



Unusual Complications of Tympanomastoid Surgery- a Case Series

KEYWORDS

Cortical mastoidectomy, Tympanoplasty, Papilloedema, Neurofibroma

Dr. Manas Ranjan Rout

MS(ENT & HNS) Associate Professor and Author Department of ENT &HNS Alluri Sitarama Raju Academy of Medical sciences, Eluru,A.P (India)

Dr. C Pakir Das

Professor and HOD Department of ENT &HNS, ASRAMS

Dr K Chandra Sekhar

Professor of Community Medicine, ASRAMS

ABSTRACT

Introduction: - Injury to facial nerve, sigmoid sinus, jugular bulb, mastoid emissary vein, dura and ossicular chain are common complications of tympano-mastoidectomy. There are some rare complications like pneumocephalus, pneumomediastinum, Papilloedema and brain abscess following mastoid surgery reported in the literatures. Here we are presenting three rare complications of tympano-mastoid surgery which we have experienced in our practice ie. Postmastoidectomy tetanus infection, post mastoidectomy scar neurofibroma and unexplained dead ear after tympano-mastoid surgery.

Materials and Methods: - Study has been conducted in the department of ENT and HNS, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh (India). Three rare complications we got in Tympano-mastoid surgery in our four years of study period (2010 – 2014). Cases in detail have been presented here for their rare occurrences.

Conclusion: - Three rare complications after tympanomastoid surgery has been described here; ie. tetanus infection , scar neurofibroma and unexplained dead ear

Introduction

Tympano-mastoidectomy is a micro-surgical procedure by which the disease from the mastoid antrum, air cell system, aditus ad antrum and middle ear are removed, particularly in case of mastoiditis and chronic suppurative otitis media with or without cholesteatoma.

There are so many complications of tympano-mastoid surgery and more in the hand of inexperienced surgeons. Complications are because of abnormal anatomy, altered anatomy due to disease process, destruction of coverings of the vital structures like dural plate, sinus plate and facial canal etc.

Usual complications of tympano-mastoidectomy are injury to facial nerve causing facial palsy. Injury to sigmoid sinus, dura and middle ear structures like ossicles are also found in some cases. Some rare complications like pneumocephalus, pneumomediastinum, papilloedema, surgical emphysema and brain abscess following mastoid surgery have been reported in the literature.

Post operative tetanus after mastoidectomy is a very rare complication and no case has been reported in the world literature. Tetanus is a neurological disorder caused by a gram positive, anaerobic bacteria "Clostridium tetani".

Neurofibroma after tympano-mastoid surgery is a rare complication. Neurofibroma may develop because of trauma (Surgical or Non surgical). Neurofibromin regulates fibroblasts in response to injury. Mast cells and inflammatory response are linked to tumor formation.

Neurofibromas are benign neoplasm derived from the myelin sheath of peripheral nerve. They often occur in the context of neurofibromatosis, a hereditary condition.

Dead ear after tympano-mastoid surgery is rare unless injury to the inner ear structures like semicircular canals, oval window, round window and cochlea. And sometimes it is because of trans-cochlear surgeries. Unexplained dead ear after tympano-mastoidectomy has not been reported in the literatures.

These cases are being reported for their rare occurrence.

Materials and Methods

Study has been conducted in the department of ENT & HNS, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, A.P (India) over a period of four years (2010 – 2014). All the patients planned for tympano-mastoid surgery were evaluated both pre-operatively and post-operatively. Data collected for any post operative complications.

In this four years period we got three rare complications, those we are presenting here.

Results

Case 1 -

A 24 year male patient came to our ENT out patient department with chief complaints of intermittent discharge from right ear since 5 years and decreased hearing in that ear since 3months. Detail history was taken and thorough clinical examination was done. He was a non smoker, non alcoholic and from a family of low socio-economic status.

