A Case Report of Diabetic Peripheral Neuropathy

Authors: Xun Xiaojuan, Deng Yunhui, Deng Yunhui

Date: 2023-10-11T00:00:00+00:00

Abstract

This article summarizes the nursing care experience of a pregnant patient with diabetic peripheral neuropathy. The main nursing care points included: enhanced condition monitoring and management of precipitating factors; prevention of diabetic ketoacidosis with intensified dietary guidance; close blood glucose monitoring and establishment of a multidisciplinary team for collaborative management; rational selection of delivery mode with continuous psychological counseling; and building patient confidence. Through meticulous treatment and nursing care, the patient successfully delivered a healthy infant, with a total hospitalization of 25 days and discharge 3 days after normal delivery.

Full Text

A Case Report of Diabetic Peripheral Neuropathy in Pregnancy

Authors: Xun Xiaojuan, Deng Yunhui
Affiliation: Sichuan Jinxin Xinan Women's and Children's Hospital

Abstract

This article summarizes the nursing experience of a pregnant woman with diabetic peripheral neuropathy. The main nursing priorities included: strengthening condition monitoring and trigger management; preventing diabetic ketoacidosis and enhancing dietary guidance; closely monitoring blood glucose with multidisciplinary team collaboration; selecting appropriate delivery methods; and providing continuous psychological support to enhance patient confidence. After meticulous treatment and nursing care, the patient successfully delivered a healthy infant after a 25-day hospitalization and was discharged three days postpartum.

Keywords: Pregnancy; Obstetric Nursing; Diabetes Mellitus; Diabetic Peripheral Neuropathy

Introduction

Diabetic peripheral neuropathy is a common chronic complication of diabetes mellitus with a relatively clear etiology. Prolonged hyperglycemia damages peripheral nerves, causing symptoms such as paresthesia, pain, sensory loss, muscle weakness, and abnormal temperature sensation. The disease significantly impacts daily life and follows a prolonged course; in severe cases, it can threaten patient safety and often leads to loss of confidence, anxiety, depression, and other negative emotions that hinder disease control [1]. Diabetic neuropathy comprises a group of clinical syndromes with diverse manifestations resulting from different pathophysiological mechanisms and represents the most common chronic complication of diabetes. The most common types are distal symmetric polyneuropathy (DSPN) and autonomic neuropathy, with DSPN accounting for approximately 75% of diabetic neuropathies and often referred to by scholars as diabetic peripheral neuropathy. Currently, few reports exist on the nursing care of pregnant patients with this condition. We now report the nursing experience of one such case.

Case Report

Our hospital admitted a pregnant woman on February 22, 2023, at 31+6 weeks gestation with a singleton cephalic presentation. The patient carried diagnoses of diabetic peripheral neuropathy, pregestational diabetes (Class D), diabetic retinopathy, mild anemia complicating pregnancy, and severe depressive episode without psychotic symptoms (G4P1+2). A multidisciplinary hospital-wide consultation was organized on the same day, yielding recommendations for management focusing on: intensive glycemic control, close monitoring of uterine contractions and fetal status, thrombosis prevention, psychological support, nutritional guidance, and safety nursing. After three weeks of treatment, the patient could not tolerate continued pregnancy due to pain and depression. At 35 weeks gestation, she delivered a newborn weighing 2800g with Apgar scores of 9-10-10. Postpartum management included uterotonic agents, continued duloxetine, oral alpha-lipoic acid for antioxidant effects, mecobalamin for neurotrophic support, low molecular weight heparin for thromboprophylaxis, and foot care. Postpartum blood glucose monitoring remained within normal range without insulin requirement. The patient's bilateral lower extremity pain improved slightly with normal mobility, and she was discharged on March 19, 2023. This rare and complex case demonstrated favorable outcomes with significant clinical learning value.

1.1 General Information The patient was a 33-year-old female admitted at 11:44 on February 22, 2023, at 31+6 weeks gestation with a chief complaint of "bilateral lower extremity pain under investigation, pregestational diabetes."

