



## Review on Clinical Management, Prevention and Control of Preeclampsia

Prof (Dr.) Mohd Wasiullah<sup>1</sup>, Swapnil Kumar Yadav\*<sup>2</sup>, Sujeet Kumar Yadav<sup>2</sup>

1. Prof & Principal, Department of Pharmacy, Prasad Institute of Technology, Jaunpur, U.P., India.

2. Department of Pharmacy, Prasad Institute of Technology, Jaunpur, U.P., India.

\*Corresponding author's E-mail: [drwasipharma@gmail.com](mailto:drwasipharma@gmail.com)

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### ABSTRACT

Classically most women who develop hypertension and proteinuria (Preeclampsia) present sometime after 20 weeks of gestation up to 48 hours postpartum. Recent data suggest that in some women preeclampsia and even eclampsia may develop in the absence of hypertension or proteinuria. Protein nutrients supply to placenta. Due to it the placenta becomes immature, poor plantation and some time it causes the death. In the preeclampsia the spirals arteries are becomes narrow due to fibrous depositions. Anti-hypertensive drugs and diuretics Anti-hypertensive drug treatment for mild to moderate hypertension during pregnancy. Preeclampsia risk is increase two or four times in women during women suffer from diabetes (TYPES-1 AND TYPES-2). Now days diabetes is also common disease or disorder but there is limited number of women whose get pregnant with pre-existing diabetes. Also suffer from preeclampsia. A Hypertensive disorder of pregnancy occurs in about 10% of all pregnant women around the world. Preeclampsia is affected 3-5% of pregnancies. Which are included in the group of hypertensive disorders of pregnancy are eclampsia, gestational hypertension and chronic hypertension. In preeclampsia condition generally doctor advise anti-hypertensive agent for treatment such as methyldopa, hydralazine, labetalol, nifedipine which maintain high blood pressure. Now days methyldopa is used and prescribed by doctor at broad spectrum because it has less side effect and less harmful for pregnant woman. In this article we mention WHO guideline treatment and other basic information which are collected through the doctor and other article which reference are mention in it. There are also mention the seriousness of the preeclampsia condition and complication with other disease or disorder.

**Keywords:** Postpartum, Gestational, Primigravida, Hydratidiform Mole, American diabetes association; American Congress of Obstetricians and Gynaecologist, Trophoblast, Thwart.

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According to the new guidelines given by American Congress of Obstetricians and Gynecologist (ACOG) in 2013. The diagnosis of high level of protein in the urine along with hypertension. Evidence shows that changes in kidney and liver can occur without signs of proteinuria and the amount of protein in urea disease will progress. In preeclampsia required timely diagnosis and management are critical in avoiding complication.<sup>1-3</sup>

### INTRODUCTION

In India the incidence of preeclampsia is reported to be 8-10% among the pregnant women.

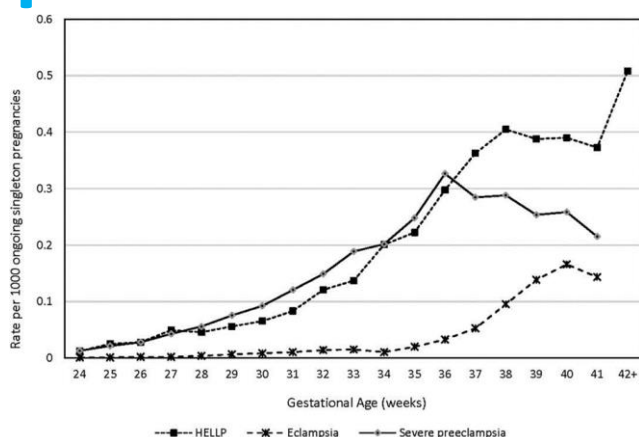


Figure 1: Incidence of preeclampsia

“The purpose of this review is to increase the awareness of atypical form hypertensive disorder during pregnancy.”

Preeclampsia is derived from two word “Pre and eclampsia”.

