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## Case Report

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# Guillain-Barré Syndrome in the First Trimester of Pregnancy and its Improvement by Rehabilitation

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A 31-year-old healthy mother of twins developed Guillain-Barré syndrome in her fourth gestational week of pregnancy. Impaired motor coordination, sensation, and joint position sense were observed. Immunoglobulin therapy was not performed given the early stage of pregnancy. She received rehabilitation to accommodate changes in her body shape and movements necessary for pregnancy, childbirth, and childcare. The patient delivered a healthy baby by cesarean section. By 42 weeks postpartum, she was capable of almost all housework activities and childcare. Family support was important in this case. Patient-oriented intervention, which included periodic confirmation and establishment of goals in each phase and continuity of intervention, was also essential.

**Keywords:** acute inflammatory demyelinating polyneuropathy, continuity of intervention, first trimester

## INTRODUCTION

Guillain-Barré syndrome (GBS), also referred to as acute inflammatory demyelinating polyneuropathy (AIDP), is rare in pregnancy. While some studies have reported GBS in pregnancy, only a few reports exist on patients who developed GBS in their first trimester and who gave birth successfully.<sup>1,2</sup>

We experienced a patient who developed GBS in her fourth gestational week of pregnancy and who subse-

quently delivered a healthy baby. From the onset of the GBS through to childbirth and childcare, considerations appropriate for each phase were undertaken to optimize intervention, including the rehabilitation process.

## CASE REPORT

A 31-year-old healthy mother of twins visited a neurologist at our hospital with the complaint of weakness in her distal muscles of all four extremities.

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**Table 1. Neurological findings**

		right/left	
eye movements	nomal	Deep Tendon Reflex	
diplopia	none	biceps	-/-
facial sensory	nomal	triceps	-/-
facial motor	normal	brachioradialis	-/-
dysarthria	none	patella	-/-
		Achilles	-/-
<b>Motor</b>		<b>Manual Muscle Test</b>	
finger tapping	clumsy, ataxic	deltoid	4+/4+
heel tapping	clumsy, ataxic	biceps	4+/4+
diadochokinesia	clumsy, ataxic	triceps	4/4
finger nose test	ataxic	wrist extension	3/3
		wrist flexion	3/3
<b>Sensory</b>		opponens digiti minimi	3/3
position	normal	opponens pollicis	3/3
pain	reduced in periphery	iliopsoas	4+/4+
vibration	weak	quadriceps femoris	4+/4+
		hamstrings	4+/4+
gait	unstable	tibialis	4+/4+
		gastrocnemial	4+/4+
bladder and rectal disturbance			

She had no antecedent infectious symptoms. Fifteen days prior to the visit, she noticed an occasional sharp pain in her posterior right thigh. Although the pain improved, moderate numbness commenced in both hands, which spread to both upper extremities. Neurological findings at her initial visit are shown in **Table 1**. Deep tendon reflexes were absent. GBS was considered highly likely, and she was referred to the Department of Neurology at a different medical facility. The laboratory data findings are shown in **Table 2**. The sensory nerve action potentials were reduced in the nerve conduction study of median and sural nerves, respectively. These findings and the clinical progression led to a confirmed diagnosis of GBS with a Hughes functional grade of 3. Urine pregnancy testing confirmed that the patient was in her first trimester of gestation. Thus, cerebrospinal fluid examination was not undertaken, and neither immunoglobulin administration nor plasma exchange was performed. Weakness and sensory disturbances progressed over the next five days, and the patient's Hughes functional grade deteriorated further to Grade 4, after which her symptoms showed some improvement. On the 31st day of hospitalization,

the patient was confirmed as eight weeks pregnant, and thus her first visit to our institution corresponded to about the fourth gestational week of pregnancy.

On the 10th day of hospitalization, rehabilitation was initiated. The patient could not stand upright or undertake activities of daily living without help. Severe impairment of motor coordination, sensation, and joint position sense were present at this stage. Grip strengths were 8 kg for the right hand and 5 kg for the left hand, respectively. The motor Functional Independence Measure (motor FIM) score was 23 (**Table 3**). On the 38th day of admission (9th gestational week), she was transferred to the rehabilitation unit of our hospital.

