the interim and patient should not undergo any surgical measures to improve facial nerve function.

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