

Both My Ears are Swollen: Bismuth Iodoform Paraffin Paste (BIPP) Delayed Hypersensitivity Reaction Following Otological Surgery

Case Report

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ABSTRACT

Introduction: Ribbon gauze impregnated with Bismuth Iodoform Paraffin Paste (BIPP) is commonly used for packing following surgical procedures in otorhinolaryngology, especially aural, nasal, and maxillofacial procedures. Unfortunately, BIPP can cause delayed hypersensitivity reactions albeit it is a rarity. To the best of our knowledge, no such cases have been reported previously in Malaysia. We present a case report regarding a delayed hypersensitivity reaction that occurred following mastoidectomy.

Case Report: A 30-year-old Chinese man with no known allergy and a history of right mastoid surgery 8 years ago for chronic suppurative otitis media with cholesteatoma. The left ear was normal on the first presentation. He was then presented again with bilateral ear discharge for the past 1 year. Upon assessment, bilateral cholesteatoma was noted and he underwent an endoscopic right ear examination with lowering of the right facial ridge and a modified radical mastoidectomy of the left ear. The surgery done for both ears went well and both ears were packed with BIPP. The patient was discharged on the third postoperative day. Unfortunately, he came back 2 days later due to painful left ear swelling which progressed to involving both ears the following day. The condition resolved completely one day after the removal of both BIPP packing.

Conclusion: Our case highlights the occurrence of a hypersensitivity reaction following BIPP packing. Although it is rare, it should be considered especially in patients with a history of exposure to BIPP.

Key Words: Bismuth iodoform paraffin paste, hypersensitivity, packing, cholesteatoma.

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INTRODUCTION

Bismuth iodoform paraffin paste (BIPP) packing was first introduced in 1916 by Rutherford Morrison. It consists of 25% of bismuth subnitrate, 25% liquid paraffin base, and 50% of iodoform^[1]. BIPP has been widely used for packing following external and middle ear surgery. It has the properties to ensure that the wound is clean and helps promote granulation. Unfortunately, BIPP can cause delayed hypersensitivity reactions (type IV) which may affect the healing process, particularly those needing further medical treatment^[2]. BIPP can cause allergic contact dermatitis, commonly due to the iodoform component compared to bismuth subnitrate, which is in the form of an insoluble salt^[3]. In a retrospective study done by Lim *et al.* (1998), 11 out of 185 patients (5.9%) developed allergic reactions toward BIPP packing. Two out of 11 patients had no history of exposure to BIPP while the rest had a history of exposure to BIPP either once, twice or more^[4].

CASE REPORT

A 30-year-old Chinese man presented with recurrent bilateral ears otorrhea associated with occasional left earache and bilateral reduced hearing for 1-year duration. There were no tinnitus or vertigo. Eight years before, he had right canal wall down mastoidectomy for right chronic otitis media with cholesteatoma. It is not known whether he has a history of food or drug allergies. His right ear was packed with BIPP-impregnated gauze during his previous ear operation, with no complications or sequelae. His evaluation revealed bilateral ear cholesteatoma; consequently, he underwent an endoscopic right ear examination with lowering of the right facial ridge and a modified radical mastoidectomy of the left ear. Intraoperatively, the right endoscopic ear examination revealed high facial ridge that subsequently lowered down during the procedure. Left ear revealed cholesteatoma sac in the left mastoid cavity and the middle ear (epitympanum and mesotympanum region were clear).

Postoperatively, both ears were packed with BIPP with the plan of removal on day 14 postoperatively. He was discharged well on day 3 on oral cefuroxime 250mg bd for a week duration. Unfortunately, he came back on day 5 post-surgery with swelling of his left ear, associated with severe otalgia that was disturbing his sleep. He was compliant with the antibiotics given. Otherwise, there was no otorrhea, bleeding, fever, vertigo, tinnitus, facial asymmetry, headache, vomiting, or history of trauma to the left ear.

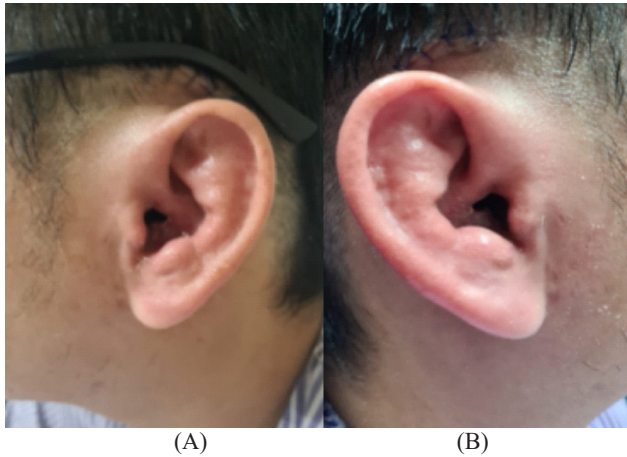


Fig. 1: (A): Left pinna was swollen, mild erythematous, and tender involving the helix, triangular fossa, and antitragus. This was on the day 5 post surgery
(B): Right pinna was swollen, erythematous, and tender (occurred a day later on day 6 post-surgery), involving the triangular fossa, antihelix, helix, and antitragus.