Pre means before chronic (acute) Eclampsia is a chronic condition or advance level of upgrade preeclampsia. ‘Eclampsia is a new onset of grand mal seizure in women with preeclampsia’.<sup>4,5</sup>

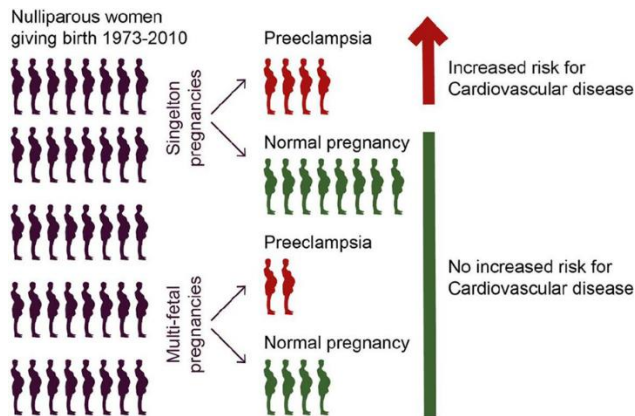
In preeclampsia the blood pressure increases in pregnant women. It affect pregnant women in Two conditions.....

- After 20 weeks Gestations
- Up to 6 weeks after Delivery

Preeclampsia is increasing Blood pressure and the hypertension in pregnancy condition. Generally, it is occurring first time gestation and the chance of



preeclampsia become less chance during multiple time gestation.



**Figure 2:** Preeclampsia is increasing Blood pressure and the hypertension in pregnancy condition

The preeclampsia risk factor increases when the age of women age is less than 18 and more than 35 years and get pregnancy. On the basis of their randomized blood pressure, it is described into two parts.<sup>7-8</sup>

*Mild Preeclampsia*

*Severe Preeclampsia*

**a) Mild preeclampsia:** In mild condition of preeclampsia, blood pressure increase from normal range (120/80mmHg).

In which their systolic pressure is more than 140mmHg and diastolic pressure more than 90mmHg.

**b) Severe preeclampsia:** In it the blood pressure become maximum and their systolic become more than 160mmHg and diastolic more than 110mmHg.

**Table 1:** Clinical and Laboratory parameters

Parameters	Mild	Severe
<b>Clinical parameter</b>		
Systolic BP (mmHg)	140-160	≥160
Diastolic BP (mmHg)	90-110	≥110
Headache	Absent	Present
Visual disturbances	Absent	Present
Epigastric pain	Absent	Present
<b>Laboratory parameters</b>		
Urinary output	>500 ml/24h	≤500 ml /24h
Urinary Protein	<5g/24h	≥5g/24h
Urinary dipstick	1+/2+	3+/4+

**Condition of Preeclampsia<sup>10</sup>**

Development of an abnormal placenta are describing in two ways...

*Normal condition*

*Preeclampsia condition (Abnormal condition of placenta)*

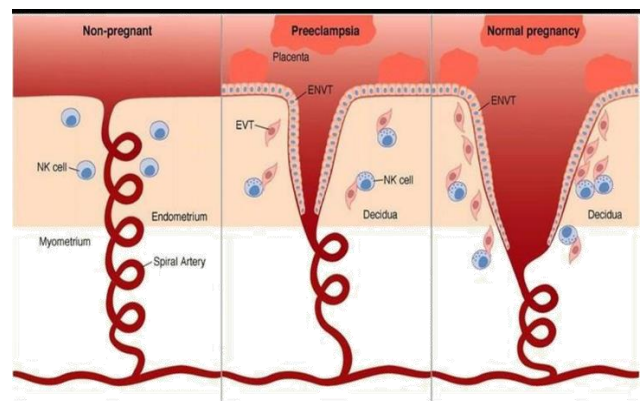
**Normal condition**

In the condition of placenta growth there is arteries arise from mother and connected with the placenta which helps in the delivery and transport of the important protein nutrients and bloods to the placenta.

**Preeclampsia condition**

Protein nutrients supply to placenta. Due to it the placenta becomes immature, poor plantation and some time it causes the death. In the preeclampsia the spirals arteries are becomes narrow due to fibrous depositions.

Which cause the insufficient blood of placenta.



