

[CASE REPORT]

The Development of Yellow Nail Syndrome after the Implantation of a Permanent Cardiac Pacemaker

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Abstract:

Yellow nail syndrome (YNS) is characterized by yellowish nails, lymphedema, sinusitis, and pulmonary involvement and can be triggered by various underlying conditions, such as sinusitis or titanium exposure from an artificial joint or dental implant. Since YNS is potentially treatable, its timely diagnosis is important. The authors recently experienced a case of YNS in a patient who developed sinusitis, yellowish nails, bilateral edema of the extremities, and subclinical rheumatoid arthritis after the implantation of a cardiac pacemaker made from titanium. This case may be the first report of YNS induced by a titanium cardiac pacemaker.

Key words: yellow nail syndrome, titanium exposure, sinusitis, rheumatoid arthritis

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Case Report

A 65-year-old Japanese man developed edema of the face, bilateral hands and forearms, stiffness of the fingers of both hands, an abnormal sensation that affected the whole body, and generalized rash, in the month after the implantation of a cardiac pacemaker for complete atrioventricular block. The implanted pacing system was composed of a Medtronic Advisa MRI™ and CapSureFix MRI™ (Medtronic, Minneapolis, USA) leads; the body of the pacemaker was made from titanium, while the tip of the lead was coated in titanium. The patient's medical history included hypertension and right carotid artery stenosis with asymptomatic right cerebral stroke. After undergoing carotid endarterectomy, the patient developed atrioventricular block and a permanent cardiac pacemaker was implanted. After right carotid endarterectomy, the stent was not placed.

When the patient was diagnosed with stroke, he started to take the following medications: low-dose aspirin, clopidogrel, candesartan, pitavastatin, amlodipine, lansoprazole, and eicosapentaenoic acid. On examination, the patient was alert, hemodynamically stable and afebrile. The abnormal physical findings included yellow-colored fingernails (Fig. 1) and (all) toenails, fine crackles at the lung bases, and swelling of the forearms and hands; the extent of the swelling on the

left side was greater than that on the right side (Fig. 2).

Blood tests showed normal leukocyte count and C-reactive protein level and were negative for antinuclear antibodies, rheumatoid factor, and anti-cyclic citrullinated peptide (CCP) antibodies. The erythrocyte sedimentation rate was 32 mm/h. Spirometry showed no evidence of obstructive or restrictive disease.

Whole-body contrast-enhanced CT showed no pulmonary lesions, pleural effusion or any findings suggestive of malignancy. Upper gastrointestinal endoscopy and colonoscopy showed no evidence of neoplasms. A hand radiograph indicated mild bone erosion of the hands, which was predominant at the metacarpophalangeal joints. Echography of the joints revealed the thickening of the synovial membranes around the carpal bones with increased blood flow, suggesting the presence of synovitis. Head MRI showed bilateral maxillary sinusitis.

Based on the yellow nails and diffuse edema as well as the symptoms and signs in relation to the patient's paranasal sinuses and joints, yellow nail syndrome (YNS) along with sinusitis and seronegative rheumatoid arthritis (RA) was considered. Furthermore, the titanium cardiac pacemaker was suspected as an additional predisposing factor for the development of YNS.

He was referred to an otorhinolaryngologist and clarithromycin was administered to treat his sinusitis. The patient's

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Figure 1. Yellow nails. All the fingernails are involved.



Figure 2. Bilateral swelling of fingers with predominance for the left hand.

edema and abnormal sensation gradually improved with the treatment for sinusitis, but his yellow nails remained unchanged. He is currently under close observation to identify a worsening of the symptoms and signs of YNS and subclinical seronegative RA.

Discussion

This might be the first case involving a patient who developed YNS after the implantation of a titanium cardiac pacemaker. Several cases of YNS are reported to have developed after titanium exposure in patients with bioprosthetic implants such as artificial joints (1). Additional case reports and studies are needed to confirm the possible association between titanium cardiac pacemaker implantation and the development of YNS.

A case of a possible relationship between sinusitis (2) or RA (3) and the development of YNS was previously suggested, and the treatment of sinusitis or RA was proposed to reverse the symptoms of YNS (4). In our case, bilateral maxillary sinusitis was observed before the implantation of the pacemaker. However, the implantation of the pacemaker, which exposed the patient to titanium, could have triggered YNS along with the patient's predisposing conditions of si-

nusitis and seronegative RA. Another possible etiology is paraneoplastic syndrome (5, 6); however, our thorough examination revealed no evidence of malignancy. The prognosis of YNS patients is poorer in comparison to the general population in terms of life expectancy. In a previous study in which a survival analysis was conducted, the survival time of patients with YNS was shown to be significantly inferior to that of the general population. The estimated median survival of YNS patients after the onset of symptoms was approximately 132 months (4). No previous studies have analyzed the QOL of patients with YNS; however, several case series have shown that YNS patients develop diverse symptoms, such as sinusitis, bronchiectasis, chronic cough, pleural effusion or edema in addition to yellow nails. In particular, patients with pleural effusion may need to undergo invasive procedures (such as thoracentesis or thoracotomy) for the diagnosis or treatment of YNS. These procedures may impair QOL of YNS patients (4). Thus, these symptoms and the adverse effects related to YNS and its treatment may impair the QOL of YNS patients. The pathophysiology of the nail discoloration remains unclear, but a previous report suggested that the lipofuscin, which may be deposited in the tissues of the nail plate, might be a culprit substance (7). Half of the patients with YNS show spontaneous remission, with vitamin E or glucocorticoid therapy having been reported as effective treatment options (4). We therefore employed a wait-and-see strategy for our patient to observe whether he showed the development of symptomatic seronegative RA. In the event that symptomatic seronegative RA developed, an appropriate treatment for RA would be initiated.

The authors state that they have no Conflict of Interest (COI).

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