Allergic Reaction to Bismuth-Iodoform-Paraffin Paste (BIPP) Following Ear Surgery

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Abstract:
Bismuth Iodoform Paraffin Paste (BIPP) impregnated ribbon gauze is one of the most commonly used packs after external and middle ear surgery. Allergic reaction to BIPP is rare. We report two cases of hypersensitive BIPP reaction following tympanoplasty surgery. To our knowledge no such cases have been reported previously in Qatar. We reviewed the literature and discuss the management and its prevention.

Keywords: Bismuth Iodoform Paraffin Paste, Complications, Allergy

Introduction:
BIPP is commonly used for packing in ear, nose and throat, maxillofacial and neurosurgical procedures. It was introduced in 1916 by Rutherford Morrison, contains two parts of iodoform 50% and one part of bismuth subnitrate 25% in a liquid paraffin base 25%. Bismuth subnitrate was included for its astringent activity and was also said to contribute to antiseptic activity by releasing dilute nitric acid on hydrolysis.

It has been used also for packing of wound cavities, reducing the risk of bacterial infection and promoting granulation tissue formation. It has minimal antibacterial activity against Staphylococcus aureus, Escherichia coli and Pseudomonas aeruginosa.

Published reports of adverse side effects of using BIPP dressings include allergic hypersensitivity reactions, encephalopathy, delirium and confusion, methemoglobinemia, and facial paralysis. The overall incidence of allergic reaction to BIPP reported in the literature varies from 0.4% to 5.9%. Recently Bennett, et al., reported a 12% incidence of allergy in patients who had previous exposure to BIPP.

In our department, BIPP impregnated ribbon gauze is used routinely for packing for the external ear after tympanoplasty and middle ear and mastoid exploration. We report two cases of delayed hypersensitivity (Type IV) reaction to BIPP after tympanoplasty operation and discuss its management.

Case Reports:

Case 1:
A 38-year old Indian female presented to our ENT clinic in December 2003 with a history of bilateral ear chronic suppurative otitis media, with hearing loss and recurrent ear infections. Clinical examination showed a posterior tympanic membrane perforation on the right side and a subtotal perforation in the left ear. Audiogram showed conductive hearing loss, 20-25 dB on the right and 30-40 dB on the left.

She had a history of failed left ear tympanoplasty done in India two years prior to this presentation. She underwent left tympanoplasty in December 2003 and BIPP pack was used. The tympanic membrane healed well with improved hearing to normal thresholds. She did not develop any allergic reaction to BIPP.

In February 2008, she underwent right ear tympanoplasty. On admission she denied any history of allergy. Intra-operatively a BIPP pack was inserted in the ear canal. Nine days later she presented with severe itching, watery discharge and swelling of the right ear canal and pinna. Clinical examination showed erythema, blister and increased warmth of local tissues of the external ear canal, concha and right pinna. She was admitted for intravenous antibiotics (Cefepime 1 gram bid) to prevent secondary bacterial infection and perichondritis. The BIPP pack was removed immediately. In addition, she received intravenous and topical cortisone and oral antihistamines. She made a good uneventful recovery and was discharged home after three days. Further follow up showed a well vascularised grafted tympanic membrane with good improvement of hearing to normal thresholds.
Case 2:

A 33-year old Somali male presented to our ENT clinic in 2005 with a history of bilateral chronic suppurative otitis media with subtotal perforation and recurrent ear infections. Pure tone audiogram hearing test revealed up to 45 dB conductive hearing loss on the right ear and 30–35 dB on the left ear. He had undergone right tympanoplasty in India in 2003 which failed. Temporal bone CT scan showed significant chronic sclerotic mastoids.

He underwent revision right tympanoplasty with cortical mastoidectomy in 2006. BIPP dressing was used in the ear canal. Post-operatively, after seven days, he presented with an allergic reaction to BIPP involving the ear canal, pinna and right peri-auricular region. The BIPP was removed immediately from the ear canal, and he was started on an oral antibiotic, (Ciprofloxacin 500mg bid) topical steroid ear drops and oral antihistamine.

During clinical follow-up the patient had a well vascu- larised tympanic membrane and the conductive hearing loss had improved to 30 dB.

Discussion:

BIPP has been used as packing in middle ear and external ear operations and in nasal packing after epistaxis. Its other uses include packing the nasal cavities after sinonasal procedures, dental extractions(6), and trans-sphenoidal surgery(2).

BIPP is kept in the ear canal routinely for two weeks or more after ear surgery and prolonged contact increases the potential for sensitization. Lim et al., reported an incidence of 5.9% hypersensitive reaction to BIPP and claimed that the frequency of allergic reactions was significantly higher in patients who had previous exposure. This study also identified that the relative risk of developing allergic reactions to BIPP was five times more for those patients who had previous exposure when compared to patients who had no previous exposure. It showed also the allergic reaction response as primary exposure rate was 2% and as secondary exposure rate was 10.9%(1).

Reactions to BIPP are well documented in the literature(1–14). The most common reaction is hypersensitivity to the iodiform component rather than allergic contact dermatitis from bismuth subnitrate(6,7,13). The iodiform (triiodomethane) is an antiseptic that decomposes to elemental iodine, thought to be responsible for the antiseptic effect(6). Farell 1994(12) in his retrospective study reported BIPP allergy in three cases in a series of 712 cases, a 0.4% incidence(3).

Nakhla, et.al., reported hypersensitivity reaction in one of 106 patients who had received BIPP pack following myringoplasty(14). Recently Bennett, et.al., in their prospective patch testing study identified a 12% incidence of BIPP allergy in those previously exposed and 1% in those not exposed previously(13). The study recommended patch testing for patients previously exposed to BIPP if postoperative packing is considered after ear surgery.

Chevretton et al., (1991) compared the safety of BIPP packing with xeroform packs after mastoidectomy in 40 patients and concluded that BIPP is a safe dressing and none of the patients had allergic reactions(3). Raised serum bismuth levels are reported to be the cause of post-maxillectomy delirium(9), encephalopathy(2), methaemoglobinemia(4) and neurotoxicity(8). Recently, Flook, et.al., (2006), addressed the need to include BIPP reactions in routine consent(5).

We agree that all patients who may require BIPP dressing should be warned about the bismuth and iodiform reactions and this should be documented in the case notes to avoid medico-legal issues. In our cases, both patients had previous exposure to BIPP resulting in a delayed hypersensitivity reaction.
Conclusion:

BIPP reactions are rare. BIPP is safe to use after ear surgery provided that the clinician is fully aware of the side effects and its early recognition and management. We do not recommend patch testing in patients who have had no previous exposure to BIPP dressing since the incidence of hypersensitivity is very low but strongly recommend patch testing of those who have had previous exposure to BIPP. We suggest alternative dressing in patients who are allergic to BIPP. The surgeon will not be protected from litigation if the patient was not informed about BIPP reaction and consented appropriately.

References: