HYPERTENSIVE DISORDERS OF PREGNANCY

#REVISED PROTOCOL 2012

1: Hypertensive disorders are the most common medical problems encountered by women during pregnancy and remain a major cause of maternal and fetal mortality and morbidity throughout the world.

- Worldwide, each year, more than four million women will develop pre-eclampsia and approximately 100 000 women will have eclamptic convulsions, with over 90% occurring in developing countries.
- WHO 2005 reported HDP, accounted for 10-15% of direct maternal deaths and eclampsia 10%.

2: Incidence

- The incidence of pre-eclampsia in an unselected population is approximately 2-3%. (5-7% in nulliparous women)
- Complicates 25% of pregnancies with chronic hypertension
- At 20 weeks gestation in an unselected population, approximately 20% of women with bilateral uterine artery notching will develop pre-eclampsia.
- All forms of glucose intolerance, including GDM are associated with an increased risk; this may be related to obesity.
- 2% of women with pre-eclampsia will develop eclampsia.
- Forty-four per cent of seizures occur postnatally, the remainder being antepartum (38%) or intrapartum (18%).
- The maternal case fatality rate is 1.8% and 35% of women will have at least one major complication.
- Cerebrovascular haemorrhage is a complicating factor in 1-2%.

Table 5: Classifications of hypertensive disorders in pregnancy proposed by the CHS and other international bodies

CHS	NHBPEPWG	WHO	ISSH	ASSH	ACOG
Pre-existing hypertension (HT), essential/secondary	Chronic HT	Pre-existing HT, renal HT and/or proteinuria in pregnancy; underlying HT or renal disease	Chronic HT Chronic renal disease	Chronic HT, essential/ secondary	Chronic HT
Gestational HT without proteinuria, with or without adverse conditions	Transient HT	Gestational HT Gestational proteinuria	Gestational HT Gestational proteinuria	–	Pregnancy-induced HT (includes pre-eclampsia, eclampsia and HELLP syndrome)
Gestational HT with proteinuria, with or without adverse conditions	Pre-eclampsia/ eclampsia	Pre-eclampsia/ eclampsia	Gestational proteinuric HT	Pre-eclampsia, mild/severe	–
Pre-existing HT + superimposed gestational HT with proteinuria	Pre-eclampsia superimposed on chronic HT	Superimposed pre-eclampsia	Chronic HT with superimposed pre-eclampsia	Pre-eclampsia superimposed on chronic HT	Chronic HT with superimposed pregnancy-induced HT
Unclassifiable antenatally	–	Unclassifiable	–	–	–

Guideline: Department of O&G, RIPASH; 2012

3: Classification of hypertension in pregnancy

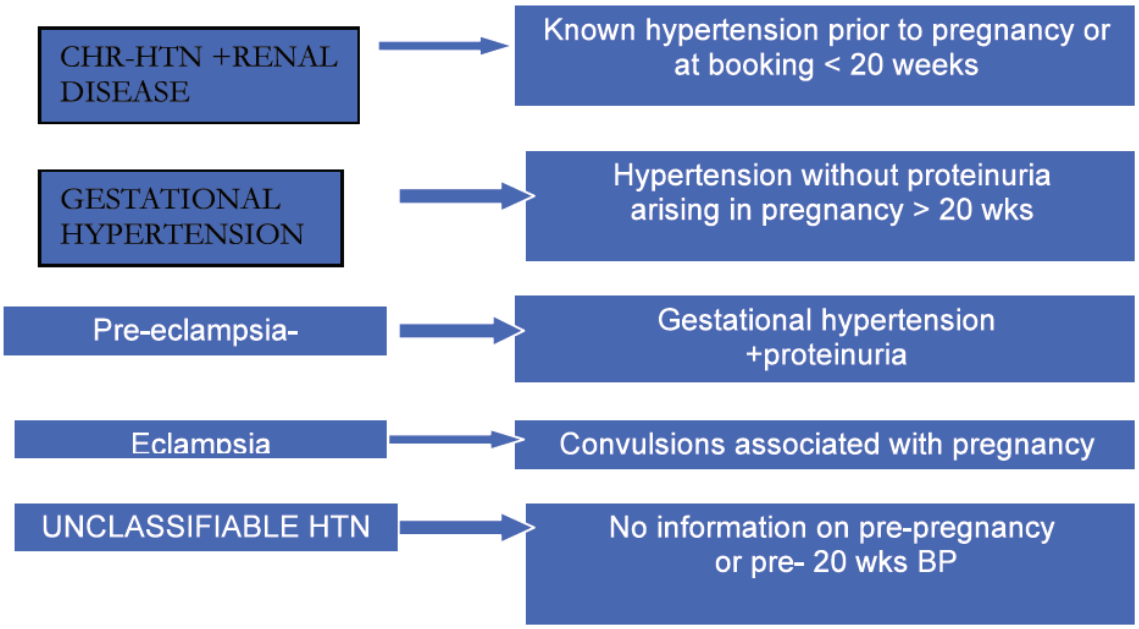
(classification system is based on the system proposed by Davey and MacGillivray)

