



**Thi Loi Dao<sup>1,2</sup>, Trung Kien Nguyen<sup>1,2</sup>,  
 Xuan Bai Nguyen<sup>1,2</sup>, Kieu Dung Le<sup>1</sup>,  
 Khanh Linh Duong<sup>1</sup>,  
 Duc Manh Bui<sup>1</sup>,  
 Cam Anh Nguyen Le<sup>1</sup>,  
 Van Thuan Hoang<sup>1,2</sup>**

<sup>1</sup>Thai Binh University of Medicine and Pharmacy,  
 Thai Binh; <sup>2</sup>Thai Binh Medical University Hospital,  
 Thai Binh, Vietnam

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Corresponding author: Van Thuan Hoang, MD,  
 PhD  
 Thai Binh University of Medicine and Pharmacy,  
 373 Ly Bon, Thai Binh City 410000, Vietnam  
 Tel: +84-2273838545, Fax: +84-2273847509  
 E-mail: [thuanhb36c@gmail.com](mailto:thuanhb36c@gmail.com); [thuanhv@tbump.edu.vn](mailto:thuanhv@tbump.edu.vn)

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# Urinary incontinence after COVID-19 vaccination: a case study in an 8-year-old boy

There have been many studies on the adverse effects of coronavirus disease 2019 (COVID-19) vaccines but the urinary incontinence after COVID-19 vaccination is rare. Here, we report an 8-year-old boy presented to outpatient department, Thai Binh University of Medicine Hospital, Thai Binh, Vietnam with complaints of urinary incontinence for the past 2 weeks, following the first dose of the messenger RNA vaccine. He had no other abnormalities in clinical and laboratory exams. This clinical situation suggested vaccine side effects. No specific treatment was administered upon diagnosis without toilet and bladder training. Subsequent monitoring revealed a gradual reduction in symptoms over 2 months, with complete recovery achieved at the 14th week from the onset of symptoms, without necessitating any medical intervention. This case highlights the need for thorough evaluation and assessment of potential adverse effects following vaccination, including uncommon presentations.

**Keywords:** Vaccine, COVID-19, Adverse effects, Urinary incontinence, Case reports

## Introduction

The coronavirus disease 2019 (COVID-19) pandemic has caused widespread health, economic, and social impacts [1]. Several vaccines have been rapidly developed and authorized for emergency use in response to the rapid spread of the coronavirus (severe acute respiratory syndrome coronavirus 2) [2]. The vaccine has undergone an expedited review process and has been licensed for widespread use to control the pandemic. The assessment of side effects followed appropriate protocols, but at the population level, especially in children, was not as extensive as with previous vaccines. This can be explained by the newer form of the vaccine and its urgent use at that time [3,4]. There have been many studies on the adverse effects of COVID-19 vaccines [5]; however, detailed assessments of reports at the population level in the pediatric age group are limited.

In this report, we present a rare case of urinary incontinence after COVID-19 vaccination among an 8-year-old boy. Urinary incontinence, characterized by the involuntary leakage of urine, is a complex condition with diverse etiologies and varying presentations across different age groups [1]. While primarily associated with aging and certain medical conditions, recent reports have raised concerns about the potential occurrence of urinary incontinence following COVID-19 infection [6-8] and COVID-19 vaccination [9]. This phenomenon highlights the importance of vigilance regarding

potential adverse events associated with COVID-19 vaccination.

The urinary incontinence post-vaccination poses challenges for healthcare providers in both diagnosis and management. Understanding the underlying mechanisms and potential risk factors associated with this phenomenon is crucial for ensuring the safety and efficacy of vaccination programs, especially considering the widespread administration of COVID-19 vaccines to pediatric populations.

In this context, it is imperative to explore the existing literature and clinical evidence to elucidate the possible mechanisms underlying urinary incontinence following COVID-19 vaccination and to guide clinical decision-making and public health policies. Our case study highlights the importance of heightened awareness and comprehensive evaluation of potential vaccine-related adverse events.

### Case Report

An 8-year-old boy presented to outpatient department, Thai Binh University of Medicine Hospital, Thai Binh, Vietnam with complaints of urinary incontinence for the past 2 weeks. The parents reported that the symptoms started 2 days after the child received the first dose of the messenger RNA vaccine. Before vaccination, the patient had no history of urinary symptoms or any significant medical issues. The urinary symptom was described as intermittent episodes of involuntary urine leakage during both daytime and nighttime, occurring approximately 4–5 times a day. The patient did not have a bowel disorder. The parents denied any history of urinary tract infections, trauma, or psychological stressors preceding the onset of symptoms.

On physical examination, the patient appeared well-nourished and in no acute distress. There were no signs of fever, abdominal tenderness, or neurological deficits. Genito-urinary examination revealed no abnormalities, including normal external genitalia and absence of signs of urinary tract obstruction. Urinalysis showed no evidence of infection. The neurological examination was unremarkable, with intact motor and sensory functions.

Given the temporal association between the onset of symptoms and COVID-19 vaccination, further investigations were pursued to evaluate other potential causes of urinary incontinence. However, laboratory tests, including complete blood count, renal function tests, and renal ultrasound, were all within normal limits (Table 1).