Obstetric nurses at our hospital typically perform continuous interventions appropriate to each patient and their stage of development. We believe it is important to maintain a healthy physical and mental state during these transitional periods, and to perform patient-oriented continuous interventions in rehabilitation. Therefore, a physical therapist with childbirth experience was constantly assigned to the patient throughout the course of her hospitalization, and subsequent outpatient rehabilitation. A rehabilitation

**Table 2. Laboratory Data**

					IgM	IgG
TP	7.1 g/dL	WBC	8500/ $\mu$ l	GM1	–	–
Alb	4.3 g/dL	RBC	$453 \times 10^4$ / $\mu$ l	GM2	–	–
T-bil	0.9 mg/dL	Plt	290000/ $\mu$ l	GM3	–	–
AST	13 IU/L			GD1a	–	–
ALT	15 IU/L			GD1a	–	–
ALP	126 IU/L	ANA	<40	GD1b	–	–
$\gamma$ GTP	18 IU/L	CH50	59 U/ml	GD3	–	–
LDH	190 IU/L	C3	128 mg/dL	GT1b	–	–
Ch-E.	282 IU/L	C4	40 mg/dL	GQ1b	–	–
AMY	48 IU/L	IgG	1073 mg/dL	GA1	–	–
CK	48 IU/L	IgA	337 mg/dL	Gal-C	–	–
Na	136 mEq/L	IgM	168 mg/dL	GalNAc-GD1a	–	–
K	3.9 mEq/L	RF	5 IU/mL	GD1a/GD1b		–
Cl	102 mEq/L					
BUN	7 mg/dL	SS-A	<7.0 U/mL			
Cre	0.5 mg/dL	SS-B	<7.0 U/mL			
UA	2.6 mg/dL	ds-DNA IgG	<10 IU/mL			
T-cho	139 mg/dL	ss-DNA IgG	<10 AU/mL			
		PR3-ANCA	<10 EU			
TSH	1.49 $\mu$ IU/mL	MPO-ANCA	<10 EU			
FreeT3	1.75 pg/mL					
FreeT4	1.32 ng/dL	MMP-3	<12.7 ng/ml			

plan was also designed by combining the conditions of pregnancy, childbirth, and childcare with functional recovery. Regular monthly meetings that included the attendance of the doctor, nurse, rehabilitation staff, patient, and family members were initiated to assess current conditions, and to re-establish goals.

During the first trimester, we focused on the recovery of the patient's functional abilities. Rehabilitation began with standing exercises using a walker and skilled fine movement exercises using origami paper. Eight weeks after the disease onset, the patient began to stay overnight at her home with a wheelchair once a week. This helped the patient visualize her life after discharge, and it reduced the stress of separation between the patient and her family (particularly her three-year-old twins).

At a regular meeting in the 15th gestational week (11 weeks after disease onset), we scheduled the 24th gestational week for discharge to her home, assuming that her daily activities would become rehabilitation activities by then.

At the 23rd gestational week, we observed a stable improvement in her functional abilities. She was discharged with a motor FIM score of 75 (**Table 3**) and she continued outpatient rehabilitation once weekly. The obstetric examination estimated the fetal weight at 530 grams (–1.6 standard deviations). Changes in fetal weight over the course of pregnancy are shown in Table 3. Ultrasonography showed no remarkable abnormalities of the fetus during the entire gestation period. Twenty-one weeks after disease onset, the patient could stand up from a chair without help, and walk a few steps without assistance.

In the third trimester, we provided obstetric and prenatal guidance as well as training for childbirth and postnatal childcare. She continued to walk with a stable gait using Lofstrand crutches and she practiced muscle-strengthening, skilled movement exercises, and how to hold a baby.

In the 37th gestational week, she was hospitalized and gave birth to a 2,500 gram girl via cesarean section under spinal anesthesia (2.4 mL of 0.5% Marcaine).