**Figure 3:** Preeclampsia condition

**Risk Factor of Preeclampsia<sup>11-14</sup>**

There is a lot of factor involves which cause the preeclampsia some of them listed below.

**Age:** If the women get pregnancy and their age is less than 18years or more than 35 years then the preeclampsia chance is increase.

**Primigravida:** Primigravida is most common factor which causes preeclampsia. It is a condition when who is pregnant for the first time.

At the first-time women get pregnancy then the preeclampsia chance is increase.

**Hydatidiform mole:** It is meaning a non-cancerous tumor develops in the uterus as a result of a non-viable pregnancy.

In other words, we can say growth of fetus or a side formation growth of mass.

**Gestational diabetes:** It is also called diabetes during pregnancy. In it a form of high blood sugar affecting pregnant women and cause preeclampsia and those who develop gestational diabetes are at high risk of developing type-2 diabetes later in life.

**Obesity:** It is very common disorder involving excessive body fat that increases the risk of health problem. Obesity often results from taking in more calories than are burned

by exercise and normal daily activity. It blocks and disturb the flow of blood and caused preeclampsia.

**Polyhydramnios:** Polyhydramnios is a condition which affects the uterus of pregnant women. In this condition too much amniotic fluid collects in the uterus. Baby floating fluid this fluid volume increases more than 1000ml.

**Renal & vascular disease:** Renal disease is the complication or dysfunction of kidney and produced proteinuria.

Vascular disease is a complication of arteries and veins. It caused hypertension and high blood pressure.

**Family history:** A maternal family history of preeclampsia was associated with up to a 115% increase in preeclampsia risk with the association strongest for early onset preeclampsia. The timing of preeclampsia on set should be considered if preeclampsia heritability and etiology are to be thoroughly elucidated.

**Placenta Ischemia:** - Ischemia is defined as the not sufficient amount of blood reach at the organ. Some things happen with the placenta ischemia. The placenta does not find sufficient amount of blood to get nutrient and oxygen. It also causes preeclampsia.

**Mal nutrient:** If the mother does not get proper or sufficient amount of nutrient and the baby does not find it rise malnutrient and cause preeclampsia.

**Emotional stress:** Sometimes pregnant women become emotional for few reasons then the blood pressure will be increase and cause hypertension cause preeclampsia.

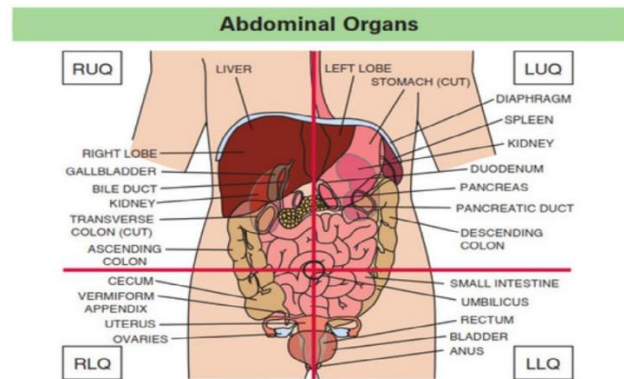
**Table 2:** Risk factor

Risk Factor	Mean RR (95%CI)
Antiphospholipid syndrome	9.72 (4.34-21.75)
Relative risk of preeclampsia	7.19 (5.85-8.83)
Previous preeclampsia	7.19 (5.85-8.83)
Insulin dependent diabetes	3.56 (2.54-4.99)
Multiple pregnancy	2.93 (2.04-4.21)
Null parity	2.91 (1.28-6.61)
Family history of preeclampsia	2.90 (1.70-4.93)
Obesity	2.47 (1.66-3.67)
Age>40 years	1.96 (1.34-2.87)
Preexisting hypertension	1.38 (1.01-1.87)

**Harmful Effect of Preeclampsia on Different Organ of Body<sup>15</sup>**

**Local vasospasm:** It is a condition in which arteries becomes narrow and cause by a persistent contraction of the blood vessels. It is also known as Vasoconstriction this narrowing of blood vessels can reduce blood flow or block. Vasospasm affects mainly brain (Cerebral vasospasm) and coronary artery which is also known as coronary artery vasospasm.

