

Avoidance of BIPP allergy hypersensitivity reactions following ear surgery

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Keypoints

- Bismuth Iodoform Paraffin Paste (BIPP) is one of the most commonly used packs after middle and external ear surgery.
- Only two retrospective case studies exist which found a 0.4% and 6% overall risk of BIPP allergy.
- The result of our prospective patch testing study identifies the true incidence of BIPP allergy to be 12% in those previously exposed and 1% in those not previously exposed.
- The component part responsible is iodoform not iodine.
- We recommend patch testing patients previously exposed to BIPP undergoing ear surgery, if postoperative BIPP packing is being considered.
- We recommend those patients allergic to BIPP should be tested with its constituent parts for future reference. It is important to determine whether there is allergy to iodine solution or not as this would preclude them from future iodine solution contrast studies and iodine solution skin prep before surgery.
- We do not recommend testing patients not previously known to be exposed to BIPP as the incidence of allergy is low and there exists a risk of sensitization.

Bismuth Iodoform Paraffin Paste (BIPP) has been used since 1916 as a wound dressing for its ability to render cavities clean and promote granulation.¹ BIPP impregnated ribbon gauze is now one of the most commonly used packs after middle and external ear surgery. Unfortunately, it is associated with a Type IV (delayed) contact hypersensitivity allergic reaction which can delay healing and necessitate return to hospital.²

The authors could find only two retrospective case note review studies identifying the incidence of allergic reactions to BIPP. Farrell found an incidence 0.4% (three out of 712).³ More recently, Lim *et al.*⁴ found a 6% overall risk with a fivefold increase associated with previous exposure to BIPP (nasal as well as ear surgery).

We therefore decided to identify the true incidence of BIPP allergy, determine the component part responsible and then generate a philosophy for the avoidance of allergic reactions to BIPP in our patients.

Materials and methods

The senior author (MW Yung) has an allergy database in which all patients previously exposed to BIPP and other common allergens due to undergo ear surgery are prospectively patch tested. Patients undergoing surgery with no previous exposure to BIPP should not be tested as both the authors' experience and that of Lim *et al.* show evidence of sensitization (increased response as a result of previous exposure). When the senior author began the database, all patients, previously exposed or not, were tested for allergy. Only one of the 104 (1% CI 0–3%) patients not previously exposed to BIPP tested positive. More importantly some patients found not to be allergic to BIPP on patch testing subsequently developed allergic reactions after surgery as a result of the previous exposure.

For those undergoing patch testing, data are collected on name, age, sex, known eczema, previous ear surgery and exposure to BIPP and the proposed operation. Those found to be allergic to BIPP are then tested with 50% iodoform paste, 25% bismuth, 0.5% iodine solution and paraffin, the concentrations of the constituent parts of BIPP as produced by our formulary at the time the audit began. We have subsequently changed to a very similar preparation produced by Aurum Pharmaceuticals Ltd

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(Essex, UK) (40% iodoform paste, 20% bismuth, 40% paraffin) currently used by all the hospitals in the East Anglia. A 2% iodine solution is also tested as a negative response to 0.5% may be due to the weak concentration rather than the substance itself. In our experience, concentrations >2% iodine frequently resulted in irritant reactions.

Patch testing

Patch testing is performed by our specially trained Clinical Allergy Nurse Specialist (J Bartle). After informed consent, hypoallergenic aluminium wells ≈ 1 cm in diameter (Finn chambers) containing: a 1-cm piece of the BIPP impregnated gauze; blotting paper for iodine solution, and other allergens mixed with paraffin as well as a control containing only paraffin paste are fixed to the patient's back using Micropore Tape (Fig. 1a). These are then inspected for an allergic or irritant reaction at 96 h as Type IV (delayed) contact hypersensitivity reactions commonly occur between 12 and 72 h (Fig. 1b,c). An allergic reaction demonstrates: erythema, infiltration, papules and discrete vesicles. Those found to be allergic to BIPP are then tested in the same manner for responses to its constituent parts.