**Table 1.** Results of laboratory tests

Laboratory tests	Results	Normal range
Urinary tract ultrasound	Normal	
Urinary analysis		
Leucocytes	Negative	Negative
Nitrite	Negative	Negative
Protein	Negative	Negative
pH	5.5	4.8–7.4
Red blood cells	Negative	Negative
Urobilinogen (mg/dL)	1.0	<1.0
Bilirubin	Negative	Negative
Specific gravity	1.034	1.015–1.025
Ketone	Negative	Negative
Glucose	Negative	Negative
Urinary culture		
Urinary culture	Negative	Negative
Complete blood count		
Red blood cells count (T/L)	4.81	4.0–5.8
Hemoglobin (g/L)	137	120–180
Hematocrit (%)	42.5	37.0–50.0
White blood cells (G/L)	8.72	3.5–10.5
Neutrophils (G/L)	6.66	2.0–6.9
Lymphocytes (G/L)	1.70	0.6–4.0
Eosinophils (G/L)	0.21	0.0–8.0
Basophils (G/L)	0.00	0.0–2.5
Monocytes (G/L)	0.15	0.0–0.9
Platelets (G/L)	327	150–450
Blood biochemistry test		
Urea (mmol/L)	4.30	3.2–7.7
Creatinine (μmol/L)	51.4	28–54
Protein (g/L)	74.9	57–80
Calcium (mmol/L)	2.35	2.31–2.64
Alkaline Phosphatase (IU/L)	274	42–362

This clinical situation suggested vaccine side effects. No specific treatment was administered upon diagnosis without toilet and bladder training. Subsequent monitoring revealed a gradual reduction in symptoms over 2 months, with complete recovery achieved at the 14th week from the onset of symptoms, without necessitating any medical intervention.

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Institutional Review Board of Thai Binh University of Medicine and Pharmacy (protocol code number: 1393.1; date of approval: December 17, 2021). The patient provided written informed consent for the publication of the research details and clinical images.

## Discussion

There are several causes of urinary incontinence such as urinary system infections, certain medications like diuretics and hormone replacement therapy, damage to pelvic floor muscles, excess consumption of caffeine or alcohol, or compressed cauda equina nerves [10]. Previous studies have found that COVID-19 infection could cause lower urinary tract symptoms [6,11], this implies that these symptoms might be considered as a manifestation of COVID-19 infection. On the other hand, the severity of urinary symptoms is proportional to the severity of COVID-19 disease [11]. A recent study showed that lower urinary tract symptoms might deteriorate after COVID-19 vaccination. Indeed, COVID-19 vaccines can cause overactive bladder which is significantly associated with a higher risk and greater changes in storage and worse the lower urinary tract symptoms. Lower urinary tract symptoms should be closely monitored during storage after COVID-19 vaccination, especially in patients with overactive bladder.

One reasonable mechanism for the development of urinary incontinence post-vaccination involves an immune-mediated response. Vaccines stimulate the immune system to produce antibodies against specific viral antigens, which may inadvertently lead to immune-mediated reactions affecting various organ systems, including the urinary tract [12]. Additionally, psychological factors such as anxiety or stress related to vaccination could potentially contribute to the onset or exacerbation of urinary symptoms in susceptible individuals.

The occurrence of urinary incontinence following COVID-19 vaccination in this pediatric case raises several considerations. While urinary symptoms are not commonly reported adverse events following vaccination, the temporal relationship observed in this case suggests a possible association. Although causality cannot be established based on a single case, it prompts the need for heightened awareness among healthcare providers regarding the potential rare adverse effects of COVID-19 vaccines.

It is essential to recognize that the benefits of COVID-19 vaccination far outweigh the risks, particularly in preventing severe illness and transmission of the virus. However, healthcare providers should remain vigilant in monitoring and managing potential adverse effects, including rare occurrences such as urinary incontinence.

In conclusion, urinary incontinence following COVID-19 vaccination is a rare but important consideration in pediatric patients presenting with urinary symptoms post-vaccination.

This case highlights the need for thorough evaluation and assessment of potential adverse effects following vaccination, including uncommon presentations. Further research is necessary to investigate the underlying mechanisms and establish definitive associations between vaccination and urinary symptoms, ensuring the continued safety and efficacy of COVID-19 vaccines in pediatric populations.

## ORCID

Thi Loi Dao <https://orcid.org/0000-0001-7129-3785>

Trung Kien Nguyen <https://orcid.org/0000-0001-9366-6116>

Xuan Bai Nguyen <https://orcid.org/0009-0006-7507-4129>

Kieu Dung Le <https://orcid.org/0009-0007-0069-3395>

Khanh Linh Duong <https://orcid.org/0009-0009-4101-4058>

Duc Manh Bui <https://orcid.org/0009-0003-2535-8105>

Cam Anh Nguyen Le <https://orcid.org/0009-0001-7647-3483>

Van Thuan Hoang <https://orcid.org/0000-0003-1369-8615>

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