Learnovate-International
An International Open-Access Journal Published by Lapain Press Publications[LPP]
Content Available at www.lapinjournals.com E-ISSN: 3049-1592
Case Study Open Access

PREECLAMPSIA IN HIGH-RISK PREGNANCY: A CASE STUDY ON DIAGNOSIS AND MANAGEMENT

G Venkata Nagaraju*, Guntur Venkata Srilekha
*Department of Pharmacy Practice, Hindu College of Pharmacy, Amaravati Road, Guntur, A.P, India

Article History: Received: 03 Sept 2024, Revised: 18 Oct 2024, Accepted: 10 Nov 2024, Published: 15 Dec 2024

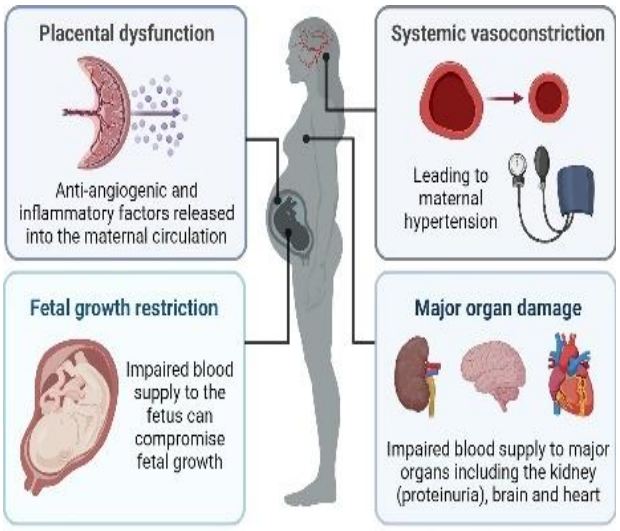
***Corresponding author**
G Venkata Nagaraju

Abstract
Preeclampsia is characterized by the development of hypertension and proteinuria after 20 weeks of pregnancy in women who were previously normotensive. This condition poses risks for significant complications affecting the mother, fetus, and newborn. The aim of this study is to assess the maternal and perinatal outcomes of preeclampsia without severe features in women receiving care at the Government General Hospital in Guntur.
***Keywords*:** pre ecclampsia, HELLP syndrome,

Introduction
Pre-eclampsia is a pregnancy-related condition marked by elevated blood pressure and, often, a significant level of protein in the urine, typically occurring after 20 weeks of gestation in women who previously had normal blood pressure [1].

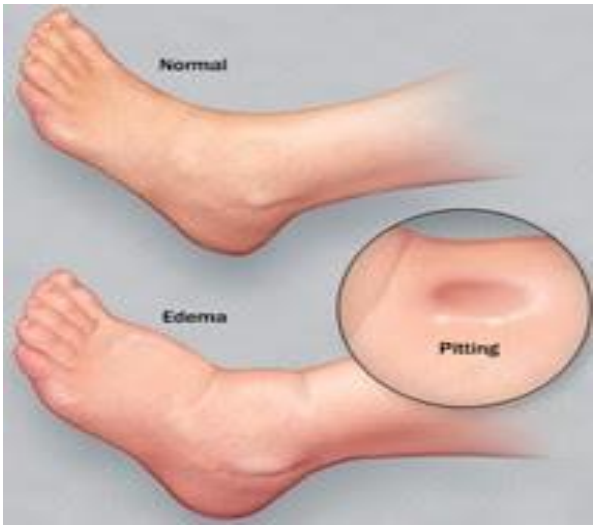
Types of Pre-eclampsia
1. **Non-severe Pre-eclampsia:** This involves elevated blood pressure without significant proteinuria.
2. **Severe Pre-eclampsia:** This condition includes high blood pressure accompanied by proteinuria and potential liver damage.

Pathogenesis
Pre-eclampsia develops due to a combination of genetic predisposition, environmental factors, maternal characteristics, and immune/inflammatory responses. These factors disrupt normal uterine vascular remodeling during early pregnancy, resulting in placental hypertrophy, infarctions, and reduced placental blood flow. These abnormalities can lead to fetal distress, intrauterine growth restriction (IUGR), or intrauterine fetal death, all of which contribute to hypoxia and placental dysfunction. Dysfunctional placental tissues release mediators into the maternal circulation, impairing the maternal systemic endothelial layer. This ultimately manifests as hypertension, proteinuria, eclampsia, or complications such as HELLP syndrome [2].



Symptoms
Preeclampsia is primarily a condition identified through clinical signs, and by the time symptoms appear, it is often in an advanced stage.

