

Main Articles

Hypersensitive allergic reactions to bismuth-iodoform-paraffin paste following ear surgery

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Abstract

The case notes of 185 patients who had bismuth-iodoform-paraffin paste (BIPP) impregnated ribbon gauze used for packing following ear surgery were analysed retrospectively. The incidence of hypersensitive allergic reactions to BIPP was 5.9 per cent and a five-fold increase risk of developing allergic reactions was found in those with previous exposure to BIPP. Where temporalis fascia was used to repair tympanic membrane defects, the incidence of tympanic membrane graft perforations was higher when allergic reactions to BIPP developed post-operatively, compared to non-allergic cases.

Key words: Otitis media, suppurative; Tympanoplasty; Iodine; Dressings; Hypersensitivity

Introduction

Bismuth-iodoform-paraffin paste (BIPP) impregnated gauze is commonly used by otorhinolaryngologists to pack the external auditory canal following ear surgery. It is also used in packing the nasal cavity to control epistaxis. BIPP consists of one part of bismuth subnitrate, two parts of iodoform and one part of sterilized liquid paraffin by weight. It was first used by Morrison (1916) as a form of temporary dressing for the suppurating wounds of war casualties. BIPP dressings proved to cause minimal tissue irritation and exert continuous chemical activity reducing the risk of bacterial infection. It renders wound cavities clean and promotes granulation tissue formation (Colman, 1962; Radden, 1962; Chevetton *et al.*, 1991). The known adverse effects of using BIPP dressings to pack wounds include allergic hypersensitivity reactions (Farrell, 1994), facial paralysis (Diamond and Frew, 1979; Jones, 1985), bismuth toxicity (Kruger *et al.*, 1976; Jones, 1990; Sharma *et al.*, 1994) and iodoform toxicity (Muir, 1903; Short, 1910; Bousfield, 1917; O'Connor *et al.*, 1977; Harry *et al.*, 1992).

BIPP-impregnated ribbon gauze is widely used in current day otorhinolaryngological practice for prolonged packing of cavities (Chevetton *et al.*, 1991). In our department, BIPP-impregnated half inch ribbon gauze is routinely used as packing for the external ear canal following myringoplasty, mastoid surgery and tympanoplasty. In patients with history of allergic or adverse reactions to iodine or BIPP,

alternative forms of dressing are used. This study was carried out to ascertain the incidence of allergic reaction to BIPP and whether previous exposure increases the risk of developing allergic reactions to BIPP.

Materials and methods

The case notes of 185 patients who had BIPP-impregnated ribbon gauze packing to their ears after myringoplasty, mastoid surgery or tympanoplasty between February 1991 and September 1994 were analysed retrospectively. All the patients had their operated ears packed with BIPP impregnated ribbon gauze for three weeks after surgery and any previous episodes of exposure to BIPP were noted. This included any previous BIPP impregnated dressings used for nasal packing. All patients were reviewed by medical staff prior to discharge from hospital and were given instructions to contact the department promptly if they experienced increased discomfort, swelling, itching or redness of their packed ears. In these cases, the patients were reassessed by medical staff and the dressings were promptly removed. All visible BIPP in the ear was then removed by gentle suction.

Allergic reaction was defined as the development of unprecedented erythema, oedema and increased warmth of local tissues in the ear canal packed with BIPP-impregnated ribbon gauze within 72 hours of surgery and in the absence of signs of sepsis. These tissue reactions resolved rapidly following removal

TABLE I
THE ASSOCIATION BETWEEN PREVIOUS EXPOSURE TO BIPP AND ALLERGIC REACTIONS

No. of previous exposure to BIPP	No. of patients developing allergic reactions to BIPP (%)	No. of patients not allergic to BIPP (%)	Total no. of patients
Nil	2 (2)	96 (98)	98
One	7 (10.9)	57 (89.1)	64
Two or more	2 (8.7)	21 (91.3)	23
Overall	11 (5.9)	174 (94.1)	185

(Yates corrected Chi-square for 9/87 versus 2/98 = 4.29, $p < 0.05$. Relative risk = 5.07, 95 per cent confidence limits 1.13–22.83.)

of the BIPP pack and suction toilet of all visible BIPP particles. Patients who did not have BIPP packing to their ear canals following surgery and those with history of iodine or BIPP allergy were excluded from this study.

The integrity of the temporalis fascia grafted tympanic membrane were noted at outpatient follow-up after surgery.

Results

From the total of 185, 98 had no previous exposure to BIPP, 64 had one previous exposure to BIPP, 18 had two previous exposures to BIPP and five had more than three previous exposures to BIPP (see Table I).

A total of 11 (5.9 per cent) patients developed allergic reactions to BIPP-impregnated ribbon gauze packings. In the group of patients who had no previous exposure to BIPP, two (two per cent) patients developed allergic reactions on their first exposure to BIPP. In the group of patients who had one previous exposure to BIPP, seven (10.9 per cent) patients developed allergic reactions on their second exposure to BIPP. For those who had two or more previous exposures to BIPP, two (8.7 per cent) patients developed allergic reactions after their third and fourth exposures to BIPP respectively.

Following surgery, three (27.3 per cent) tympanic membrane graft perforations were noted post-operatively where BIPP allergic reactions had occurred compared to 34 (19.5 per cent) tympanic membrane graft perforations in the non-allergic cases. Table II shows the distribution of the incidence of graft perforations in relation to the presence or absence of allergic reactions to BIPP.

Discussions

In our study, the incidence of hypersensitive allergic reactions to BIPP was 5.9 per cent. Farrell

(1994) reported an incidence of three cases (0.4 per cent) from his series of 712 cases. The much higher incidence reported in this study may, however, reflect the larger proportion of patients (78) who had multiple exposures to BIPP. Our study suggests that previous non-allergic exposures to BIPP increases the risk of developing allergic reaction in subsequent exposure (Table I). The frequency of allergic reactions to BIPP was significantly higher in patients who had previous exposure. In comparing patients who had no previous exposure to BIPP with all patients who had one or more previous exposures to BIPP, the relative risk of developing allergic reactions to BIPP was five times greater for the latter group ($p < 0.05$). There is no previous published data on the association between multiple exposures to BIPP and the increased risk of developing of allergic reactions. There were no other adverse reactions to BIPP reported in our patients.

We were not able to draw any meaningful conclusions about the possibility of increased risk of tympanic membrane perforation following BIPP allergy reactions in our study because of the small numbers of allergic patients (11) identified.

In conclusion, our experience of using BIPP-impregnated ribbon gauze following otological surgery as a form of packing is safe with only a small chance of allergic reaction.

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TABLE II
THE ASSOCIATION BETWEEN BIPP ALLERGY REACTION AND TYMPANIC MEMBRANE GRAFT INTEGRITY POST-OPERATIVELY ($p > 0.2$ using Fisher's Exact test)

	Perforated tympanic membrane grafts	Intact tympanic membrane grafts	Total number
Allergic to BIPP	3 (27.3%)	8 (72.7%)	11
Non-allergic to BIPP	34 (19.5%)	140 (80.5%)	174
Total tumber	37	148	185

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