

CASE REPORT

Hand atrophy in a leprosy patient – treatment with polymethylmethacrylate

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Accepted for publication 23 June 2010

Summary Leprosy, an infectious disease caused by *Mycobacterium leprae*, affects mostly the skin and peripheral nerves. The polymethylmethacrylate has been used as bone cement, knee and intraocular implants as a bioexpansor, filling the area where it is applied. We describe the case of a Brazilian male with tuberculoid leprosy who developed muscular wasting between the metacarpals of both hands. Ten years after leprosy treatment, he was submitted to five applications of 10% polymethylmethacrylate. The treatment was successful, improving the appearance of his hands leading to a positive impact on the patient's life.

Introduction

Atrophy of the metacarpals muscles of the hand is a common finding in patients who have acquired paralysis of the median and ulnar nerves as a result of leprosy infection.^{1,2} This deformity is unsightly and contributes to the strong stigma still associated with the disease, particularly in countries where the disease is still endemic. According to the World Health Organization (WHO), Brazil is among the most endemic countries for leprosy in the world, with 34 296 new cases of the disease in 2008.³

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We report a Brazilian patient with atrophy of the metacarpal muscles of both hands caused by tuberculoid leprosy in which the deformity was successfully treated with polymethylmethacrylate (PMMA) injection.

Case Report

A 51 year-old Brazilian man was diagnosed with tuberculoid leprosy in 1976. He was given anti-leprosy monotherapy with dapson. In 2000, he presented with bilateral ulnar median paralysis, claw hands, muscular wasting between the metacarpals of both hands (Figure 1) and dry skin on his lower limbs.

According to the WHO disability grading system, the deformity of the hands was grade 2; no previous treatment was recorded. He had diabetes Type II, which was controlled with metformin. Five years later, the patient was submitted to five applications of PMMA 10%, in each hand, with a 5 to 6-month interval between each procedure. Each procedure was performed using alcohol 70% for skin asepsis and lidocaine 4% for local anesthesia. Treatment consisted of parallel and net-crossed retro-injections of PMMA in the subcutaneous area of PMMA. Due to the high viscosity of PMMA, a local massage aiming to model the substance was applied to the site followed by cold compress for 15 minutes every 2 hours at the day of the procedure and three times along the next day. Additional recommendations given to the patient were: cold compress for the next 3 to 5 days if oedema persists; analgesics in the case of local pain and avoidance of alcohol consumption, physical



Figure 1. Before PMMA injection. Claw hands, muscular wasting between the metacarpals of both hands.

activities and sun exposure for 10 days. After the five injections, the patient was evaluated by a physiotherapist. The treatment was successful, improving the appearance of the hands and allowing for a disability downgrading to 1 since the impairment of sensitivity was still present. Cosmetic improvement persisted after a 4-year follow-up, the fullness of the deformity is still good (Figure 2).

During and after the procedure, the patient was evaluated by a physiotherapist, and the movements of his hands were maintained.

Discussion

A variety of materials have been used for reconstructing muscular wasting due to leprosy, ranging from autogenous dermal grafts and adiposubcutaneous flaps to inorganic, rubber implants.^{2,4-7} In 1981, Harahap inserted a skin graft taken from the lateral aspect of the buttock in a surgically created pocket in the wasted area. The operation was successful and the patient was considered cured.⁵ Carvable silicone rubber prosthetic implant was also used to correct the deformity of 13 patients with leprosy. The prosthesis was carved out of an estimated soft-silicone block and inserted into a dissected pocket. Local anesthesia was used. There was one complication due to an implant that was too large. According to the authors, the procedure was simple, safe, cheap, and lead to a satisfactory cosmetic outcome.⁶