1.2 Admission Physical Examination The patient arrived by wheelchair with vital signs: temperature 36.7°C, pulse 98 beats/min, respiration 20 breaths/min, blood pressure 112/98 mmHg. Anxiety score was 16 and depression score 23. She was conscious with a distressed facial expression, dry skin on both upper extremities, and exhibited poor cooperation during examination, dull gaze, and impulsivity. Pupils were equal, round, and reactive to light. Cardiopulmonary auscultation revealed no abnormalities. Uterine height measured 27cm, abdominal circumference 98cm, with no palpable contractions and fetal heart rate of 140 beats/min in cephalic presentation, not engaged, with intact membranes and no vaginal examination performed. No limb deformities or joint swelling were noted. Below the knee, skin showed edema with erythema, normal temperature, severe tenderness to touch, and refusal of palpation. The left lower extremity exhibited multiple skin breaks ($3\$\times 4cm^{\{2\}}, ulcers, and erythema(6\times 8cm\{2\}\$$), while the right ankle showed multiple scattered small vesicles. Dorsalis pedis pulses were palpable bilaterally with normal muscle tone. Both feet demonstrated intermittent startle responses and were continuously immersed in an ice bucket, with skin appearing yellowish-brown and dark.

1.3 Patient History **Past Medical History:** Generally healthy. The patient reported gestational diabetes diagnosed at 7+ months in 2013, controlled through diet and exercise with no postpartum glucose monitoring. In 2020, gestational diabetes was diagnosed again, requiring insulin injection due to poor dietary control. At 4+ months gestation, termination was performed due to abnormal NT values on ultrasound; insulin was discontinued post-termination without glucose monitoring. She denied hepatitis, tuberculosis, or contact history. **Trauma History:** During pregnancy, she twice ingested 20+ sleeping pills, experiencing medication-related falls while somnolent during toileting, without abdominal pain or vaginal bleeding, thus not seeking medical attention. No surgical, transfusion, or drug/food allergy history. Vaccination history unknown. **Medication History:** Symptomatic pain management during pregnancy. **Personal History:** Born and residing locally, junior high school education. Denied exposure to epidemic water areas, industrial toxins, dust, or radioactive substances. Denied smoking or alcohol use. **Menstrual History:** Menarche at age 13, irregular cycles lasting 3-7 days, last menstrual period July 14, 2022, expected delivery date April 21, 2023, normal flow and color without clots or dysmenorrhea. **Marital and Obstetric History:** Married, G4P1+2, healthy spouse, denied extramarital partners or family genetic diseases. Remarried, denied consanguinity. First delivery at age 23 via spontaneous vaginal delivery (child from previous marriage), one induced abortion at 4+ months, one spontaneous abortion. Denied molar pregnancy or ectopic pregnancy. Last delivery: 2013 full-term spontaneous vaginal delivery without complications. Last abortion: 2020. **Family History:** Denied family genetic or infectious diseases. **Mental Health History:** Following an abortion in 2018 attributed to her mother, she experienced emotional instability, anhedonia, and prominent

suicidal ideation. Six months prior, she ingested 20 tablets of estazolam after marital conflict. Five days before admission, she ingested another 20+ tablets of estazolam due to pain-induced low mood and irritability. **Other:** At 20 weeks gestation, pain episodes triggered hair-pulling, head-hitting, screaming, and suicidal behaviors.

1.4 Physical Examination Measurements Height 154cm, weight 60kg. Uterine height 27cm, abdominal circumference 98cm. Fetal position: cephalic, not engaged. External pelvic measurements: IS 24-IC 26-EC 20-TO 8.5cm. Fetal heart rate: 142 beats/min. No rectal or cervical examination performed. Bishop score: not assessed. Contractions: absent. Estimated fetal weight: 1700g. Additional findings: bilateral symmetric, non-pitting edema below the knees, most prominent on the dorsal feet, with skin breakdown on the left lower extremity and no obvious tactile hypoesthesia. High-risk pregnancy classification: red. Admission assessment: high risk for falls and pressure injuries.