Ethical considerations

Informed consent needs to be obtained from all patients undergoing allergy testing as they may develop erythema, papules or even blistering in response to the allergens being tested. Those patients known to be allergic to BIPP undergoing component testing will certainly develop a reaction after testing. In our experience, all of the reactions have been localised, lasted only a few days and responded well to topical Betamethasone Valerate Cream 0.1%.

Results

Two-hundred and thirty-seven patients were tested between March 2000 and April 2007 (Fig. 2). Of the 28 patients allergic to BIPP, 17 were female and 11 male. There was an age range between 8 and 78 years with a median age of 40 and a mean of 41 years.

Discussion

We feel the higher incidence of BIPP allergy (12%) in our study probably represents the higher pick up rate with prospective patch testing when compared with a trawl of case notes which may miss some cases and contain others misdiagnosed as either irritation or infection.

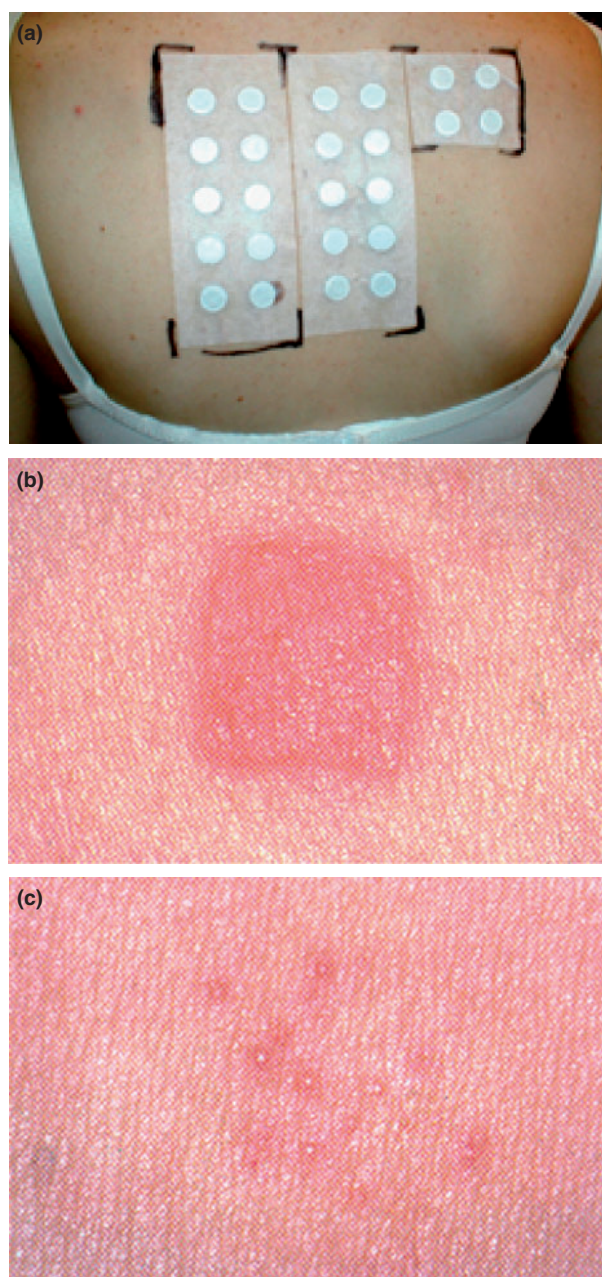


Fig. 1. (a) Patch testing. (b) Allergic reaction. (c) Irritant reaction.

One possibility considered was that the allergic reaction could be due to the blue multi-filament polypropylene yarn filled with Barium Sulphate which makes the BIPP dressing X-ray detectable. However, a reaction to this strip would be expected to exhibit a linear rather than square skin reaction. Moreover, the fact that all those allergic to BIPP were found to be allergic to the iodoform paste in the second batch of tests (without the strip) is further evidence against the strip itself being the cause.

