
ORIGINAL ARTICLE

Delayed Facial Nerve Paralysis After Tympanomastoidectomy. Incidence, Aetiology and Prognosis

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ABSTRACT

Background: Facial nerve paralysis is a well known complication of tympanomastoid surgery. In certain cases facial nerve is paralyzed without any injury a few days after surgery, known as Delayed Facial Nerve (DFN) palsy. It can occur two weeks after surgery. A retrospective study was conducted at ENT Unit –II, Fatima Jinnah Medical College / Sir Ganga Ram Hospital (FJMC/SGRH), Lahore, to document frequency of, etiological factors and long term prognosis.

Material and Methods: The study period spanned over six years (May 2008 – May 2014) during which a total of 350 patients underwent tympanomastoid surgery. Three patients (0.85%) were identified as having delayed facial nerve paralysis. Those patients were clinically assessed and their medical records were reviewed. Tympanomastoid surgery included Cortical, modified radical, radical mastoidectomy and atticotomy.

Results: There were only 3 cases of delayed facial palsy after tympanomastoid surgery (0.85%). Examination under microscope showed pus in mastoid cavities in two patients who developed facial palsy on day nine and day ten; while the third patient who developed facial palsy on day five had a clean mastoid cavity except the exposed facial nerve in horizontal segment. Appropriate management with antibiotics alongwith steroids in two patients having infection proved effective. While in third patient, the mastoid pack was removed and steroids alongwith prophylactic antibiotics were given resulting in recovery.

Conclusion: The incidence of delayed facial nerve palsy (DFP) after Tympanomastoid surgery is low. The appropriate management & follow up is essential. The overall prognosis for delayed facial nerve palsy (DFP) in such cases is good.

Key words: Facial paralysis, Tympanomastoidectomy, mastoid pack.

INTRODUCITON

Facial nerve paralysis is relatively rare , with an annual incidence of approximately 30 per one hundred thousand (100000) individuals in a population. Facial nerve paralysis has various causes , ranging from head injury to idiopathic Bell's palsy, and may occur due to injury to the central or peripheral system. Since peripherally travelling facial nerves that run along the inside of the facial canal in the temporal bones are ratively long they are at greater risk of injury compared with other cranial nerves. Facial nerve paralysis may induce facial asymmetry , leading to a loss of balanced appearance and function, which may have a deleterious effect on a patient's psychology and social life(1). Facial nerve paralysis due to iatrogenic trauma is a well known complication of Tympanomastoid surgery. In few cases facial nerve becomes paralysed in spite of no injury to nerve during surgery⁽²⁾. Delayed facial nerve paralysis after Tympanomastoid surgery, the

exploration of the mastoid antrum, air cells, tympanum and its appendages, is rare(3). Delayed facial nerve palsy was reported to occur after otological and neurotological surgeries including tympanoplasties with mastoidectomies, stapes surgery and cochlear implant. DFP only occur on the same side as that operated, and is rare following other types of ENT surgeries such as head and neck surgical procedures, suggesting a direct role of temporal bone surgery procedures. Its incidence varies between 0.38 to 1.46%³. Seven patients within a series of 486 patients (1.4%) were described by Vrabec(5) et al while Bonkowsky (2,4,5) et al described seven cases (0.38%). There are many factors which can influence this complication e.g. iatrogenic injury, the extent of the disease and surgical expertise available etc. Neural oedema secondary to surgical trauma, infection of the mastoid cavity, fungal infections, local anaesthetic agents and viral reactivation have been described as aetiological

factors in DFP after Tympanomastoid surgery. Therefore, identification of the cause of DFP is important for management and prognosis.

MATERIAL AND METHODS

The medical records of all patients who underwent Tympanomastoid surgery in our department over a period of six years (May 2008 – May 2014) were reviewed. Identification of deterioration in facial nerve function noticed 72 hours after surgery was the criteria with a normal facial nerve function documented pre-operatively and immediate after surgery. All patients of active chronic suppurative otitis media, both tubotympanic & atticofacial disease, in which mastoid exploration was indicated were included in this study. Patients undergoing middle ear surgical procedures like myringoplasty and stapedectomy were excluded. Patients upon which cortical, modified radical, radical mastoidectomies and atticotomies were performed were included in this study. The age range was between 12-45 years with a mean age of 28.5 years. The indications for surgery in these patients were cholesteatoma, fibrotic granulations in middle ear and mastoid, chronic suppurative otitis media resistant to medical treatment and acute mastoid infections. 12 patients presented with complications related to middle ear and mastoid infections.

