



# Appearance of Lower Limb Symptom in a Case of Prodromal Parkinsonism during the Postpartum Period

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## Abstract

**Objective:** Prodromal postpartum Parkinsonism is rarely documented in the literature. We reported a case of prodromal Parkinsonism developed in postpartum period with lower limb symptoms only.

**Case Report:** A 37-year-old woman gradually developed progressed lower limb weakness, action tremor and bradykinesia in postpartum period, six months after childbearing. Based on clinical history, symptoms presentation, and TRODAT imaging, prodromal Parkinsonism was highly considered. Her leg symptoms ameliorated with Carbidopa/Levodopa 25/100 mg three times daily, with regular follow-up at outpatient department. Through the case, we clinicians should raise our awareness to early warning signs of prodromal Parkinsonism after childbearing. Based on the clinical pictures and the TRODAT images, we sanction that TRODAT is valuable in the field of scintigraphic rehabilitation for assessing the corresponding neural dysfunction.

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**Keywords:** Postpartum; Prodromal Parkinsonism; TRODAT; Lower extremity; Basal ganglion

## Introduction

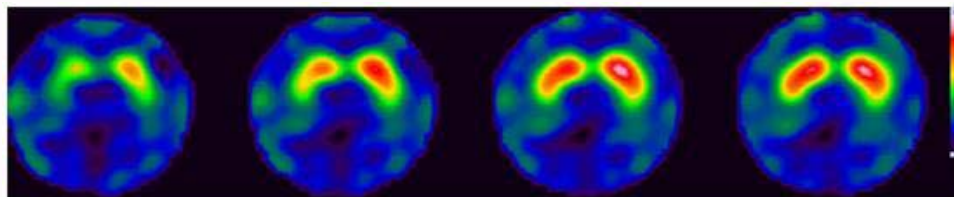
Parkinsonism in adults, a heterogeneous syndrome, is not synonymous with Parkinson's Disease (PD), and is typically an age-related, irreversible and degenerative disease. Parkinsonism can be caused by diverse etiologies including drug exposure, chronic medical conditions, and other neurodegenerative disorders [1]. Parkinsonism is correlated with adverse health outcomes including death, disability, and cognitive impairment, as well as societal burden [2]. The increasing enormity with age makes the early diagnosis of Parkinsonism a public health priority.

The literature strongly supports a paradigm shift in the diagnosis of PD with a new focus on defining prodromal stages of the disease. In view of the existence of varying stages of PD, it has been defined that 'prodromal PD' when involved subjects may present with a variety of nonmotor symptoms and/or faint motor signs that do not meet classic diagnostic criteria, and 'preclinical PD' if they are asymptomatic [3].

There was little documentation in literature regarding postpartum Parkinsonism. We report a 37-year-old primiparous woman who received epidural anesthesia for vaginal delivery, and developed bradykinesia, and action tremor of left lower extremity six months after childbearing. Nuclear medicine for dopamine transporter study provided supportive evidence to indicate occurrence of postpartum prodromal Parkinsonism.

## Case Presentation

Patient was a robust 37-year-old primiparous woman, and her prenatal visits were uneventful. She underwent epidural anesthesia for vaginal delivery. The delivery only took about fifteen minutes. Pubic pain developed one week later, accompanied with right great toe, right lateral heel soreness and intermittent numbness at right lower limb with no exacerbating factors. Intermittent pubic pain persisted and intensified gradually. Besides, difficulty in walking with pain extending from pelvis to lateral side of right lower limb ensued. Two months after childbirth, she experienced devastating pelvic and lower abdominal pain lasting two to three days, radiating to bilateral inguinal areas, with left lower limb numbness. Electromyography and nerve conduction tests of bilateral lower extremities yielded no pelvic plexus abnormality. MRI of lumbar spine showed no significant



**Figure 1:** Tc-99m TRODAT image of our case obtained 6 months after delivery. Reduced uptake of the isotope of basal ganglion is seen on the right side.

abnormality. Childbirth related injury was impressed, and her pain diminished after receiving chiropractic adjustment for two months.