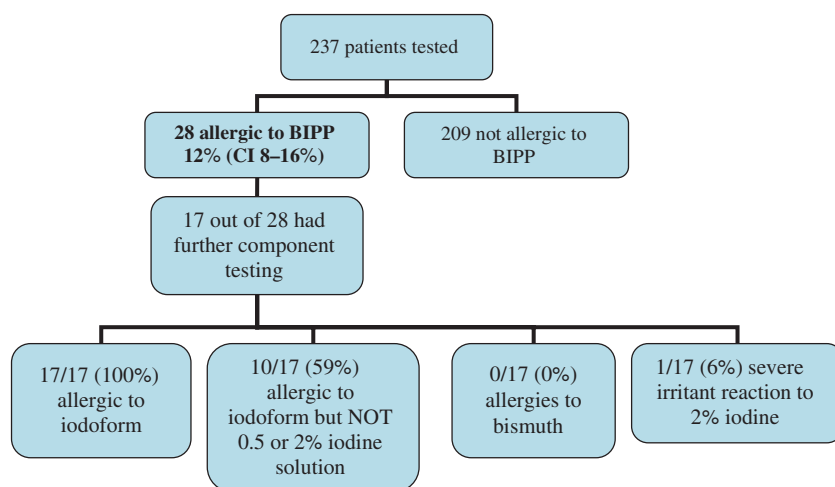


Fig. 2. Flow-chart of results.

Eleven patients declined further testing; possible reasons could include lack of time, discomfort or having moved away.

It was interesting to note the high rate of allergic reactions to iodoform (100% of those allergic to BIPP) but not iodine solution. We suggest that this is due to a change in the allergenicity of iodine when contained within a paraffin paste (iodoform) rather than in solution.

One of the BIPP allergic patients had an irritant reaction to iodine 2%. We feel it is as important to record those patients with irritant reactions as allergic reactions as they too will need to avoid BIPP in future.

Conclusion & recommendations

On the basis of our experience, we would recommend patch testing patients previously exposed to BIPP undergoing ear surgery, if postoperative BIPP packing is being considered.

Those patients allergic to BIPP should be tested with its constituent parts for future reference. It is important to determine whether there is allergy to iodine solution or not as this would preclude them from future iodine solution contrast studies and iodine solution skin prep before surgery.

In those that are allergic to BIPP, alternative dressings should be considered. A recent study has shown Tri-Acortyl Cream (TAC) to be as effective as BIPP.⁵ However, TAC contains 0.25% neomycin which is also associated with allergic reactions. Eight of the 28 (29%) patients allergic to BIPP in our study were also allergic to neomycin and a recent study by the senior author found an overall incidence of 13%.⁶ In those patients allergic to both BIPP and TAC, we would suggest Terra-cortril ointment provided they are not allergic to oxytetracycline.

It is beyond the scope of this study to discuss in detail the cost implications of such a change in practice. However, the number of tests required is relatively small when compared with the total number of operations performed. This is because many patients are either having their first and only ear operation or have had multiple operations and thus have already had allergy tests which do not need to be repeated. Testing involves taking consent; performing the test; reading the results and giving advice to the patient: our allergy nurse specialist allows ≈1 h per patient over two visits. The 237 tests performed in 7 years have therefore required an average of 34 h per year of her time. In our opinion, this is an effective use of resources to avoid the morbidity associated with BIPP allergy.

Conflict of interest

None to declare.

References

- Morrison R. (1916) The treatment of infected suppurating war wounds. *Lancet* ii, 268–272
- Roest M.A., Shaw S. & Orton D.I. (2002) Allergic contact otitis externa due to iodoform in BIPP cavity dressings. *Contact Derm.* **46**, 360
- Farrell R.W. (1994) Dangers of bismuth iodoform paraffin paste. *Lancet* **344**, 1637–1638
- Lim P.V., Hughes R.G. & Oates J. (1998) Hypersensitive allergic reactions to bismuth-iodoform-paraffin paste following ear surgery. *J. Laryngol. Otol.* **112**, 335–337
- Nakhla V., Takwoingi Y.M. & Sinha A. (2007) Myringoplasty: a comparison of bismuth iodoform paraffin paste gauze pack and tri-adcortyl ointment ear dressing. *J. Laryngol. Otol.* **121**, 329–332
- Yung M.W. & Rajendra T. (2002) Delayed hypersensitivity reaction to topical aminoglycosides in patients undergoing middle ear surgery. *Clin Otolaryngol. Allied Sci.* **27**, 365–368