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Gold wedding bands: Attenuation of Heberden's nodal expression in osteoarthritis

Mark Rabinovitch, Elliot Kravitz

CASE REPORT

At a routine annual checkup, an otherwise healthy 71-year-old man was noted to have painless nodal osteoarthritis with large Heberden's nodes at the distal interphalangeal joint (DIP) of each of his fingers except for the left fourth finger. He had worn a 14-Karat gold wedding band on that finger for the previous 38 years. To document this finding radiographically, plain X-rays of the hands were acquired. The catcher's view and posterior to anterior (PA) film showed prominent osteophytes at the DIP joints of nine fingers with only limited sclerosis of the left 4th DIP joint (Figures 1 and 2).

Figure 1: A catcher's view X-ray of the patient's hands. Note the prominent disc space narrowing and osteophyte formation in all DIP joints except for the left ring finger DIP joint (see arrow).

DISCUSSION

Systemic gold therapy has been used in the treatment of rheumatoid arthritis [1]. It is now understood that gold inhibits the production of proinflammatory cytokines [2] and reduces oxidative stress [3]. Systemic toxicity now limits its use [1]. Three prior publications had documented the apparent protective effect of a gold ring in erosive arthritis [4–6]. In the first case report by Bolosiu and Parasca [4], a 54-year-old female with Sjogren's syndrome and rheumatoid arthritis of 25 years duration showed sparing from erosive changes in the proximal interphalangeal (PIP) joint of the left ring finger. Bolosiu [7] later hypothesized that the sparing of the PIP joint in their patient was not from the gold in the ring but was from a mechanical effect of the ring. In the

Figure 2: A PA view X-ray of the patient's left hand. Note the sparing of the left ring finger DIP joint (see arrow).

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second report by Mulherin et al. [5], 30 gold ring wearers with rheumatoid arthritis had less articular erosion at their adjacent metacarpal-phalangeal (MCP) joint than 25 non-ring wearers with rheumatoid arthritis at their MCP joint. The authors hypothesized that gold could pass from the ring through the skin and local lymphatics downstream to the local MCP joint to delay articular erosion. In the third case report by Hlaing et al. [6], a 49-year-old female with psoriatic arthritis was found to have joint space narrowing and extensive synovitis with articular erosions at the PIP joints of all the fingers sparing the left ring finger PIP joint. The patient had worn a gold wedding ring on the left ring finger for the previous 26 years. They proposed 5 separate mechanisms for the joint protection: (1) absorption of gold via skin, (2) mechanical factor, (3) constriction leading to a reduction in local tissue perfusion and/or differential drop in the finger temperature, (4) neural factors akin to stroke patients who develop less severe arthritic changes on the paralysed side, and (5) magnetic effect.

Our report is the first to demonstrate the possible protective effect of a gold ring on the DIP joint of a patient with nodal osteoarthritis. In our opinion, it is unlikely that the gold ring is sparing the DIP joint by some mechanical effect. The patient has rarely if ever removed the ring from its baseline position. Furthermore, the presence of a normal brachial to finger index at the left distal ring finger (0.95) rules out ischemic possibilities. We initially hypothesized that gold nanoparticles had infiltrated the skin to reach the DIP joint [8] and exerted anti-inflammatory and antioxidant effects in that joint [9, 10]. However, bulk gold has not yet been proven as a therapeutic transmitter of gold nanoparticles (personal oral communication with Professor Ofra Benny, The Center of Nanoscience and Nanotechnology of The Hebrew University of Jerusalem, Israel, 2022). We are therefore curious as to the potential mechanisms which may contribute to this case's observation of the association of gold bands and Heberden's nodal attenuation.

Prior studies do support the role of inflammation in the pathogenesis of osteoarthritis including nodal osteoarthritis of the hand [9, 10]. Injection of gold microparticles directly into osteoarthritic knee joints may provide pain relief and improved joint function [11]. The use of gold-based autologous conditioned serum injection into affected joints is now being explored as a treatment in osteoarthritis [12]. Drug delivery systems of anti-inflammatory medications for osteoarthritis have been growing in recent years [13, 14]. In vitro studies provide a strong scientific basis for intracutaneous delivery of plasmonic gold nanoparticles to treat inflammatory skin conditions [3]. On this basis, we believe that a subcutaneous delivery system of gold nanoparticles may play a role in the treatment of osteoarthritic joints. The potential cytotoxicity of gold nanoparticles is currently a matter of controversy that also requires further study [15].

CONCLUSION

Our case is the first that highlights the attenuating effect of wearing a gold ring on the expression of nodal osteoarthritis at the DIP joint. Our research of plausible explanations for this phenomenon did not generate a definite mechanism. However, the same research has led us to believe that a subcutaneous gold nanoparticle delivery system should be explored as a treatment of osteoarthritic joints.

Keywords: Gold ring, Heberden's node, Osteoarthritis

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Mark Rabinovitch – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Elliot Kravitz – Conception of the work, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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