**Quadrant pain:** (Liver damage) Quadrant is mainly divided into 4 parts on the basis of GIT function or their organ.



**Figure 4:** Abdominal organs

The right lower quadrant is the bottom right of tummy (Abdomen) from the tummy down side.

There are many reasons of right lower quadrant pain in the pregnancy most are of no concern; But it is important to seek medical help if your pain is severe don't settle or it is associated with other symptoms.<sup>16-19</sup>

“In the preeclampsia condition the right upper quadrant pain occurs in Epigastric”.

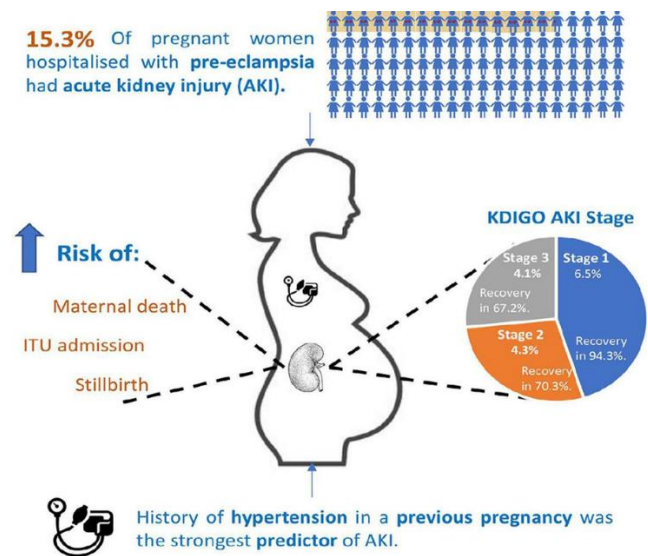
**Reason:**

Due to injury and swelling in the liver. Elevation of liver enzyme.

Stretches capsule liver it is a condition tumor grow in liver or accumulation of inflammatory cell and fluid within the liver cell.

**Effect on kidney:** (damage kidney); When the kidney will be unable to produced sufficient amount of urine and low urine discharged it condition known as Oliguria.

When kidney becomes dysfunction then some time the patient is discharge urea then the same amount of protein may be present which cause Proteinuria.



**Figure 5:** History of hypertension in a previous pregnancy



Proteinuria is a condition in which kidney does not function properly and protein discharged with urine. This condition also indicates the kidneys are damaged. Protein which helps in build muscle and bone regulate the amount of fluid in blood combat infection and repair tissue should remain in the blood. If protein enters the urine, they ultimately leave the body which is not healthy. Some time it damages kidney or other organs.<sup>20-24</sup>

#### Effect on Retina<sup>25-28</sup>

Due to high blood pressure, it also affects the retina which caused "Blurred vision". Flashing light in eye it is a condition flashes are bright spots or points of light in your field of vision.

Scotoma it is a condition in which an area of partial alteration in the field of vision. Scotoma also may look like a dark or blurred spot in vision.

### Retinal Changes

- Diabetic Retinopathy
- Quick progression of Diabetic Retinopathy



- Cause:-
  1. Haematological, hormonal, metabolic, cardio-vascular and immunologic factors.
  2. Increased retinal capillary blood flow – Increased endothelial cell damage.
  3. Progesterone elevates the production of VEGF and other angiogenic factors
- Dependant on several factors:-
  1. Degree of retinopathy at beginning of pregnancy
  2. Time duration since diabetes
  3. Glycemic control
  4. Associated hypertension.

**Figure 6:** Retinal changes

**Hypertension:** Hypertension is very common disorder. Hypertension is a major effect which is produced during preeclampsia. Due to prostaglandin-I<sub>2</sub> which cause the vasodilator decrease and thromboxane are increase due to it vasoconduction increase and blood pressure will be high.

**HELLP Syndrome:** HELLP syndrome is a potentially life threatening disorder that is usually associated with preeclampsia, A condition that occurs in 6-8% of pregnancy.