Mild Symptoms
One of the early signs of edema associated with preeclampsia is slight swelling around the ankles, which persists even after getting out of bed in the morning. Another early indication may include a feeling of tightness in rings worn on the fingers. Over time, the swelling can progress, spreading to the face, abdominal wall, vulva, and, in severe cases, the entire body [3].



Alarming symptoms

Preeclampsia is associated with various clinical manifestations, diagnostic criteria, complications, and management approaches, which are outlined below:

Symptoms

- **Headache:** Often localized in the frontal or occipital region.
- **Sleep disturbances** and **reduced urinary output.**
- **Epigastric pain** and discomfort.

Signs

- **Abnormal weight gain.**
- **Elevated blood pressure.**
- **Edema**, including pulmonary edema.
- **Abdominal examination:** May indicate chronic placental insufficiency, evidenced by reduced amniotic fluid (oligohydramnios) or fetal growth restriction [4, 5].

Diagnostic Criteria

1. **Mean Arterial Pressure Calculation [6]**
   Formula:
   Systolic pressure+(Diastolic pressure×2)/3\text{Systolic pressure} + \left (\text{Diastolic pressure} \times 2 \right) / 3Systolic pressure+(Diastolic pressure×2)/3.
2. **Urine Analysis [7]**
   - Proteinuria is a late sign of preeclampsia, which can range from minimal to significant, sometimes making the urine appear solid when boiled.
   - Urine analysis may reveal hyaline casts, epithelial cells, or red blood cells.
   - A 24-hour urine collection is performed to measure protein levels.
3. **Ophthalmic Examination [7]**
   - Severe cases may show retinal edema, narrowed arterioles, and "nicking" where veins are crossed by arterioles.
4. **Blood Tests [8]**
   - Elevated serum uric acid levels (>4.5 mg/dL) are a biochemical marker of preeclampsia.
   - Other findings may include thrombocytopenia, abnormal coagulation profiles, and elevated liver enzymes.
5. **Antenatal Fetal Monitoring [9]**
   - Assessment includes physical examination, daily fetal kick counts, ultrasonography for fetal growth and amniotic fluid levels, cardiotocography, umbilical artery Doppler studies, and biophysical profiles.

Complications [10, 11]

- **Maternal:** Eclampsia, abruptio placentae, oliguria or anuria, preterm labor, cerebral hemorrhage, acute respiratory distress syndrome (ARDS), postpartum hemorrhage, shock, and sepsis.
- **Fetal:** Intrauterine death, growth restriction, preterm delivery, and residual hypertension.
- **Recurrent Preeclampsia:** Increased risk in future pregnancies.

Management [12]

1. **Rest:**
   - Improves renal and uterine blood flow, enhancing placental perfusion and reducing blood pressure.
   - Complete bed rest is not always necessary.
2. **Diet:**
   - Should include approximately 100 g of protein daily, normal salt intake, and sufficient fluids.
   - Total caloric intake should be around 1,600 calories per day.
3. **Diuretics:**
   - Should be used cautiously as they may reduce placental perfusion and cause electrolyte imbalances.
   - Indicated for conditions such as cardiac failure, pulmonary edema, or severe edema.
   - **Furosemide:** Commonly prescribed, 40 mg orally after breakfast, five days a week.

Commonly Used Medications [13-14]

1. **Methyldopa:** Central and peripheral anti-adrenergic action; 250–500 mg three to four times daily.
2. **Labetalol:** Adrenergic receptor antagonist; 100 mg three to four times daily.
3. **Nifedipine:** Calcium channel blocker; 10–20 mg twice daily.
4. **Hydralazine:** Smooth muscle relaxant; 10–25 mg twice daily.

These approaches aim to minimize maternal and fetal risks and ensure optimal outcomes in preeclampsia management.

Case study

A 21-year-old female patient was admitted to the Department of Gynecology with G5P1L1 and a history of previous lower segment cesarean section (LSCS), reporting normal fetal movements. Her obstetric history includes a spontaneous abortion at two months, an LSCS, a spontaneous abortion at four months of gestational age, another spontaneous abortion at two months, and her fifth pregnancy conceived spontaneously. Laboratory investigations revealed a hemoglobin level of 10.8 g/dL, WBC count of 12,100 cells/mm^3, with polymorphs at 72%, lymphocytes at 23%, eosinophils at 5%, bleeding time of 3 minutes and 30 seconds, fasting blood sugar of 98 mg/dL, serum sodium at 143 mmol/L, serum potassium at 4.1 mmol/L, and serum creatinine at 0.7 mg/dL. Thyroid function tests showed TSH at 1.9 µIU/mL, T3 at 1.02 ng/mL, and T4 at 5.91 µg/dL. Viral markers were negative, and her vitals were stable, except for elevated blood pressure at 140/90 mmHg. During her hospital stay, she was treated with injections of Moncef, Metronidazole, Pantoprazole, Diclofenac, Labetalol, and low molecular weight heparin. She was also prescribed oral medications, including Point 40 mg, Paracetamol 500 mg, Iron and Vitamin C tablets, Serax 10 mg, Labetalol 100 mg if blood pressure exceeded 140/80 mmHg, and Linezolid 600 mg. At discharge, her prescribed medications included Linezolid 600 mg (CBD), Pantoprazole 40 mg (OD), Paracetamol 500 mg (BD), Iron and Vitamin C tablets (OD), Serax 10 mg (TID), Chlorpheniramine Maleate 4 mg (OD), 2% Miconazole cream (morning application), and 2% Clotrimazole cream.