1.5 Auxiliary Examinations and Diagnosis February 22, 2023 Examinations:
Ultrasound: Abdominal ultrasound (liver, gallbladder, pancreas, spleen, kidneys, ureters, bladder) showed no abnormalities. Adult echocardiography: EF 66%, FS 42%, heart rate 110 beats/min. Mitral inflow E-wave < A-wave indicated decreased left ventricular diastolic function with tachycardia during examination. **Lower Extremity Arterial Ultrasound (5 pairs):** No obvious thrombosis in bilateral common femoral, superficial femoral, popliteal, posterior tibial, or calf muscular arteries; marked subcutaneous edema. **Lower Extremity Venous Color Doppler (5 pairs):** Normal course and diameter of bilateral common femoral, great saphenous, superficial femoral, popliteal, anterior tibial, posterior tibial, and calf muscular veins with spontaneous red blood cell contrast in some lumens and complete blood flow signals. Marked subcutaneous edema. **Laboratory:** WBC 6.22$\times 10^{\{9\}/L, NEUT\times 10}\{9\}$/L. Coagulation: FIB 6.50g/L, D-dimer 1.85 g/mL. Potassium 3.84mmol/L, albumin 29.6g/L. Random glucose 7.3mmol/L. Electrolytes: Na 132mmol/L. Immunology panel: negative. Urinalysis: ketones +2, glucose +4.

Admission Diagnoses:
1. Pregestational diabetes (Class D)
2. Bilateral lower extremity pain under investigation: vascular lesion? Lymphatic lesion?
3. Diabetic retinopathy
4. Mild anemia complicating pregnancy
5. Severe depressive episode without psychotic symptoms complicating pregnancy
6. G4P1+2, 31+6 weeks gestation, singleton cephalic presentation

1.6 Treatment Interventions Dermatology: Recommendations: Apply fusidic acid ointment to ruptured vesicles, avoid water contact; apply mag-

nesium sulfate wet compresses to swollen areas. **Ophthalmology:** Fundus examination revealed non-proliferative diabetic retinopathy. **Endocrinology:** Insufficient evidence for diabetic foot diagnosis. Recommendations: Monitor renal function, urinary protein, serum albumin, thyroid function; monitor blood glucose and adjust insulin accordingly. **Nutrition:** Low albumin and poor nutritional status required oral nutritional supplementation with high-protein, low-GI formulations to ensure adequate daily energy and protein intake. **Traditional Chinese Medicine:** Oral herbal medicine and local symptomatic treatment for bilateral lower extremities. **Psychiatry:** Diagnosis: severe depressive episode. (1) Extremely high suicide risk requiring accident prevention. (2) Medications: duloxetine 60mg daily; lorazepam 1mg nightly. (3) Physical therapy. **Pain Management:** Lidocaine/prilocaine for local analgesia; if ineffective, consider continuous intravenous analgesia with pregnancy-safe medications after evaluation. **Neonatology:** If preterm delivery required, assess neonatal condition and prepare for "golden hour" preterm care.

1.7 Nursing Diagnoses and Interventions

1.7.1 Nursing Diagnosis: Pain related to nerve function damage from diabetic peripheral neuropathy. Nursing Goal: Reduce or eliminate patient pain.
Nursing Measures: Build patient confidence in fighting the disease; Apply magnesium sulfate wet compresses with plastic wrap for analgesia [2] or administer analgesics as ordered; Perform local massage and physiotherapy as ordered to improve circulation, protect skin, and prevent burns and ulcers [3]; Timely dressing changes for ulcers and skin breakdown with aseptic technique to prevent infection, using antibiotics when necessary.
Nursing Evaluation: Patient pain decreased with no infection occurring.

1.7.2 Nursing Diagnosis: Risk for maternal-fetal injury related to fetal distress and maternal hypoglycemia from insulin use. Nursing Goal: Stable maternal-fetal vital signs with ideal glycemic control and no fetal distress.
Nursing Measures: Instruct left lateral positioning to improve fetal blood supply, oxygen therapy twice daily for 30 minutes to prevent fetal hypoxia; Closely monitor fetal heart rate and movements, teach fetal movement counting, perform daily fetal heart rate monitoring per orders, report abnormalities, and regularly monitor fetal blood flow via ultrasound; Observe for hypoglycemia symptoms including palpitations, anxiety, weakness, fatigue, and hunger, keep food readily available for immediate consumption; Monitor blood glucose at prescribed times and administer correct insulin doses per orders [4].
Nursing Evaluation: Maternal-fetal vital signs remained stable without abnormalities.