- **GESTATIONAL HYPERTENSION (PIH)**
  - Gestational hypertension (no proteinuria)
  - Gestational proteinuria (no hypertension)
  - Pre-eclampsia (proteinuria and hypertension)

- **PRE-EXISTING HYPERTENSION AND/OR RENAL DISEASE**
  - Chronic hypertension (no proteinuria)
  - Chronic renal disease (proteinuria ± hypertension)
  - Chronic hypertension with superimposed pre-eclampsia

- **UNCLASSIFIED HYPERTENSION AND PROTEINURIA**
  - When there is not enough information at the time of presentation to classify

Endorsed by ISHHP International Society for the Study of Hypertension in Pregnancy 1986



4: Hypertensive disorders of pregnancy (ISSHP Classification (Davey & MacGillivray 1988)

5: Clinical Implications of Classification

The clinical spectrum of pre-eclampsia ranges from mild to severe forms.

- **Progression slow**, and may never proceed beyond mild pre-eclampsia
- **Progresses more rapid**, changing from mild to severe in days or weeks.
- **Progression fulminant**, with mild pre-eclampsia evolving to severe pre-eclampsia or eclampsia within days or even hours.
- The major goal in managing pre-eclampsia is the prevention of maternal and perinatal morbidity and mortality, primarily through timing of delivery.

6: Maternal Complications

- Eclampsia 1% is usually part of a multisystem disorder.
- Disseminated intravascular coagulation (3%),
- Renal failure (4%)
- Adult respiratory distress syndrome (3%).
- HELLP syndrome (haemolysis, elevated liver enzymes and low platelets syndrome 3%),
- 4-12% with severe PE
- Uncontrolled Hypertension
- Risk of Cerebro-vascular Accident
- Liver failure (Liver rupture)
- Pulmonary oedema 2%(adult RDS) (commonest cause is iatrogenic fluid overload)
- Pulmonary haemorrhage
- Placental abruption
- Eclampsia (risk of aspiration pneumonia)
- Complications of treatment
    - i. Sedation and aspiration.
    - ii. Fluid overload.

7: Fetal complications

- Prematurity
- Intrauterine growth retardation
- Utero-placental insufficiency
- Oligohydramnios
- Respiratory distress syndrome
- Placental abruption placental infarcts
- Acute fetal distress 2° to sudden lowering of BP with anti-hypertensive agents)
- Intrauterine death
- Caesarean section,
- Admission to SCUBU/NICU

8: HELLP SYNDROME

Haemolysis, Elevated Liver enzymes and Low Platelets count Syndrome that occurs in 4-12% with severe PE An AST or ALT level of above 70 iu/l is seen as significant and a level above 150 iu/l is associated with increased morbidity to the mother.

- Hypertension is not always initially characteristic of this condition.
- May be confused with medical conditions like thrombotic thrombocytopenic purpura.
- Presentation
  - Epigastric or RHC pain
  - Nausea, vomiting,
- DIC
- Placental abruption
- Post-partum haemorrhage
- Fetal demise