On examination of right ear, there was a dry subtotal perforation with slight edematous middle ear mucosa. Mastoid tenderness was positive on the tip of the mastoid process. Eustachian tube function was normal. Other ear was normal and he was having normal nose and throat findings.

Patient was diagnosed to be "Right Chronic

suppurative Otitis media with dry subtotal perforation and masked mastoiditis" and planned for Right cortical mastoidectomy with tympanoplasty at same sitting.

After all routine investigations including screening tests for retro virus and hepatitis viruses and with all preventive measures like tetanus toxoid vaccine and lignocain test, surgery was done under general anesthesia.

Cortical mastoidectomy was done by post auricular approach and all the disease air cells were removed. Intra operatively there was a big mastoid cavity because of bone erosion. Polypoid mucosa and granulation tissues found in the mastoid cavity were removed. Aditus ad antrum was patent and middle ear was having normal and mobile ossicular chain. Type-1 tympanoplasty was done using conchal cartilage and temporalis fascia.

Immediate post operative period was uneventful and patient was doing well.

On third post operative day patient was complaining of mild dragging sensation in the neck and stiffness over the face and reeling of head. First it was ignored thinking to be mild muscle spasm due to immobility after surgery and advised light neck exercise with oral muscle relaxant.

But after few hours patient developed severe painful spasm of facial and neck muscles. On examination the facial and neck muscles were stiff along with mild stiffness of abdominal muscles. Patient was having typical facial expression of "risus sardonius". All the vital signs were normal. Upper limbs, lower limbs and back muscles were also normal.

On clinical basis it was diagnosed to be tetanus and patient shifted to intensive care unit. Medical treatment started with out delay. Infusion metronidazole (500mg) started 6 hourly. To reduce muscle spasm slow continuous infusion of diazepam was given in normal saline drip. Human tetanus immunoglobulin 3000 unit total was given intramuscularly in single dose at different sites. Patient was kept in intensive care unit for 10 days with continuous monitoring of the vitals.

Swab was taken from the mastoid wound and sent for macroscopic examination and culture sensitivity test (Figure -1). Tetanus bacilli were isolated from the wound. His cerebrospinal fluid test was normal.

While enquiring about the childhood history of vaccination, it was found that he has not been vaccinated with any vaccine.

Patient responded well to medical treatment and discharged after ten days (Published).

Case 2 –

A 20 year male patient came to our ENT out patient department with chief complaints of intermittent discharge from left ear since 4 months which at times associated with pain and decreased hearing in that ear since 3months. There was no history of foul smell discharge. Detail history was taken and thorough clinical examination was done. He was a non smoker and non alcoholic from a family of low socio-economic status.

On examination of left ear, there was a big central perforation involving both antero-inferior and posterior-inferior

quadrant with congested and edematous middle ear mucosa. Mastoid tenderness was positive on the tip of the mastoid process. Tuning fork test revealed conductive hearing loss on left ear.

Patient was diagnosed to be "Left Chronic suppurative Otitis media with big central perforation having conductive hearing loss and mastoiditis" and planned for cortical mastoidectomy with tympanoplasty at the same sitting.

Cortical mastoidectomy was done by post auricular approach and all the disease air cells were removed. Intra operatively mastoid cavity was having granulation tissue. Aditus ad antrum was made patent by removing the granulation tissues. Middle ear was having normal and mobile ossicular chain. Type-1 tympanoplasty was done using temporalis fascia graft.

Immediate post operative period was uneventful and patient was doing well. We discharged patient on 3rd postoperative day.

After two months patient developed a small swelling over the post auricular incision near tip of the mastoid process (Figure -2). He was complaining of intermittent neuralgic pain over the swelling which was more at night causing disturbance in sleep. Swelling was progressively increasing in size to attend the size of 2 cm x 2cm. Swelling was reddish – brown in color, having smooth surface and tender on palpation.

Patient was diagnosed clinically as traumatic neuroma or foreign body granuloma and planned for excision.

