



# EOSINOPHILIC GASTROENTERITIS FOLLOWING COVID-19 MRNA VACCINATION

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Received: 20/01/2024 Accepted: 05/02/2024 Published: 12/02/2024

**Conflicts of Interests:** The Authors declare that there are no competing interests.

**Patient Consent:** Written informed consent was obtained from the patient after full explanation by the corresponding author.

**Acknowledgements:** We would like to thank Editage (www.editage.jp) for English language editing.

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**How to cite this article:** Yoshino Y, Tsuboi K. Eosinophilic gastroenteritis following COVID-19 mRNA vaccination. *EJCRIM* 2024;11:doi:10.12890/2024\_004316.

## ABSTRACT

**Introduction:** Large-scale clinical studies for COVID-19 vaccines have shown the infection-preventing effect and short-term adverse effects. Some rare illnesses such as eosinophilia can develop following COVID-19 vaccinations.

**Case description:** We report a case of 65-year-old man with unexplained abdominal pain that developed 2 weeks after COVID-19 mRNA vaccination. The patient had received a second dose of COVID-19 mRNA vaccine and revealed eosinophilia at the first visit to our hospital. Eosinophil infiltration was observed in the lamina propria of the duodenum by a step biopsy. Montelukast 10 mg was administered as the initial treatment of eosinophilic gastroenteritis (EGE), and the abdominal pain was improved.

**Discussion:** The strong influence of COVID-19 vaccination on the development of EGE remains unproven. Reports of eosinophilia following COVID-19 vaccination have discussed that COVID-19 mRNA vaccination triggered an eosinophilic response.

**Conclusion:** This case presented EGE that developed following COVID-19 mRNA vaccination, which would be a rare adverse event.

## KEYWORDS

Eosinophilic gastroenteritis, SARS-CoV-2, vaccines, COVID-19

## LEARNING POINTS

- Eosinophilia can develop following COVID-19 mRNA vaccination.
- To evaluate the relationships of these illnesses with vaccination, clinicians should collect information on vaccinations history and vaccination dates through interviews.
- It is clinically practical to know the differential diseases that may develop after a new vaccination.

## INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) caused the global pandemic, which has resulted

in millions of deaths. Vaccines have been developed to combat SARS-CoV-2 infections, and large-scale clinical studies have shown the infection-preventing effect and



short-term adverse effects of COVID-19 vaccination<sup>[1]</sup>. Meanwhile, some rare illnesses can develop after COVID-19 vaccinations<sup>[2]</sup>. To evaluate the association of these illnesses with vaccination, information on vaccinations history and vaccination dates should be collected through interviews. Moreover, it is clinically practical to know the differential diseases that may develop after a new vaccination. Here, we report a case of eosinophilic gastroenteritis (EGE) following COVID-19 mRNA vaccination.

### CASE DESCRIPTION

A 65-year-old man with a history of bronchial asthma presented to our hospital with postprandial abdominal pain and poor appetite lasting 2 months. The patient had received a second dose of COVID-19 mRNA-1273 vaccine 2 weeks before the onset of abdominal pain, which had started gradually, approximately 2 hours after eating and lasted for 3 hours before the pain spontaneously disappeared. This pain recurred after every meal and was particularly intense in the upper abdomen. The patient became insomniac because the pain persisted after dinner every night, and he lost appetite owing to the anxiety of pain. Although endoscopy and computed tomography by a local gastroenterologist revealed no abnormalities, blood test findings revealed eosinophilia at the first visit to our hospital, with aspartate aminotransferase 33 U/l, alanine aminotransferase 61 U/l,

C-reactive protein 0.11 mg/dl and a white blood cell count of 6900/mm<sup>3</sup>, with an eosinophil count of 1042/mm<sup>3</sup>. Although another oesophagogastroduodenoscopy was performed, no significant abnormalities were observed (Fig.1A, B, C). To investigate the cause of eosinophilia, a step biopsy was performed in each region of the upper gastrointestinal tract. Eosinophil infiltration was observed in the lamina propria of the duodenum, and a maximum eosinophil count of 80 was confirmed under a high-power magnification of 400× (Fig. 1D). Montelukast 10 mg was administered as the initial treatment of EGE, and the abdominal pain completely disappeared on day 10. Parasitic diseases were ruled out as faecal egg test results were negative. The absence of other systemic diseases led to the diagnosis of EGE. At 2 years after the treatment initiation, abdominal pain had not recurred.

### DISCUSSION

COVID-19 vaccines have become widely known to cause short-term adverse effects, such as fever, headache, malaise and pain at the inoculation site<sup>[1]</sup>. However, the long-term side effects remain unclear. Recently, emerging research has indicated that COVID-19 vaccines might be related to the development of rheumatoid immune-mediated inflammatory diseases (R-IMID) such as ANCA-associated vasculitis<sup>[2]</sup>. Just as the relationship between R-IMID and COVID-19 vaccination, the strong influence of COVID-19