Fig. 2: Left modified radical mastoidectomy wound was clean with no wound gapping or discharge. There was no mastoid swelling or tenderness



Fig. 3: (A) left pinna on day 3 admission, post BIPP removal.
(B) right pinna on day 3 admission, post BIPP removal.
The swelling and erythematous area were completely resolved with minimal dried scab at the bilateral concha cavum, which was non-tender.

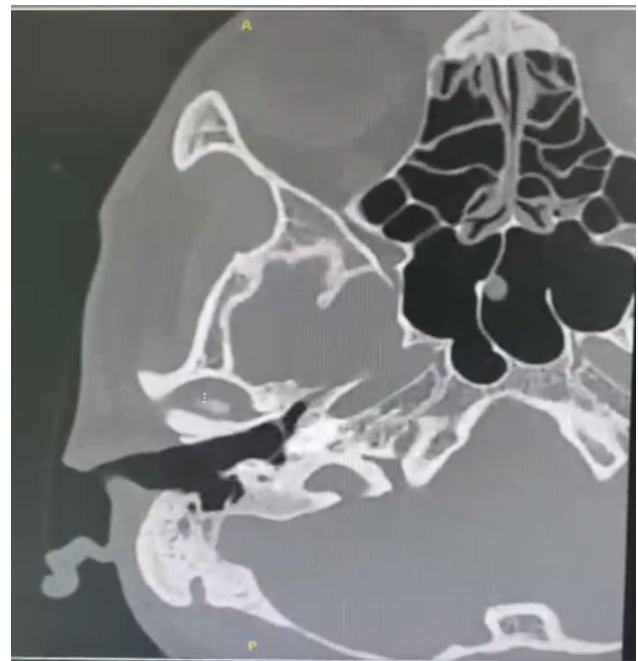


Fig. 4(a): High-resolution computed tomography (HRCT) of temporal bone. Presence of chronic otomastoiditis with post-operative changes and soft tissue densities at the remnant of the right mastoid air cells.

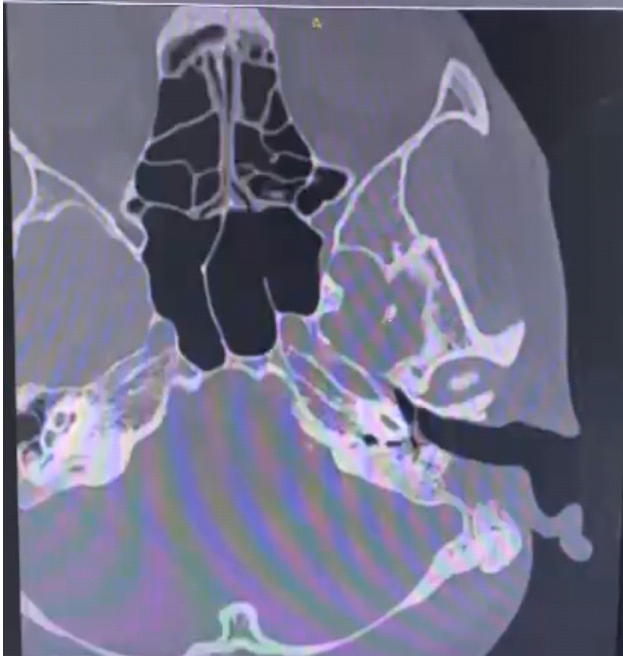


Fig. 4(b): High-resolution computed tomography (HRCT) of temporal bone. Presence of chronic otomastoiditis with post-operative changes and soft tissue densities at the remnant of the left mastoid air cells.

Upon examination, he was not septic looking, and no facial asymmetry was seen. The BIPP pack was still found in both ears. The whole left pinna was tender, swollen, and erythematous (Figure 1 (A)) extending into the meatal area, however unable to assess beyond the BIPP packing. The BIPP packing was not removed upon admission in view of no suspicion to the BIPP allergy initially. It was only removed a day after admission. The left postauricular suture was intact with no gapping and no discharge. There was no mastoid swelling noted (Figure 2). The right pinna was normal with no sign of inflammation. He was then started on intravenous ciprofloxacin 400mg bd for 3 days as ciprofloxacin have excellent tissue penetration in treating the perichondritis.