Unexpectedly, six months after delivery, she presented with bradykinesia of left lower limb and action tremor of left foot, impairing her gait. Neurological examination showed normoreflexia in the affected extremity. Balance impairment was confirmed by Berg Balance test. Rapid eye movement sleep behavior disorder was tested and confirmed with polysomnography by our expert neurologist. MRI of brain was unremarkable. Postpartum thyroiditis was surveyed and revealed elevated anti-thyroid peroxidase (anti-TPO) antibody 185 IU/mL (normally less than 35 IU/mL), while thyroid sonography showed a small nodule (0.36 cm × 0.5 cm × 0.57 cm). Progressively, she showed a re-emerging rest tremor after a couple of seconds on posture in her left lower limb. TRODAT study revealed reduced uptake at right basal ganglion (Figure 1). Under consideration of prodromal postpartum Parkinsonism, relevant medication was started. Pramipexole 0.375 mg was administrated twice per day initially and shifting to Carbidopa/Levodopa 25/100 mg three times daily due to intolerable side effects. Symptoms ameliorated with Carbidopa/Levodopa 25/100 mg, with regular follow-up at outpatient department.

## Discussion

Prodromal Parkinsonism refers to the stage where early symptoms or signs of PD are present, but typical clinical diagnosis based on fully evolved motor Parkinsonism is not made yet. To our knowledge, this was the first case as prodromal postpartum Parkinsonism reported in Asia. Prodromal Parkinsonism, especially women during childbearing age, is rarely documented in literature. Our case presented similar symptoms as to previous reports of one case from Ramani et al. [4], and four cases from Maltête et al [5]. Nonetheless, the symptoms of our case mainly occurred in the left lower limb alone (Table 1). The reason for symptoms occurring in lower extremity alone is difficult to explain and is also our limitation.

Diagnosis of Parkinsonism can be made based on the presence of the characteristic clinical manifestations. With respect to categorization of Parkinsonism, previously validated categories of Parkinsonism were based on the number of Parkinsonian signs present. A sign is present if 2 or more of respective items had at least a score of 1 indicative of mild abnormality. Parkinsonism is present if 2 or more signs were documented. Possible Parkinsonism was present if there is 1 sign and No Parkinsonism if there is none [2]. Growth of PD pathology may affect a big amount of adults, who manifest varying degrees of non-motor deficits like bradykinesia in combination with mild motor impairments not severe enough for a traditional diagnosis of PD. The International Parkinson and Movement Disorder Society combined various risk and prodromal markers to set up criteria for the study of definition of prodromal PD in order to examine interventions for syndrome prevention in at-risk

individuals [6]. Our case present only 1 sign, therefore, prodromal parkinsonism is the tentative diagnosis [7,8].

Some claimed that the incidence of Parkinsonism before the age of 40 is only around 5% [9]. In viewing of our case, who was just 37 years old and progressively developed Parkinsonism after giving birth by six months. Dating the timeline of the symptomatology of our case, prodromal Parkinsonism seemed developed in postpartum period. Until now, only five cases regarding postpartum parkinsonism were reported [4,5]. Of them, onset of Parkinsonism from one week to nine months after childbearing was reported in article of Ramani et al. [4], and eight weeks in Maltête et al. [5]. Based upon the clinical picture and TRODAT study, we still have to consider the best likelihood of postpartum Parkinsonism.

Early detection of preclinical Parkinsonism is an important matter, and it has been demonstrated that the underlying mechanism contributing to selective execution of desired movements in the motor system should be Surround Inhibition (SI). In a study in assessing the functional operation of SI by using transcranial magnetic stimulation in PD, Shin et al. performed self-initiated flexion of the index finger at different intervals from 3 ms to 2000 ms a in the asymptomatic hands of hemiparkinsonism patients, and found that during index finger flexion, motor evoked potential amplitudes from the little finger were increased, even without any motor deficit, which identical results did not happen in healthy controls. They confirmed that in PD, the functional operation of SI is impaired and its disturbance precede motor deficit, and declared that SI impairment can be useful to detect preclinical Parkinsonism [10]. We believe the bradykinesia and action tremor precede the classic motor deficit in our case.

