resulting in new-onset autoimmune polyarthritis-like RA. A 77-year-old nonsmoking woman manifested bilateral arthritis of wrists, fingers, and toes in late June 2021. She was diagnosed with slowly progressive insulin-dependent diabetes mellitus and Hashimoto thyroiditis in 2015. In May 2021, she developed fatigue, and the SARS-CoV-2 polymerase chain reaction test using a nasopharyngeal specimen was positive. Fortunately, her SARS-CoV-2 infection resulted in only fatigue without any febrile and respiratory symptoms. Then, she received the first BNT162b2 vaccination per her wishes in early June; subsequently, she developed peripheral polyarthritis. Laboratory findings showed an elevated level of C-reactive protein (3.2 mg/L, reference: <1.4 mg/L) and matrix metalloprotease-3 (MMP-3), and positivity of rheumatoid factor (RF) and anticitrullinated protein antibody (ACPA) (22.7 U/mL). Ultrasound and magnetic resonance imaging showed synovitis in the fingers and wrists. We considered the mRNA vaccination-induced transient autoimmune phenomenon and provided supportive care using analgesics. However, she wished to finish the second BNT162b2 vaccination in July, resulting in symptomatic worsening with elevated levels of C-reactive protein (12.8 mg/L), RF, MMP-3, and ACPA titer (39.1 U/mL). We diagnosed the patient with BNT162b2-induced new-onset autoimmune arthritis-like RA and administered methotrexate. A month later, her arthritis was dramatically ameliorated with decreased inflammation. However, the RF and ACPA titers maintained high levels with active synovitis (Figure).

We believe that this patient with autoimmune background newly developed RA-like autoimmune arthritis, which was perhaps mRNA vaccination-induced interferonopathy. Autoimmune diseases including T1DM and RA share several common genetic variants deciding disease risk and autoimmune mechanisms. Similar molecular signatures at the target tissues in T1DM and RA are confluent with type I interferon signaling. It is biologically plausible that SARS-CoV-2 mRNA vaccination developed new-onset RA-like arthritis. This case reiterates the importance of interferon signaling for developing autoimmune diseases in predisposed individuals.

Available mRNA vaccines are reported to rarely, but rationally induce autoimmune flare-up. The reported percentage of flare-up ranges from 3% to 14%, but this might be overestimated because the definition of flare-up includes fever and musculoskeletal symptoms similar to adverse effects of vaccination, and the flare-up decision depends on patient self-reports. However, cases of mRNA vaccination-induced autoimmunity do exist. Nonetheless, there is established treatment for many autoimmune diseases. Therefore, we advocate that vaccination outweighs possible risks for autoimmune developments to end the unjustifiable threat by coronavirus disease 2019.

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Introducing Artificial Intelligence into the Preventive Medicine Visit

To the Editor: The artificial intelligence—enhanced electrocardiogram (AI-ECG) has been validated for
the identification of multiple cardiac pathologies.\(^1\)\(^-\)\(^3\) We developed an AI-ECG algorithm that closely predicts chronologic age and demonstrated that the difference between AI-ECG age and chronologic age, or delta age (the first minus the latter), predicts long-term survival. Furthermore, AI-ECG age has been associated with cardiovascular diseases and risk factors such as hypertension and dyslipidemia.\(^4\)\(^,\)\(^5\) As this AI tool reflects potentially valuable information about overall fitness and cardiovascular health, we discuss an exemplary case where the AI-ECG showed a change towards youth following risk factor modification.

A 36-year-old woman presented to an outpatient appointment in June 2021. She had no significant cardiac history. She weighed 106 kg at that visit (body mass index [BMI]: 39.2 kg/m\(^2\)); 6 months prior, she had altered her diet and exercise regimen in attempt to lose weight and improve fitness. An ECG was obtained (Figure 1A) showing sinus bradycardia. At a follow-up visit 7 months later in January 2022, the patient reported 40 pounds of intentional weight loss in the past year. Her weight was now 96.4 kg (BMI: 36.15 kg/m\(^2\)). An ECG showed normal sinus rhythm with no significant change compared with her prior ECG (Figure 1B). Interestingly, the patient’s AI-ECG predicted age had significantly dropped over the past 6 months (Figure 1C). Her June 2021 AI-ECG age was 40.76 years (actual age: 35.44 years), and her January 2022 AI-ECG age was 36.45 years (actual age: 36.05 years). These results were shared with the

![Figure A](image1.png)

**A**

![Figure B](image2.png)

**B**

![Figure C](image3.png)

**C**

**FIGURE.** A,B, Electrocardiograms (ECGs) obtained in (A) June 2021 and (B) January 2022. C, AI-ECG physiologic age (y-axis) vs the patient’s chronologic age (x-axis). The two collected ECGs from (A) June 2021 and (B) January 2022 are represented by the labeled red circles and correlate with the ECGs in the Figure with the same letter. Exact artificial intelligence (AI)—ECG predicted age for the respective ECGs is given in parenthesis below each red circle. The patient’s chronologic aging over time is represented by the red dotted line.
patient study both as an encouragement and reinforcement that her healthy lifestyle changes resulted in measurable physiologic improvement.

Algorithms using AI-ECG have been validated as promising screening tools for specific cardiac pathologies,1,2 and the clinical application of AI continues to evolve as this area of research grows exponentially. It can be expected that AI tools will become a routine part of patient care. Here we offer an example of how AI-ECG results may be introduced in the physician-patient encounter both as a quantifiable marker of physical well-being and as a reinforcement of positive lifestyle changes.

Previously, we found that patients with an AI-ECG age greater than chronologic age (a positive age gap) more frequently had pre-existing comorbidities including hypertension, coronary disease, and low ejection fraction with greater exposure to cardiovascular risk factors.4,5 Patients with an AI-ECG predicted below their chronologic age had significantly less comorbidities than their “older” AI-ECG counterparts.4 In the present case, a young woman with obesity but no other cardiovascular comorbidities exhibited a decreasing AI-ECG age over 6-months’ time correlating with improved physical fitness and weight loss stemming from alterations in diet and exercise. The AI-ECG results were discussed with the patient to demonstrate that her lifestyle changes had a measurable, physiologic impact recorded by her heart, beyond simple weight change identified by a scale. Although significant physiologic changes may be represented by variation in AI-ECG age, further prospective study is needed to validate that “fitness” interventions result in a reduction of physiologic age.3,5

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Impending Arteriovenous Fistula Bleeding With Skin Ulceration

To the Editor: Arteriovenous fistulas are a common form of autogenous access in patients requiring renal replacement therapy.1-3 Aneurysmal degeneration of segments of the outflow vein and outflow stenosis are frequently identified.4 Albeit rare, arteriovenous fistulas bleeding can be a devastating and fatal dialysis access complication. Skin thinning and ulceration are signs of increased risk for bleeding or impending rupture.5 Immediate investigation of the fistula for any concerning signs of bleeding is imperative and any issues should prompt swift referral. Herein we present a case of impending fistula rupture.

The patient is a man in his mid-60s with a history of end-stage renal disease on hemodialysis secondary to hypertensive glomerulosclerosis. Access for hemodialysis was performed through a right brachiocephalic fistula created nearly 12 years before presentation. The patient had previous history of central outflow vein stenosis, with placement of a cephalic vein stent and several previous balloon venoplasty procedures. At the time of presentation, the patient was having no issues with hemodialysis. During dialysis session, the patient had small volume bleeding from