

METHYLMETHACRYLATE HYPERSENSITIVITY IN A PATIENT WITH CEMENTED ENDOPROSTHESIS

A Case Report

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A case of methylmethacrylate monomer hypersensitivity in a 76-year-old patient with a cemented endoprosthesis is reported. The accuracy of the method for preoperative testing of a patient's sensitivity is discussed.

Key words: allergic reaction; hip arthroplasty; methylmethacrylate

Accepted 13.xi.77

After reports of several cases of sudden death during endoprosthesis fixation with methylmethacrylate cement (MMC) (Kepes et al. 1972, Monteny et al. 1975) as well as various cases of loosening of the prosthesis or of skin eruptions due to an allergic reaction (Bouffieux 1959, Laugier & Foussereau 1966, Munro-Ashman & Miller 1976, Oleffe & Wilmet 1972), attention has been drawn to the possible hypersensitivity of these patients to the different components, i.e., metal and MMC, introduced into the organism during operation.

Benson et al. (1975), Elves et al. (1975), Evans et al. (1974) and Nater et al. (1976) reported a high incidence of hypersensitivity to nickel, cobalt and vanadium in patients with a hip prosthesis. In the present study patients with a hip arthroplasty were investigated for sensitivity to methylmethacrylate monomer (MMM) by patch tests and a case of hypersensitivity to MMM is reported.

CASE REPORT

A 76-year-old woman underwent a left hip replacement. During implantation of the endoprosthesis and the acrylic cement into the femoral shaft the blood pressure decreased characteristically. The postoperative course was uneventful. The patient's history revealed that she had undergone a Moore arthroplasty for transcervical fracture of the right hip 6 years previously. She wore a double dental prosthesis without trouble. Patch tests were performed 3 weeks postoperatively. The 5 per cent MMM patch test was negative, whereas the 20 and 40 per cent MMM patch tests were strongly positive. Biopsy of the last test was interpreted as an allergic response following the main lines of Achten & Oleffe (1966).

METHODS

One, two and five per cent MMM concentrations dispersed in olive oil or petrolatum (Foussereau & Benezra 1970, Fregert 1974, Malten & Zielhuis 1964, Nyquist 1958) as well as cement retained during operation and reduced to powder were

used. After the first results, 20 and 40 per cent MMM (in olive oil) tests were added to the test tray.

Forty-two patients were investigated (36 women and 6 men, average age: 68.9 years). All patients underwent a hip arthroplasty using MMC (type McKee-Farrar and Moore). The case histories revealed earlier hip arthroplasty in nine patients, dental prostheses in 31 and both hip and dental prostheses in seven.

The patch tests were performed on the arm as most patients were lying on their back. To prevent possible evaporation phenomena, the patches were covered with a MMC cup or an aluminium patch (Silverpatch Van Der Bend). The patch tests were applied for a period of 48 hours and read after 48 and 96 hours.

DISCUSSION

Hypersensitivity to methylmethacrylate has been reported to occur in dentists (Fisher 1954), patients with dental prostheses (Crissey 1965, Dechaume & Brunel 1948, Huriez et al. 1970, Jedrzejewski & Danilewicz-Stysiak 1970), manicurists (Canizares 1956, Fisher et al. 1957) and a laboratory technician (Moody 1941) but the exact incidence of methylmethacrylate skin sensibility in the general population remains unknown. Nyquist (1958) noted 90 per cent positive reactions in a student nurse population with a 5 per cent concentration dispersed in olive oil or paraffin. On the contrary, Nater et al. (1976) with the same concentration in acetone did not obtain a single positive reaction in patients with total hip replacement.

These authors agree upon the role of MMM as an allergen. After polymerization of the MMM, the polymer may be considered as inert provided the reaction of polymerization is complete and no monomer is left.

In patients with a cemented endoprosthesis sensitization to MMM seems to be very rare (Bouffieux 1959, Nater et al. 1976). A certain amount of MMM is pushed into the injured bone blood vessels when the prosthesis and the MMC are packed into the femoral shaft (Homsy 1969, Pahuja et al. 1974). This MMM may produce a sensitization reaction

as the elimination of the monomer via the respiratory system is reduced (Derks & D'Hollander 1977). The negative reactions with the polymer reduced in powder confirm previous works (Oettel 1963). Our study is also in accordance with Nater's results (1976) as no positive reaction was observed with a 5 per cent concentration of MMM.

In view of the conflicting results, further investigations of methylmethacrylate sensitivity are relevant. We believe a 20 per cent concentration of MMM is more adequate than a 5 per cent concentration. Chloroform is used as a solvent. As a 40 per cent concentration is usually employed to test chloroform allergy (Fisher 1975) the latter is not involved in the reaction.

ACKNOWLEDGEMENTS

This study was performed in the Orthopaedic Department of the Brugmann University Hospital (Prof. de Marneffe), Brussels.

The authors would like to thank D. Roosels Sc. Dr., Chemical Advisor, Laboratory Head, Occupational Diseases Fund, Brussels, for his assistance in this study.

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