9: RECURRENCE RATES

1. Women who have had pre-eclampsia are more prone to hypertensive complications in subsequent pregnancies,
2. Risk is best established for nulliparous with a history of pre-eclampsia, the magnitude of the recurrence rate increasing the earlier the disease manifested during the index pregnancy.
3. When pre-eclampsia presents clinically before gestational week 30, the recurrence rate may be as high as 40%.
4. PE reappearance rates may also be population-specific
5. In whites with gestational week 36, recurrence is barely 10%, but it may be substantially greater in black patients. .
6. The recurrence rate for women with one episode of HELLP is almost 5%.
7. Recurrence rates are higher for those experiencing pre-eclampsia as multiparas compared with nulliparous women.
8. Risk is also increased in multiparas who conceive with a new father even when their first pregnancy was normotensive, the incidence being intermediate between that of primiparous women and monogamous multiparous women who have not had a preeclamptic pregnancy.
9. At some stage women should be informed that pre-eclampsia increases the risk of recurrence 7 fold. This risk is higher with preterm pre-eclampsia.

Delivery due to pre-eclampsia	Recurrence risk
20-28 weeks	40%
29-32 weeks	30%
33-36 weeks	20%
37+ weeks	10%

- Women with early –onset pre-eclampsia, necessitating deliver before 34 weeks should be tested for antiphospholid syndrome before discharge and review after 6 weeks.

10: HYPERTENSION IN PREGNANCY

Measurement of blood pressure

1. **Instrument**:
   Manual mercury/aneroid sphygmomanometer or validated automated device Automated blood pressure monitoring systems systematically underestimate systolic pressure in pre-eclampsia

2. Cuff size:

- It is better to use one that is too big than one that is too small.
- Too small a cuff size will result in over-estimation of blood pressure
- Too large a cuff, in under-estimation (though to a lesser extent).
- Ideally, the bladder length should encompass 80% of the arm circumference and the bladder width should be 40% of the arm circumference.
- Standard size is 29-33cm .If ≥. 34 cm USE A LARGER CUFF.
- A larger size (33 x 15 cm) for an arm circumference between 33-41cm
- A thigh cuff (18 x 36) for an arm circumference of 41 cm or more.
- There is less error introduced by using two large a cuff than by using too small a cuff.

3. Position

- setting: relaxed, quiet environment, preferably after rest
- position: lying at a 45-degree angle or sitting (cuff at heart level)
- arm: do not take the blood pressure in the upper arm with the woman on her
- side as this will give falsely lower reading.
- Korotkoff sounds: take Korotkoff V for measurement of diastolic pressure as this is subject to less intra-observer and inter-observer variation than Korotkoff IV. first (systolic) and fifth (diastolic); if diastolic is persistently less than 40 mmHg use muffling or fourth sound and make a note. (Grade A)

11: DEFINITIONS OF Severity of HYPERTENSION IN PREGNANCY

Hypertension

- A Diastolic BP of :110mmHg on any one occasion OR
- B Diastolic BP of: 90mmHg on any two or more consecutive occasions: 4 hours apart.

Mild to moderate hypertension

- BP 140-169/ 90-109 mmHg

Severe hypertension

- Systolic ≥170 ,
- Diastolic BP : ≥ 110mmHg
- (Mean arterial pressure MAP> 125mmHg

Proteinuria

- The definition of gestational proteinuria is derived from studies calculating the 95th centile for an uncomplicated population.
- A protein loss of over 300 mg in 24 hours is associated with an increased morbidity to the mother and her baby. (Grade B)
- Two "clean-catch" midstream or catheter specimens of urine (collected < 4 hours apart)
- Reagent strip testing "++" protein.
- "+" protein IF Urine SG <1.030 AND pH: < 8

- An elevated protein creatinine ratio of *greater than 30 mg/mmol* correlates with a 24 hour protein excretion greater than 300 mg and should be used to check for significant proteinuria. (Grade C)

Severe proteinuric hypertension

- BP≥140/90
- Proteinuria ≥ 300mmHg/L or ≥ 2+ on urinary dipstick
- Urine protein/creatinine ratio ≥ 30mg %/mmol/l