On the following day, he developed gradual onset of right ear swelling with minimal pain. The right pinna was swollen, erythematous, and tender (Figure 1 (B)), similar to the left ear. The BIPP packing was then removed from both ears due to the suspicion of a delayed allergic reaction followed by thorough aural toileting to clean the residual BIPP. The otoscopic examination revealed slight oedematous right external ear canal (EAC) and mastoid bowl was clear. The tympanic membrane was intact with no pus discharge seen. The left EAC was slight oedematous with no keratin pearl or debris seen. The mastoid bowl was clear and tympanic membrane was intact. Aural toileting was done to remove the residual BIPP particles in both ears. High-resolution computed tomography (HRCT) of temporal bone (Figure 4(A) & 4(B)) revealed bilateral chronic otomastoiditis with post-operative changes with soft tissue densities at bilateral

remnant of mastoid air cells. Interestingly, the both swollen pinna resolved completely after BIPP removal (Figure 3 A&B) and he was discharged well with oral Cefuroxime for one week. A week later, upon the clinic review, the both pinna were completely normal. Other examinations were unremarkable.

DISCUSSION

Packing with BIPP impregnated gauze is a universally acceptable method in the medical field that has been used since the war era. It became popular due to its effective dressing properties. BIPP has a slow release of iodine once in contact with oxygen from arterial blood or the atmosphere. Bismuth subnitrate potentiates the antiseptic activity of iodoform by yielding diluted nitric acid on hydrolysis. In Otorhinolaryngology, BIPP is considered a safe and ideal dressing for mastoid surgery which has been included as post-operative management by most ORL surgeons worldwide^[5].

In a retrospective study conducted by Chevretton *et al.*^[6] involving 40 mastoid surgeries with the aim to determine the ideal packing material in 1991, the ear was packed with either BIPP or Xeroform impregnated gauze for at least 2 weeks postoperatively. All 20 patients with BIPP packing did not have any immediate adverse events even though no perioperative antibiotics were prescribed. However, 11 out of 20 patients developed sequelae post-packing with Xeroform. The effective management consisted of the immediate removal of the packing, daily aural toileting, topical antibiotics, and appropriate intravenous antibiotics administration. Lim *et al.*^[2] reported a 5.9% hypersensitive allergic BIPP reaction in a study conducted on 185 patients. Those patients were reported to have erythema, oedema, and increased warmth of local tissues within 72 hours of packing with BIPP. The incidence of allergic reactions was elevated by a factor of up to 5 in patients with a prior history of exposure to BIPP, as observed in this particular study. The allergic reactions ceased entirely after the removal of the BIPP packing and the subsequent elimination of BIPP particles during aural toileting^[3].

BIPP packing in the external ear canal can be used post-operatively, either after raising a tympanomeatal flap or the creation of a mastoid cavity, or other than that, it can be a treatment in case of severe acute otitis externa. BIPP application aids in the prevention of hematoma formation in the tympanomeatal flap and facilitates proper anatomical healing of the flap. Following the mastoid cavity creation, BIPP packing helps to ensure that the grafts (e.g.: temporalis fascia, perichondrium, or cartilage) are in contact with the bony wall, thus preventing hematoma formation.

A study conducted by Coulson and colleagues on 587 patients found that only 1% of patients developed hypersensitivity reactions, meanwhile 2.4% developed

hypersensitivity in revision mastoid surgery after 2 weeks of packing. They postulated that BIPP reactions will be lower if BIPP exposure and contact time are minimized. BIPP reactions might also be due to type IV hypersensitivity reaction towards iodoform^[7]. Roest *et al.*^[3] postulated that prolonged BIPP packing will increase the potential for contact sensitization. Farrel reported that out of 719 patients in his study, only 0.4% of them experienced hypersensitivity^[8]. Bennet *et al.*^[2] suggested patch testing pre-operatively for those patients who will be packed with BIPP. In their study, only 1% of patients who developed hypersensitivity had no history of exposure to BIPP. Meanwhile, 12% of the patients who had previous exposure to BIPP developed hypersensitivity towards it. All of the patients who developed reactions from BIPP are due to the iodoform, not the iodine according to Bennet *et al.* There was also no relation to prove that iodine contained in seafood can cause this hypersensitivity. Those patients with an allergy to seafood do not necessarily have an allergy to BIPP^[9].

CONCLUSION

BIPP hypersensitivity is a rare adverse event. However, it will cause pain and affect the daily quality of life. There is no evidence stating that a patient with seafood allergy will have an allergy to BIPP and vice versa. A patch testing prior to doing BIPP packing is a good practice, however, requires added expenses. The lesser the exposure to BIPP, the less likely one will develop hypersensitivity towards it. In addition, thorough removal of all BIPP residue usually results in prompt resolution.

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