RESULTS

A total of 350 patients were included in this study. Out of 350 operated patients 197 were male and 153 female with average age of 28.5 years. Radical mastoidectomy was performed in 189 patients, while 72 patients underwent modified radical mastoidectomy. In 89 patients cortical mastoidectomy was done. Revision mastoidectomy was done in 3 patients and 2 patients had atticotomy. Detail of all patients was reviewed as shown in Table-I. Three patients were identified as having delayed onset facial palsy according to the established criteria. The rate of occurrence was found to be 0.85%. Two out of these three patients had DFP due to post-operative wound & cavity infection while one patient had oedema of the horizontal segment of facial nerve. Two patients had grade III facial nerve paralysis according to House & Brackman classification. One patient had grade IV facial nerve paralysis. Out of these three patients two patients underwent radical mastoidectomy for extensive cholesteatoma while in one patient modified radical

mastoidectomy was done for granulations & limited cholesteatoma. Patients who developed delayed facial nerve palsy had a long standing history of discharging ear and extensive disease, cholesteatoma and granulations, was found pre-operatively. All these patients recovered between 4 to 6 weeks after appropriate antibiotics were given after culture along with steroids and anti-inflammatory agents. Physiotherapy was advised. Recovery was good and almost complete.

Table:

Cases reviewed	
Total mastoid operation in 6 years	350
Average age of patients (years)	28.5 years
Male (n)	197
Female (n)	153
Radical Mastoidectomies	184
Modified radical Mastoidectomies	72
Cortical Mastoidectomies	89
Revision Mastoidectomies	03
Atticotomies	02

DISCUSSION

Facial nerves have long intracranial course and pass through the narrow bony canal in the temporal bone. Nerves can be injured by the middle ear or temporal bone surgery, trauma, infection, and compression caused by the surrounding tumours. Moreover, facial nerve paralysis may develop secondarily as a result of systemic diseases, or, although rarely may accompany congenital anomalies. In an analysis of 2,165 patients with facial nerve paralysis, Bell's palsy was the most prevalent cause, followed by incidence of trauma and herpes zoster oticus.⁶ The incidence of DFP after otological and neurotological surgeries was previously reported as 10-30% in acoustic neuroma surgery^{7,8,9} and vestibular neurectomy¹⁰, 0.3-8.5% in tympanoplasty with mastoidectomy¹¹, and cochlear implant^{12,13} and 0.2- 0.5% in stapes surgery^{14,15}.

Idiopathic facial nerve palsy, so called Bell's palsy, is thought to occur due to intratubal facial nerve ischaemia and oedema due to various kinds of stresses^{16,17}. In a sense, all types of surgery could produce surgical stress to the patient and therefore be a potential cause of DFP on either side. Actually after otological and neurotological surgeries, DFP is always observed ipsilaterally. The percentage of delayed facial palsy (DFP) in

our study was found to be 0.85% which is slightly higher than that described by Bonkowsky et al (0.38%). This may be due to high rate of post-operative infection or poor follow-up. A study by Kitahara⁵ et al showed the incidence of DFP after tympanomastoid surgery to be 0.7% while this incidence was 1.4% in a study by Vrabec JT et al. Immediate onset facial nerve palsy after tympanomastoid surgery requires surgical exploration. Deka et al reported 10 patients with immediate post-operative facial paralysis after tympanomastoid surgery and surgical exploration demonstrated an insult to the facial nerve in almost all cases, ranging from oedema to transection. In traumatic paralysis the nerve may be transected, crushed or lacerated with resulting intraneural edema or haematoma. In infectious cases, there is no disruption of nerve fibers, but neural edema or vascular thrombosis may occur. Prognosis and management vary, depending upon the mechanism of injury. Incomplete paralysis of facial nerve has a high rate of normal recovery and recovery is better in DFP compared with those of immediate onset paralysis¹⁸. The potential causes of DFP after otological procedures include compression of the nerve, bacterial infection and viral reactivation etc. Reactivation of herpes simplex virus¹⁹ has been documented as a cause of DFP after tympanomastoid surgery. Gyo and Honda reported one case of DFP due to reactivation of varicella-zoster virus after middle ear surgery⁷. Vrabec and Bonkowsky et al reported five cases of DFP due to this virus reactivation. These patients were treated conservatively by steroids and antiviral agent – acyclovir. A study by Lee DW & Yang HC²⁰ showed three patients developing DFP due to postoperative fungal infection. They treated these patients with topical antifungal agents and patients recovered satisfactorily. In our study, patients developed DFP due to nerve oedema and bacterial infection. Culture & sensitivity (C/S) of ear discharge showed mixed growth of both gram positive and gram negative bacteria. So, ear packs were removed, suction cleaning & mopping of the cavities was done under aseptic condition. Broad spectrum antibiotics, steroids and anti-inflammatory agents were given. These patients were advised physiotherapy. All these patients recovered within 4 – 6 weeks. So the incidence of DFP after tympanomastoid surgery is very low and prognosis is good²¹.

CONCLUSION

Delayed facial paralysis (DFP) after tympanomastoid surgery is rare. There are various causes ranging from simple neural oedema, bacterial, fungal and viral infections. Prognosis is satisfactory provided patients report early and proper treatment is done as early as possible.

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