And at least one of the following

- Headache, visual disturbance, epigastric pain
- Clonus (>3 beats)
- Platelet count < 100,000/ul. and or falling from previous count.
-

or

- BP of 160 mm Hg or more systolic, or 110 mm Hg or more diastolic.
- Proteinuria of 2.0 g or more in 24 hours (2+ or 3+ on qualitative examination). The proteinuria should occur for the first time in pregnancy and regress after delivery.
- Increased serum creatinine (>1.2 mg/dL unless known to be previously elevated).
- Platelet count < 100,000 cells/mm3 and/or evidence of microangiopathic haemolytic anaemia (with increased lactic acid dehydrogenase).
- Elevated hepatic enzymes (alanine aminotransferase [ALT]> 50U/L or aspartate aminotransferase [AST]).
- Persistent headache or other cerebral or visual disturbances.
- Persistent epigastric pain. Liver tenderness
- Papillodema
- Clonus
- Eclampsia is the occurrence, in a woman with pre-eclampsia, of seizures that cannot be attributed to other causes.
- Edema legs occur in too many normal pregnant women to be discriminant and has been abandoned as a marker in this and other classification schemes.

Chronic hypertension

- Chronic hypertension is defined as hypertension that is present and observable before pregnancy or that is diagnosed before the 20th week of gestation.
- Hypertension is defined as a blood pressure equal to or greater than 140 mm Hg systolic or 90 mm Hg diastolic (5th K sound disappearance).
- Hypertension that is diagnosed for the first time during pregnancy and that does not resolve postpartum is also classified as chronic hypertension**.**

Gestational hypertension

- The woman who has blood pressure elevation detected for the first time after 20 WEEKS in mid pregnancy, without proteinuria, is classified as having gestational hypertension.
- This nonspecific term includes women with the pre-eclampsia syndrome who have not yet manifested proteinuria as well as women who do not have the syndrome.
- The hypertension may be accompanied by other signs of the syndrome, which will influence management.

Guideline: Department of O&G, RIPASH; 2012

- The final differentiation that the woman does not have the pre-eclampsia syndrome is made only postpartum.
- If pre-eclampsia has not developed and blood pressure has returned to normal by 12 weeks postpartum, the diagnosis of transient hypertension of pregnancy can be assigned.
- Note that the diagnosis of gestational hypertension is used during pregnancy only until a more specific diagnosis can be assigned postpartum.

Superimposed pre-eclampsia

- Most of the increased risk associated with chronic hypertension occurs in the setting of superimposed pre-eclampsia.
- Pre-eclampsia is more common in women with chronic hypertension and complicates almost 25% of such pregnancies. The incidence is even higher if the high blood pressure is associated with renal insufficiency, the presence of hypertension for at least 4 years, and a history of hypertension in a previous pregnancy.

Renal function during pregnancy

- Glomerular filtration increases as early as 6 weeks gestation and as a consequence creatinine and urea values fall from a mean of 62 µmol/L and 4.3 mmol/L, respectively, to 44 µmol/L and 3.2 mmol/L, respectively.
- Consequently a creatinine level of 80 µmols/L is abnormal in pregnancy.
- Physiological dilatation of the ureters and calyces occurs in pregnancy and is more common on the right (75%) than left (33%).
- Calyceal dilatation is up to 15mm is considered normal.
- The assessment of renal function by creatinine levels alone is prone to error in women with advanced renal dysfunction (i.e. plasma creatinine levels > 125 µmol/L).
- Urinary creatinine excretion results from both glomerular filtration and tubular secretion, but the proportion formed by secretion increases with advancing renal dysfunction – hence, "GFR" can be overestimated by up to 50%.
- Renal function in these circumstances is better assessed by creatinine clearance

Test	Rationale
Hemoglobin and hematocrit	Hemoconcentration supports diagnosis of preeclampsia and is an indicator of severity. Values may be decreased, however, if hemolysis accompanies the disease.
Platelet count	Thrombocytopenia suggests severe pre-eclampsia.
Quantification of protein excretion	Pregnancy hypertension with proteinuria should be considered preeclampsia (pure or superimposed) until it is proved otherwise.
Serum creatinine level	Abnormal or rising serum creatinine levels, especially in association with oliguria, suggest severe preeclampsia.
Serum uric acid level	Increased serum uric acid levels suggest the diagnosis of pre-eclampsia.
Serum transaminase levels	Rising serum transaminase values suggest severe pre-eclampsia with hepatic involvement.
Serum albumin, lactic acid	For women with severe disease, these values indicate the extent of endothelial leak (hypoalbuminemia), presence of hemolysis (latic acid dehydrogenase level increase, schizocytosis, spherocytosis), and possible coagulopathy, including thrombocytopenia.