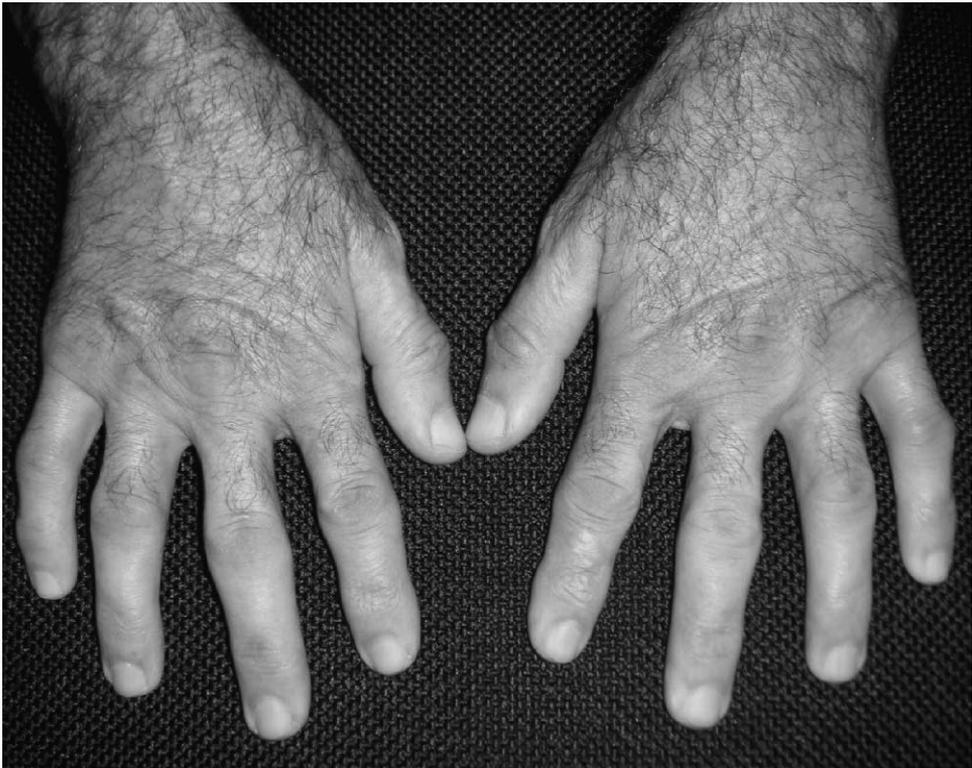


Figure 2. After 5 PMMA injections. Result after a 4-year follow-up.

Another attempt to correct leprosy-related deformity was published by the Japanese Leprosy Mission for Asia (JALMA) that successfully used an autogenous adiposubcutaneous flap as a filler material. The flap was taken from the radial border of the lower forearm and transposed in the depression after making a tunnel. The 6-month follow-up was considered to be good with fullness of the defect and no restriction of the tendon gliding.²

Polymethylmethacrylate (PMMA) is an injectable filler implant indicated for permanent correction of cosmetic defects such as deep facial wrinkles – particularly where the skin is thick – soft tissue defects and depressed scars.^{8–10} The product was first synthesised in 1902, and has been also used as bone cement, as a bioexpansor of knee and intraocular implants as a bioexpansor, filling the area where it is applied. PMMA is composed by microspheres in a non-protein vehicle, which produces permanent results. After application in the dermis, PMMA stimulates fibroblast proliferation and production of collagen and elastin.⁸

In Brazil, smooth PMMA microspheres have been successfully used for many years to treat lipodystrophy in AIDS patients.¹¹ In this group of patients, lipodystrophy is usually caused by the protease inhibitors and nucleoside reverse transcriptase inhibitor used in the highly active anti-retroviral therapy (HAART).¹² This unaesthetic condition poses an additional challenge to HIV-treatment, affecting self-esteem of the patient and treatment adherence. Similarly in leprosy, lipodystrophy affects psychological status and quality of life of the patients. According to the Brazilian Ministry of Health guidelines for treatment of lipodystrophy in AIDS patients, PMMA injection should not be performed in patients under chemotherapy or treatment with anti-clotting, steroids, interferon and/or immunomodulatory agents up to 30 days prior to the procedure. The presence of viral, bacterial, neoplastic and/or rheumatological disease, platelets count below 75 000/ml, pregnancy, T-CD4 + lymphocyte count below 200 cells and HIV viral load higher than 5000 also contra-indicate the procedure. Local erythema, haematoma, pain and oedema may be observed shortly after the procedure. Although foreign body granuloma formation and the appearance papules and nodules due to hypercorrection have been reported, injection of PMMA is still considered a safe and minimally invasive procedure.¹³

After observing the physical and psychological benefits patients with AIDS experienced from PMMA injection, we injected for the first time, PMMA in a patient with muscular wasting between the metacarpals of both hands caused by leprosy. The literature review of this type of correction showed that PMMA had not yet been used for this purpose. Injection of PMMA is a medical procedure that requires a previous basic knowledge of dermatological surgery and a short period of training. PMMA is a low-cost filler when compared to the available prosthetic implants. Importantly, the procedure may be regarded as a mean to minimise the physical and psychological burden faced by patients with leprosy-induced muscular atrophy of the hand.

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