Discussion

This case highlights the complexity of managing a high-risk pregnancy in a young patient with a history of multiple spontaneous abortions, previous LSCS, and the current challenge of preeclampsia. The patient's obstetric history indicates recurrent pregnancy loss at early gestational stages, reflecting possible underlying etiologies such as uteroplacental insufficiency, genetic predisposition, or immunological factors. Her current pregnancy, conceived spontaneously, marks a critical opportunity to optimize maternal and fetal outcomes through meticulous monitoring and management [15].

The patient's clinical presentation of elevated blood pressure (140/90 mmHg) with no significant proteinuria suggests the early stages of gestational hypertension, which, if unmanaged, could progress to severe preeclampsia. The laboratory findings, including normal hemoglobin, controlled fasting blood sugar, and stable kidney function, provided reassurance about her systemic health, while thyroid profiles and negative viral markers ruled out additional complicating factors. However, the elevated WBC count, although mild, underscores the need to remain vigilant against potential infections that could exacerbate maternal and fetal risks [16].

The therapeutic approach demonstrated a balance between managing hypertension and preventing complications. The use of antihypertensive therapy, particularly Labetalol, was pivotal in controlling her blood pressure, reducing the risk of end-organ damage and ensuring adequate placental perfusion. The addition of low molecular weight heparin reflects a proactive strategy to address potential thrombotic risks, especially considering her history of recurrent pregnancy losses, which could be linked to undiagnosed thrombophilia [17].

Her treatment also incorporated antibiotics like Linezolid and Metronidazole, targeting infection prophylaxis or management, alongside gastrointestinal protection with Pantoprazole. The inclusion of supplements, such as Iron and Vitamin C, addressed potential anemia and oxidative stress, crucial for supporting fetal growth. Notably, the prescription of topical antifungal agents, Miconazole and Clotrimazole, signifies an awareness of maintaining vaginal and perineal health to minimize infection risks in late pregnancy [18].

This case underscores the importance of individualized care in high-risk obstetric patients. Early identification of potential complications, combined with a multidisciplinary approach involving obstetricians, internists, and infectious disease specialists, ensured a comprehensive treatment plan. The patient's adherence to the prescribed regimen and regular antenatal visits will be essential for a favorable outcome [19].

Innovatively, this case also exemplifies how advancements in pharmacotherapy and diagnostics can transform high-risk pregnancies into manageable conditions. By employing evidence-based interventions and closely monitoring the maternal-fetal unit, healthcare teams can mitigate risks and enhance the likelihood of a successful delivery, thereby turning a high-risk scenario into a testament to modern obstetric care [20].

Conclusion

This case illustrates the importance of an interdisciplinary approach in managing high-risk pregnancies, with clinical pharmacists playing a pivotal role. The patient, with a history of multiple pregnancy losses, previous LSCS, and gestational hypertension, required a personalized treatment plan to address both maternal and fetal health.

Clinical pharmacist interventions included optimizing antihypertensive therapy with Labetalol to control blood pressure, ensuring appropriate use of low molecular weight heparin for thromboprophylaxis, and monitoring for adverse effects of antibiotics like Linezolid and Metronidazole. Patient counseling on adherence to Iron, Vitamin C, and prescribed supplements ensured better management of anemia and oxidative stress, essential for fetal development. Education on the use of topical antifungal agents helped maintain perineal hygiene, minimizing infection risks.

The clinical pharmacist also emphasized the importance of regular antenatal visits, monitoring parameters such as

blood pressure, fetal well-being, and biochemical markers to prevent complications. Through proactive interventions and collaboration with the healthcare team, the pharmacist contributed to reducing maternal and fetal risks, highlighting the value of clinical pharmacy services in achieving positive outcomes in high-risk obstetrics.

Ethical permission

The authors obtained prior informed consent from the patient before documenting this case. Ethical approval was also secured from the Head of the Department and the Superintendent of Government General Hospital, Guntur.

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