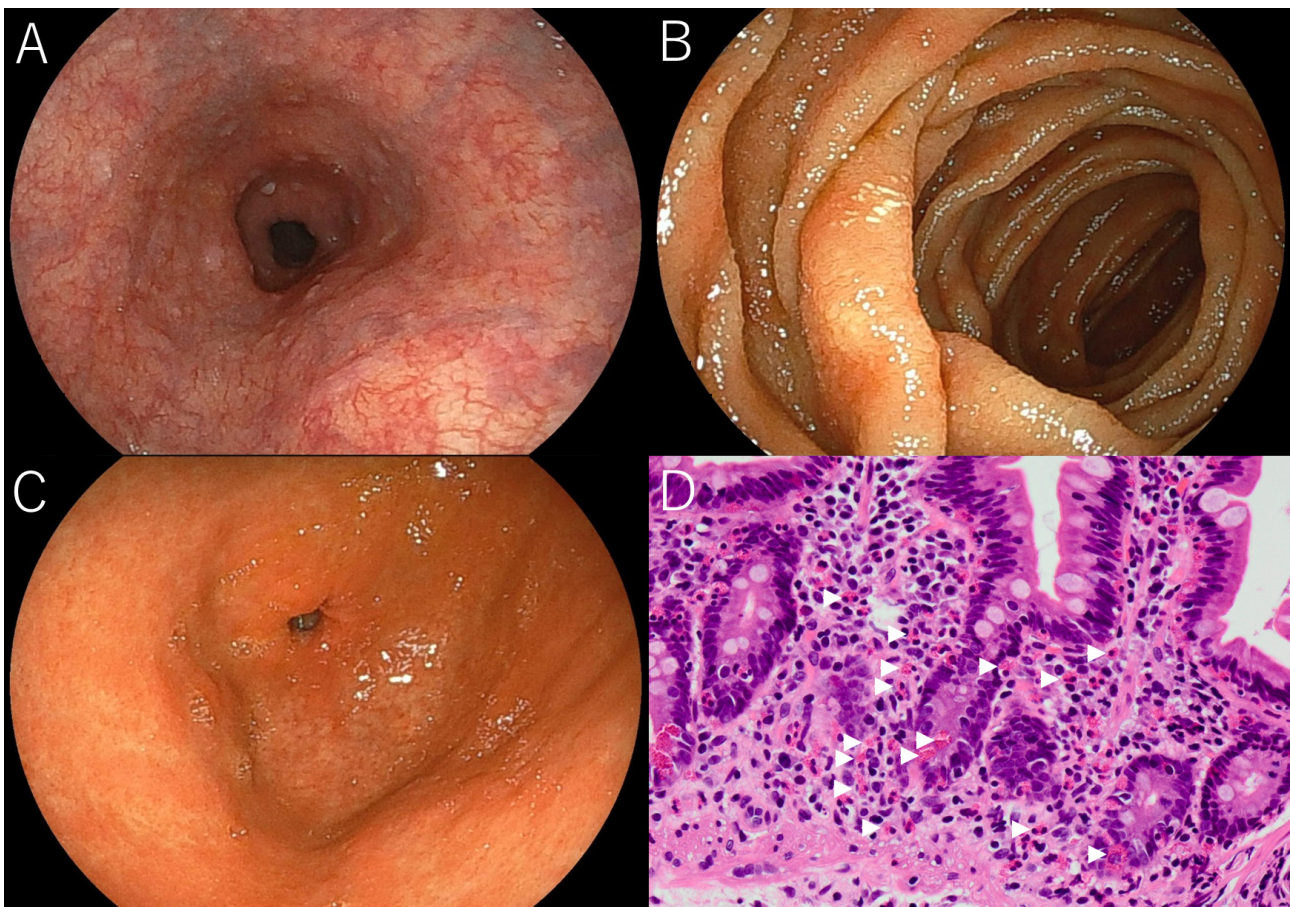


Figure 1. Pictures of oesophagogastroduodenoscopy revealed no abnormalities (A, B, C). The step biopsy was performed from each upper gastrointestinal region to collect pathological samples. Eosinophilic infiltration was found in the duodenum (D), with up to 80 eosinophils observed per high-power field (400×, arrows).

vaccination on the development of EGE remains unproven. To assess the adverse drug reaction (ADR) between EGE and COVID-19 mRNA vaccination, the Naranjo score<sup>[3]</sup> was calculated according to the ADR probability scale. The probability of ADR was estimated as a 'probable' reaction. Additionally, several cases of eosinophilia that developed following COVID-19 mRNA vaccination have been reported, such as non-episodic angioedema with eosinophilia<sup>[4]</sup>. A case of EGE following COVID-19 mRNA vaccination has been reported from Korea, similar to the present case<sup>[5]</sup>. These reports have discussed that COVID-19 mRNA vaccination triggered an eosinophilic response. A systematic review<sup>[6]</sup> found that the mean duration from COVID-19 vaccination to the onset of R-IMID was 10.6 days, suggesting a temporal association between R-IMID and COVID-19 vaccination owing to the short time to onset. Reports of eosinophilia following COVID-19 mRNA vaccination<sup>[4,5]</sup>, including the present case, also showed a similar time span to onset as that of R-IMID. As COVID-19 vaccines have been administered to a large number of people worldwide, it is necessary to investigate lesser-known adverse events and develop immunological studies on post-vaccination biological reactions. In addition, EGE should be suspected in patients with unexplained abdominal pain when they have eosinophilia and a history of allergy or allergic disease. Even if there is no obvious endoscopic abnormality, a biopsy can be performed to confirm the presence of an eosinophilic infiltrate.

## CONCLUSION

This case presented EGE that developed following COVID-19 mRNA vaccination, which would be a rare adverse event. EGE should be suspected in patients with unexplained abdominal pain when they have eosinophilia and a history of allergy or allergic disease. Furthermore, a history of COVID-19 vaccination may be useful in the diagnosis of EGE.

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