Its syndrome is a disorder of the Liver and Blood that can be fatal if left untreated.

H- Haemolysis

EL- Elevated Liver Enzyme

LP- Low Platelets Count

**Haemolysis:** Haemolysis is term when the red blood cells get breakdown. So that hemoglobin pigment becomes free and they do not bind with oxygen. So, the oxygen level will decrease

**Elevated Liver Enzyme:** It is indicated that the liver is not functioning properly. Swelling and injured liver cell leak high amount of certain chemical including enzyme into your blood level.

**Low Platelets:** Platelets are component of our blood that helps with clotting. When platelets levels are low than the bleeding time will be increase.

**Oedema:** Oedema is the condition in which fluid contain accumulated in the between tissues and produced swelling. It produced due to high blood pressure and bloods are cross membrane and come out through blood vessels.

**Eclampsia:** When preeclampsia is not treated then it converted in eclampsia and it is a new onset of grand mal seizures in women with preeclampsia.

#### MANAGEMENT AND TREATMENT OF PREECLAMPSIA

Generally, its Management is classified in two ways in which categories on the basis of precaution and surgery.<sup>29</sup>

**General management:** - General management is used at every community health centre (C.H.C) and primary health centre (P.H.C.) to prevent the mother from preeclampsia. It is also two types.

**Mild Preeclampsia:** In the mild condition of preeclampsia the blood pressure will rise more than 140/90mmHg and less than 160/110mmHg. In mild condition patient should have visit twice in a month for general diagnosis.

Diagnose the Oedema may not start and check the urine sample and observe in this protein are not present.

**Severe Preeclampsia:** In the severe condition the blood pressure will be increase more then 160/110mmHg. In this condition patient should visit in every week for diagnosis

In the severe condition patient should take proper rest by which the risen blood pressure will fall down and get maintain. The patient should avoid few things like weight lifting, heavy work load and salty food these things increase more blood pressure.

If there is need or required medication then provided hypertensive agent, diuretics, and sedative drugs.

**Obstetrical management:** - Obstetrical condition is child birth and the postpartum period. In it we get surgery and normal delivery as consider the complication of the mother and baby. It manages in four phases.

**Duration of pregnancy:** If pregnancy is less than 37 week we wait for EDD.

If pregnancy is more than 37 week and not any complication or severity present then we wait for EDD.

**Severity of preeclampsia:** If pregnancy is less than 37 week and in mild preeclampsia condition then we wait for EDD.

If pregnancy is more than 37 week and in severe preeclampsia condition occur then we terminate the placenta.

**Response of medication:** If pregnancy is less than 37 week and in severe preeclampsia condition obtain then we provide Antihypertensive drug until EDD.



**Absence of complication:** - If pregnancy more than 37 week and does not occur any complication then wait for EDD.

**WHO Guideline:** -Dietary salt restriction for prevention of pre-eclampsia

Calcium supplementation during pregnancy to prevent pre-eclampsia and its complications.

Vitamin D supplementation.

Antioxidants for prevention of preeclampsia and its complications.

Anti platelets for prevention of pre-eclampsia.

### Treatment According to WHO

Anti-hypertensive drugs and diuretics Anti-hypertensive drug treatment for mild to moderate hypertension during

pregnancy. A Cochrane systematic review of 46 RCTs involving a total of 4282 women evaluated the potential benefits, risks and side-effects of anti-hypertensive drug treatment for women with mild to moderate hypertension in pregnancy. The trials compared anti-hypertensive drugs with placebo (28 trials, 3200 women) or another drug (19 trials, 1282 women). Thirty-four of these trials (3480 women) were conducted in high-income countries and the others in low and middle-income countries. The trials were generally small, with the largest recruiting 300 women. The class of anti-hypertensive drugs evaluated included alpha agonists, beta blockers, calcium channel blockers, vasodilators, ketanserins and glyceryltrinitrate. All but glycerinetrinitrate were administered orally in the trials. In most trials, mild to moderate hypertension was defined as a diastolic blood pressure of 90 mm Hg or more, but not exceeding 110 mm Hg.<sup>30</sup>