Early diagnosis with objective evidence can be obtained from nuclear medicine. Previous study had confirmed that [18F] dopa PET can identify preclinical Parkinsonism in at-risk subjects [11]. TRODAT scan has its value in clinical practice to provide evidence of presynaptic dopaminergic function, even is not specific as to the cause of the dysfunction [12-14]. TRODAT itself is not sufficient for the diagnosis of PD, because TRODAT scan may demonstrate reduced striatal uptake in a variable pattern in atypical Parkinsonian syndromes as well; and is only useful to differentiate between these conditions (PD and atypical ones) from secondary Parkinsonisms (i.e. vascular and drug-induced forms) as well as essential tremor and psychogenic tremor/movement disorder. Abnormal TRODAT scan can be only a supportive criterion of PD [15]. Further, the anatomical localization of the reduced dopamine uptake (i.e. right side) was compatible with a contralateral left-sided symptomatology. The impairment in tracer uptake in the putamen in our case in TRODAT Scan fell at the borderline between normal and Parkinsonian values, indicating a subclinical defect in the presynaptic nigrostriatal system.

There has been demonstrated that impairment of posture and balance is common in neurodegenerative disorders such as PD and

**Table 1:** Summary of clinical characteristics of our case and five published cases with diagnosis of postpartum Parkinson's disease.

	Age	Duration	Involved limb	Diagnostic tool	Treatment
Our case	37	6 M	Left lower limb	Symptoms, MRI (Negative) TRODAT (Positive)	Carbidopa/Levodopa 25/100 mg three times daily
Ramani M et al. [4]	36	8 W	Head, trunk, bilateral arms, right hand, and right leg	MRI(Negative), Fluorodopa PET scanning (Negative)	Carbidopa/levodopa therapy (300 mg/day)
Maltête D et al. [5]	35 (#1)	1 W	Bilateral arms and left leg	MRI(Negative), TRODAT (Positive)	Dopaminergic medication
	31 (#2)	1 M	Left arm	MRI (Negative), Parkin gene (Negative)	Levodopa
	34 (#3)	9 M	Right hand	MRI (Negative), SPECT (Positive)	Monoamine oxidase inhibitor, dopamine agonist and levodopa
	29 (#4)	1 M	Four limbs	MRI (Negative), TRODAT (Positive)	Dopamine agonist

MRI: Magnetic Resonance Imaging; SPECT: Single-photon Emission Computed Tomography; M: Month; W: Week

may manifest early in the course of the disease before the onset of long-established motor symptoms [16,17]. Turning of trunk has long been clinically identified as a challenging task for patients with PD and other forms Parkinsonism [18]. In a latest article analyzing predictors of incident parkinsonism, von Coelln et al. [19] identified 2 distinct mobility scores from Time-up-to-Go (Yaw and Range) test, turning and the transition from standing to sitting, and highlight features of gait that were independently associated with incident parkinsonism. Gait and postural abnormality of our case corresponded to their results.

The pathophysiology of postpartum Parkinsonism remains unclear. There have been some theories to be stated, even only few case reports being published [4,5]. First, hormonal dysfunction will induce movement disorder. Studies have revealed that endogenous estrogen act as a protective factor against evolution of Parkinsonism [20]. In this scenario, like our case, dramatic hormonal reductions in postpartum period might devote to Parkinsonism. There has been limited data to quantify whether women who developed postpartum Parkinsonism experience abrupt decline of hormone levels or reach lower hormone concentrations after childbearing. We did not test those for confirmation. Instead, reduced uptake of right basal ganglion was detected on dopamine transporter TRODAT imaging (Figure 1).

The second, we found the patient with high anti-TPO antibody. A latest study found that autoimmune disease plays a role in pathophysiology of Parkinsonism [21]. Even thyroid sonography revealed a small nodule, either functional or not, we have to consider possible relationship between autoimmune disorder and her disease. This is our weak point that we cannot exclude the possibility of subclinical autoimmune disorder that interacts with or contributes to Parkinsonism, like our patient.

The third consideration is the possibility that our patient has had subtle even asymptomatic Parkinsonism before pregnancy, and pregnancy worsens the symptoms. However, our case did not mention any abnormal symptoms before pregnancy. The possibility should be the least. In summary, the clinical findings in our case without a definite clinical diagnosis of PD may inform on efforts to demarcate the prodromal PD [16]. Our case presented as prodromal Parkinsonism diagnosed in postpartum period, and more importantly remind clinicians be aware of early symptoms of Parkinsonism after childbearing. Based on the clinical pictures and the TRODAT images, we sanction that TRODAT is valuable in the field of scintigraphic rehabilitation for assessing the corresponding neural dysfunction.

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