1.7.3 Nursing Diagnosis: Risk for infection related to hyperglycemia, decreased host defense, and lower extremity breakdown. Nursing Goal: No infection occurs.
Nursing Measures: Regular CBC monitoring; Strict aseptic technique, single-use lancets and insulin needles with site rotation; Daily vital signs monitoring with attention to fever; Maintain clean, dry, comfortable environment and personal hygiene, trim nails, avoid scratching, ensure daily ventilation; Apply topical medications to lower extremity breakdown per orders.
Nursing Evaluation: At discharge, leg and perineal wounds healed well without bleeding or discharge, uterus contracted well without tenderness.

1.7.4 Nursing Diagnosis: Risk for gestational hypertension related to microvascular disease with renal involvement. Nursing Goal: Maintain good blood pressure control without adverse reactions.
Nursing Measures: Closely monitor blood pressure, report and treat abnormalities promptly; Address emotional status and sleep, cluster nursing activities to minimize disturbance; Instruct low-salt, low-fat, easily digestible diet.
Nursing Evaluation: Patient experienced no hypertension-related adverse reactions.

1.7.5 Nursing Diagnosis: Risk for preterm labor related to disease-induced fetal growth restriction requiring early termination. Nursing Goal: Good preterm infant outcome.
Nursing Measures: Provide psychological comfort and explanation, encourage positive mindset and avoid excessive anxiety; Regular fetal growth assessments; Nutritionist consultation for dietary adjustment and supplementation when necessary; Administer dexamethasone per orders for fetal lung maturation.
Nursing Evaluation: Preterm infant had good Apgar scores without adverse reactions.

1.7.6 Nursing Diagnosis: Risk for lower extremity venous thrombosis related to VTE risk score. Nursing Goal: No venous thrombosis occurs.
Nursing Measures: Instruct ankle pump exercises in bed, encourage frequent ambulation, and use pneumatic compression therapy; Observe for leg pain, swelling, and skin color changes; Administer anticoagulants as ordered; Regularly monitor coagulation profile and vascular ultrasound.
Nursing Evaluation: Patient demonstrated active prevention awareness, cooperated with treatment and exercise, with no venous thrombosis occurring.

1.7.7 Nursing Diagnosis: Potential complication: Diabetic ketoacidosis. Nursing Goal: No diabetic ketoacidosis occurs.
Nursing Measures: Dietary regulation with diabetic diet instruction; Administer insulin as ordered and monitor drug efficacy; Ensure adequate rest

and sleep in quiet environment; Encourage appropriate activity to increase glucose utilization; Emphasize infection prevention and monitor for signs.
Nursing Evaluation: Patient maintained good glycemic control without diabetic ketoacidosis.

2. Results and Follow-up

After three weeks of treatment, the patient could not tolerate continued pregnancy due to pain and depression. At 35 weeks gestation, she delivered a 2800g newborn via spontaneous vaginal delivery with Apgar scores of 9-10-10. Postpartum management included uterotonic agents, continued duloxetine, oral alpha-lipoic acid for antioxidant effects, mecobalamin for neurotrophic support, low molecular weight heparin for thromboprophylaxis, and foot care. Postpartum blood glucose fluctuated within normal range without insulin requirement. Bilateral lower extremity pain improved slightly with normal mobility, and the patient was discharged on March 19, 2023. Follow-up at one week and one month post-discharge revealed the patient was actively continuing specialized treatment at a general hospital with improved depressive symptoms.

3. Discussion and Conclusion

Through this case, we learned that clinical nursing care requires individualized nursing plans based on patient presentation and disease characteristics. Management must address edema, skin breakdown, weight management, glycemic control, nutrition, safety management of severe depression, and obstetric care through interdisciplinary collaboration, prioritizing the most critical nursing diagnoses to alleviate suffering. Throughout the nursing process, comprehensive analysis and discussion with emphasis on patient safety are essential. Diabetic peripheral neuropathy accounts for over 60% of diabetic complications and can cause severe disability or death. Poor compliance leading to suboptimal glycemic control is a major contributing factor. Our hospital's multidisciplinary, individualized, and refined gestational management, appropriate delivery method selection, meticulous intrapartum and postpartum care, continuous psychological support, and integrated psychological and dietary interventions significantly improved outcomes for diabetic peripheral neuropathy in pregnancy.

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Note: Figure translations are in progress. See original paper for figures.