Drug treatment	Dose, daily	Side effects and safety profile
First-line agents Methyldopa Drug of choice according to all groups	0.5–3 gm/day in 2 divided doses	Proven safety and efficacy Some concern with depression, hepatic disturbances, hemolytic anemia –may not lower BP adequately FDA class B; Compatible with breast milk
Labetalol	200–1200 mg/day in 2–3 divided doses 20–40 mg iv (max 220 mg total)	Safety similar to methyldopa may be more efficacious than methyldopa; May be associated with fetal growth restriction. Neonatal hypoglycemia with larger doses FDA class C; Usually compatible with breast milk
Second-line agents Nifedipine (long-acting)	10–30 mg	Widely used May inhibit labor Rarely, profound hypotension if short-acting agent is used with magnesium
Verapamil	80 mg	FDA class C; Usually compatible with breast milk Similar efficacy to other oral agents Risk of interaction with magnesium – bradycardia FDA class C; Usually compatible with breast milk
Clonidine	0.1–0.6 mg/day in 2 divided doses	Safety similar to methyldopa Limited data regarding fetal safety Efficacy similar to methyldopa FDA class C; Possible breast milk effects
Efficacious intravenous agent Possible maternal polyneuropathy, drug-induced lupus, neonatal lupus and thrombocytopenia Tachyphylaxis FDA class D; Usually compatible with breast milk eAlternative options Hydralazine Not recommended by ESH	50–300 mg/day in 2–4 divided doses	Efficacious intravenous agent Possible maternal polyneuropathy, drug-induced lupus, neonatal lupus and thrombocytopenia Tachyphylaxis FDA class D; Usually compatible with breast milk

### Treatment of Pregnant Women with Preeclampsia and Diabetic Patient

Preeclampsia risk is increase two or four times in women during women suffer from diabetes (Type-1 and Type-2). Now days diabetes is also common disease or disorder but there is limited number of women whose get pregnant with pre-existing diabetes. Also suffer from preeclampsia.

**Table 3:** ADA–recommended Glycemic Targets in Pregnancy

Timing	Glycemic target
Preconception	
HbA1c	<6.5%
During pregnancy	
HbA1c	<6.0%
Fasting glucose	≤95mg /dl
One hour after eating	≤140mg /dl
Two hours after eating	≤120mg /dl



GDM (Gestational Diabetes Mellitus) also increase preeclampsia risk as we know pre-existing diabetes is a risk factor for preeclampsia in compression to non diabetic. In non-diabetic condition 2-7% chance has to preeclampsia. Preeclampsia is diagnosed in 15-20% of pregnancy in women with types 1 and types 2 diabetes.

In the condition of hyperglycaemia that is first diagnosed during pregnancy. American diabetes association (ADA) recommended using either the traditional two steps approach to screen for GND at 24–28-week gestation. It is unclear whether a common etiologic pathway underlies both GDM and preeclampsia.<sup>32-34</sup>

**Incidences and adjusted odds ratios for preeclampsia by maternal BMI and diabetes status:**

BMI Category	Preeclampsia with pre-Existing Diabetes	Preeclampsia with Gestational diabetes	Preeclampsia with no diabetes	OR (95% ci) for BMI Categories
Underweight (<18.5)	6.58%	2.94%	1.50%	0.76(0.72-0.80)
Normal (18.5-24.9)	6.41%	3.56%	1.93%	1.0(referent)
Overweight (25-29.9)	8.89%	5.04%	2.91%	1.67(1.63-1.70)
Obesity (30-39.9)	10.19%	6.59%	4.23%	2.46(2.41-2.52)
Morbid obesity	12.80%	9.16%	6.52%	3.62(3.50-3.75)

**Symptom of GDM**

- Polyphasia
- Polydypsia
- Polyurea
- Weight loss
- Blured vision
- UTI (urinary tract infection)