Mass was excised under local anaesthesia using 2% xylocain infiltration and sent for histopathological study.

Histopathological report revealed hyperplastic fibrous component and neural components arranged in the form of fascicles and at places arranged in bundles and verrucae like bodies with areas of hyalinization. The tumor cell revealed elongated spindle cells with spiroform nuclei, interspersed by fibroblasts (Figure-3). This histological feature is suggestive of neurofibroma.

Patient became asymptomatic and having mild tingling sensation at times near tip of the mastoid even after surgery and under regular follow up (Published).

Case 3 –

A 22 yr male patient came to our out patient department with complaints of intermittent foul smell discharge from right ear since 1 year, decrease in hearing since 5 months and intermittent pain in the same ear since one month. He has taken treatment for this from local hospitals with temporary relief. On examination there was extensive cholesteatoma and granulation tissues.

Modified Radical mastoidectomy was done by Inside out technique and cholesteatoma sac was excised along with granulation tissues. Intra operatively all the ossicles were absent with mobile foot plate of the stapes. Facial nerve canal was dehiscient and lateral semicircular canal was normal. After removal of the disease, for hearing improvement, the teflon TORP (Total ossicular replacement prosthesis) was used. Post operative period was uneventful.

On examination after four months, patient was having dry ear with wide meatoplasty opening and improvement of

hearing on pure tone audiometry.

After seven months of surgery patient again developed hearing loss. It was not associated with vertigo or tinnitus. Both on tuning fork test and pure tone audiometry we got moderate sensory neural hearing loss. Diagnosing clinically as low grade labyrinthitis we started treating with antibiotic, steroid and neurovitamins. Then patient lost follow up for few months. And again he came after one year of surgery with complains of not able to hear at all. Pure tone audiometry was non responsive. Then we advised Auditory brain stem response (ABR) and Otoacoustic emission (OAE). ABR showed retro cochlear hearing loss. OAE report came as referred suggesting of cochlear problem. Caloric test was also done and showed no response on the right ear.

All these tests suggest dead cochlea with involvement of vestibulo-cochlear nerve. Post operative CT scan did not show any evidence of injury to the inner ear structures like cochlea, semicircular canal and vestibule. So this dead ear remained unexplained.

Discussion

Tympanomastoidectomy is an operation performed to remove disease from the mastoid antrum, air cell system, aditus ad antrum and middle ear. Broadly mastoidectomy has been classified in to open cavity mastoidectomy and closed cavity mastoidectomy.

Facial palsy is the most common serious surgical complication during all type of mastoidectomy. Injury to sigmoid sinus superior petrosal sinus, jugular bulb or mastoid emissary vein results in an alarming profuse venous bleeding (1). Complications of open cavity mastoidectomy include deafness or further hearing loss, vestibular symptoms, cerebrospinal fluid leak, infection and recurrent cholesteatoma or drainage (2).

There are some rare complications mastoidectomies reported by different authors.

Lela Migirov et al reported four cases of intra cranial complications following mastoidectomies. Out of four children one was having brain abscess, one having subdural empyema, one having epidural collection and fourth on having sigmoid sinus thrombosis (3).

Dayasena RP et al reported the rare complications like surgical emphysema and pneumomediastinum following mastoidectomy (4).

P. Harkness et al reported an unusual complication of mastoidectomy, papilloedema following cortical mastoidectomy as a part of endolymphatic sac decompression (5).

F Jégoux et al reported a case of pneumocephalus in 43 year old women 37 years after mastoidectomy (6).

Girgis BA et al reported a case of nominal aphasia following radical mastoidectomy (7). A rare complication of cerebral abscess following mastoidectomy for chronic otitis media was reported by **Amit Agrawal et al** (8).

Tetanus infection following mastoidectomy has not been reported in any literature.