**Table 3. Rehabilitation course, motor FIM score, grip strength, and fetus weight of each phase**

Rehabilitation Aim	First Trimester		Second Trimester		Third Trimester		After delivery			
	intense recovery of functional abilities for her own standing using walker gait training step-up exercises		exercise for household affairs stand up without help washing body, grooming		precautions to the abdomen/preparation for childbirth walk using crutch how to hold a baby		daily activities more naturally walk with a cane walk without cane			
<b>Physical therapy</b>	skilled movement exercises (using ohajiki/origami) putting away clothes holding an object between fingers		threading holes/using marbles		activities related to child-rearing					
<b>Occupational therapy</b>	stay overnight at home		assistive utensils		obstetric/prenatal guidance					
<b>Others</b>										
weeks	2ADO (6GA)	3ADO (7GA)	5ADO (9GA/ARU)	9ADO (13GA)	13ADO (17GA)	19ADO (23GA/DRU)	25ADO (29GA)	30ADO (34GA)	49ADO (12AD)	58ADO (46AD)
FIM score	1	2	5	6	6	6	6	6	7	7
Eating	1	1	2	3	3	4	4	4	7	7
Grooming	1	1	2	2	3	4	6	7	7	7
Bathing	1	2	2	3	3	6	7	7	7	7
Dressing-upper body	1	2	2	3	3	6	7	7	7	7
Dressing-lower body	1	2	2	3	3	6	7	7	7	7
Toileting	1	2	2	3	3	6	7	7	7	7
Bladder management	6	7	6	7	7	7	7	7	7	7
Bowel management	6	7	7	7	7	7	7	7	7	7
Transfer:bed, chair, wheelchair	1	2	2	5	7	6	7	7	7	7
Toilet	1	2	2	5	5	6	7	7	7	7
Tub, shower	1	2	1	4	5	5	5	5	5	5
Locomotion: walk (wheelchair)	1	1	1	4	5	5	5	5	6	7
Stairs	1	1	1	2	2	5	5	5	5	6
Motor FIM total	23	32	35	54	60	75	82	86	86	88
grip strength (Light) kg	5.0	nm	5.8	nm	nm	nm	8.7	8.6	11.1	
grip strength (Right) kg	8.0	nm	6.9	nm	nm	nm	8.5	9.0	10.1	
fetus weight g			530		1199		2021			
SD			-1.6		-1.7		-1.2			

GA: gestational age  
 ADO: after disease onset  
 AD: after delivery  
 ARU: Admission Rehabilitation Unit  
 DRU: Discharge Rehabilitation Unit  
 nm: not measured  
 SD: standard deviations

The Apgar score was 9/10, and no apparent infant paralysis was observed. Rehabilitation was resumed two days after delivery. The subsequent schedule focused on infant care activities, such as nursing and diaper changing. The patient and infant were discharged six days after delivery.

The patient continued outpatient rehabilitation once a week. By 12 weeks after delivery (46 weeks after disease onset), she could walk without the crutches and nurse her newborn on her own. At 42 weeks after delivery, she was capable of almost all housework activities and childcare, and her rehabilitation was deemed complete.

## DISCUSSION

Our patient developed GBS in the first trimester of pregnancy. Motor-sensory impairments improved, but were protracted.

The annual incidence of GBS is 0.75–2 per 1,000,000 people, and this incidence is unrelated to pregnancy.<sup>3</sup> Although antecedent infection by pathogens such as cytomegalovirus or *Campylobacter* may contribute to GBS,<sup>1</sup> we did not detect such infections in this patient. No abnormalities were found in the infant during gestation or in the postnatal period. Given that outcomes of infants in previous reports were mostly normal,<sup>1</sup> we continued the usual obstetric checkups.

Although basic therapy for GBS does not differ by pregnancy status, no guidelines exist.<sup>4</sup> Several studies have reported that immunoglobulin and plasma exchange had a beneficial effect on GBS in pregnancy.<sup>1,5,6</sup> However, these modalities of therapy were used in the second trimester or later. There are very few cases where the fetus reached delivery when immunoglobulin therapy was used in the first trimester.<sup>1,7</sup> In view that there was no bulbar palsy or respiratory failure, we did not perform immunoglobulin administration or plasma exchange in this patient.

Unlike typical GBS rehabilitation, interventions appropriate for each phase of pregnancy were necessary.<sup>6</sup> We conducted an interview on the 13th week postpartum to evaluate our intervention program from the patient's perspective. At first, she was highly anxious because her health was rapidly deteriorating. Detailed explanations about GBS and its recovery

relieved her concerns. She received maximum cooperation from her family members. She also gave our rehabilitation plan a good evaluation. Throughout the rehabilitation, a physical therapist with childbirth experience was constantly assigned to her and careful consideration was given to her condition. Because goals were confirmed and re-established at regular meetings, she was able to stay motivated. Patient-oriented intervention, which included periodic confirmation and establishment of appropriate goals in each phase and continuity of intervention, was also essential.

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