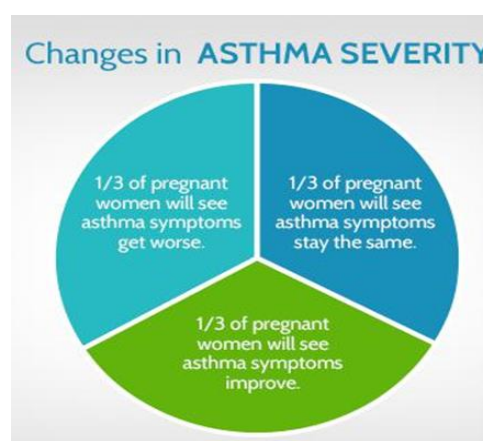
**Treatment**

- Insulin therapy
- Diet therapy (avoid rich carbohydrate food)
- Medication (antihyperglycemic drugs)
- Exercise

**Treatment of Pregnant Women with Preeclampsia and Asthma Patient**

Asthma is a chronic lungs condition in which the patient unable to take sufficient amount of oxygen due to bronchitis.

Asthma is marked by inflammation of the bronchial tube with extra sticky secretion inside the tube. During pregnancy it’s important to control any other medical condition you might have. If asthma condition generates during pregnancy, it can be complication to the mother or baby both.



**Figure 7:** Changes in Asthma severity

Any types of medication effects on the baby during pregnancy and produced the risk complication. Some time we use to treat asthma patient steroid contain drugs during pregnancy. Due to asthma becomes complication to mother and baby both.



**Figure 8:** Potential complications of asthma during pregnancy

**Symptom of asthma patient**

- Coughing
- Wheezing
- Shortness of breath
- Chest tightness
- Chest pain
- Pressure in breathing

**TREATMENT**

Most common use **Inhaler** in the asthma treatment and it is also safe for the pregnancy consume women. A very little amount of drug inhaled through inhaler and the medicament directly reaches the lungs and provides relief.

Oral medication can also be used during pregnancy.

**Treatment of Eclampsia Condition**

In eclampsia condition the treatment aim is to prevent the mother from harming herself which should avoid a fall or aspiration event during the seizures.

This seizure is usually self-limiting and first priority is maternal (Mother) stabilization.

Magnesium sulphate is used to medically manage this patient risk for their seizures.

While fatal bradycardia is common during a seizure the mother should be stabilized before moving toward delivery.

**PREVENTION****Low Dose of Aspirin**

While low dose of aspirin is occasionally used in women with pre-existing hypertension and renal disease. It is not effective in a randomized controlled trial of primigravida women who were low risk in preventing preeclampsia.

**Calcium Supplement**

Daily calcium use has also not been proven effective to prevent preeclampsia. Medically are continuing study on this topic and try to improve their treatment.

In studies that found if patients take occasionally vit.C and vit.E. Then they did not impact the incidence of preeclampsia. Generally thought to be due to inadequate invasion of the placental trophoblast in early pregnancy.

Our lack of a thorough understanding of the pathologic mechanism has thwarted prevention efforts.

**CONCLUSION**

Preeclampsia is a disorder it is not very common but it is a pregnancy complication characterized by high blood pressure and signs of damage to other organ systems most often the liver and kidney.

Preeclampsia usually begins after 20 weeks of pregnancy in women whose blood pressure had been normal. Left

untreated preeclampsia can lead to serious even fetal complications for both mother and baby. If you have preeclampsia the most effective treatment is delivery of your baby even after delivering the baby it can still take a while for mother to get better.

If mother (women) diagnosed with preeclampsia too early in their pregnancy to deliver baby than mother and doctor face a challenging task. Baby needs more time to get mature but there is a need to avoid putting mother and their baby at risk of serious complications. Rarely preeclampsia developed after delivery of a baby such type of condition known as postpartum preeclampsia.

In GDM condition there is a need for regular monitoring of the glucose level in the mother and tries to control it. As we know that diabetes is also a factor which induced or produced the preeclampsia condition. In such type of condition we use anti-hyperglycemic drugs and balance their diet and there is a need to avoid rich carbohydrate fruits and food.

In asthma condition we generally provide inhaler to patient relief and there is a need to avoid dust, pollen, and they also have a need to avoid smoking during asthma and pregnancy asthma is also a serious condition which may cause death and heart stroke.

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