Tetanus is an acute disease induced by the exotoxin (Tetanospasmin) of *Clostridium tetani*, which is a gram pos-

itive, anaerobic, spore bearing organism. The natural habitat of the organism is soil and dust. So agricultural workers are at more risk. Infection is acquired by contamination of wounds with tetanus spores. Incubation period is usually 6 to 10 days. However it may be short as one day or as long as several months (9).

It usually presents with increase muscle tone and generalized spasm. Sustained contraction of the facial muscles results in a grimace or sneer (*risus sardonius*), and contraction of the back muscles produces an arched back (*opisthotonos*). Some patients develop paroxysmal, violent, painful, generalized muscle spasms that may cause cyanosis and threaten ventilation.

Both active and passive immunisations are available for prevention of tetanus infection. But it should be pointed out that tetanus may occasionally occur in spite of active or passive immunization or both (9).

So immunization history of the patient with tetanus toxoid is very important before any type of surgery. Because one dose of tetanus toxoid before surgery is not adequate for protection against tetanus.

Neurofibromas are benign neoplasm derived from the myelin sheath of peripheral nerve. They often occur in the context of neurofibromatosis, a hereditary condition.

These are benign or non cancerous tumors that grow on nerve through out the body. There are three major types of neurofibromas ie; cutaneous neurofibroma, spinal neurofibroma and plexiform neurofibroma.

Cutaneous neurofibroma rarely cause medical problems but may itch or be tender when bumped. It is important to note that these tumors remain benign throughout life and do not become malignant cancers.

Neurofibroma may develop because of trauma (Surgical or Non surgical). Neurofibromin regulates fibroblasts in response to injury. Mast cells and inflammatory response are linked to tumor formation.

Deafness after tympano mastoid surgery is either due to injury to inner ear structures or due to labyrinthectomy. Causes of total deafness without inner ear injury have not been explained in any literature.

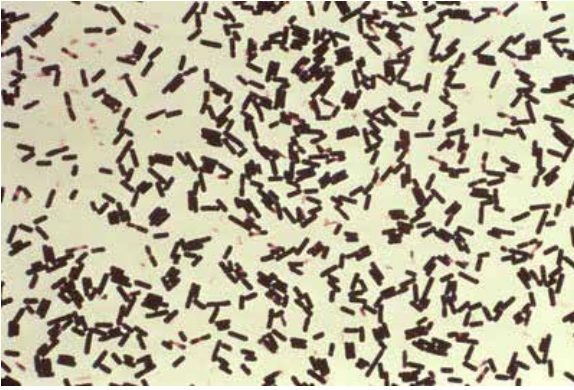
Conclusion

There are so many rare complications of tympano-mastoid surgery reported in the literature. Here we are reporting three rare complications. Those are

- 1) Tetanus infection after tympanomastoid surgery
- 2) Post auricular scar neurofibroma after tympano-mastoidectomy
- 3) Unexplained dead ear after tympano-mastoidectomy

We are reporting these cases for their rare occurrence.

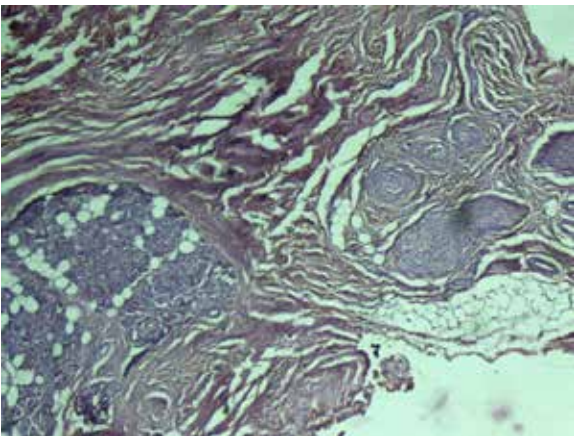
(Figures)



(Figure -1; Clostridium tetani slide)



(Figure -2 ; Post operative scar neurofibroma)



(Figure -3; Histopathology of Neurofibroma)

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