PROTOCOL FOR HYPERTENSIVE DISORDERS OF PREGNANCY
RIPAS HOSPITAL
POLICY NO/ 2011 UPDATED

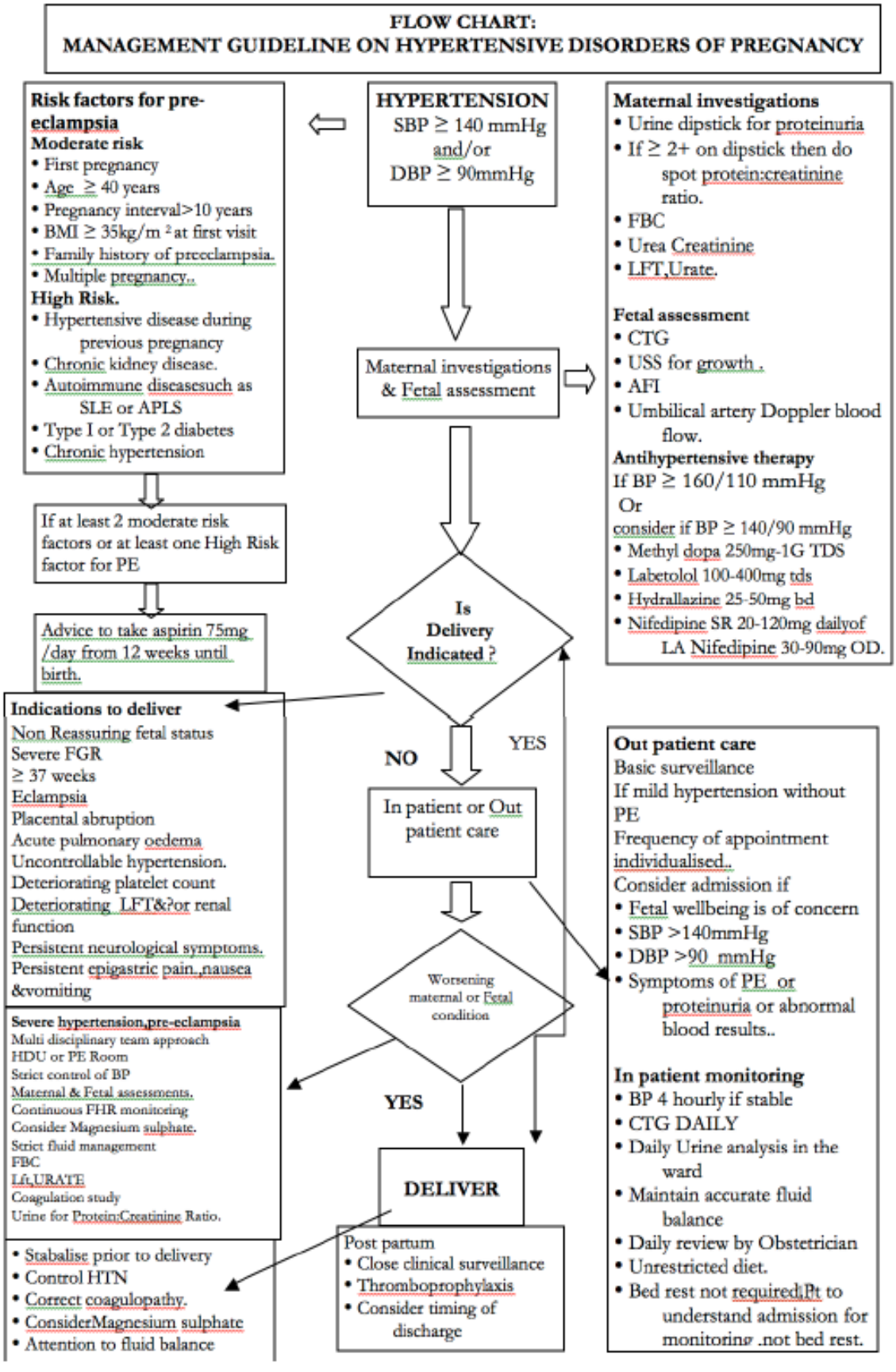
Community monitoring: thresholds for further action
(Ref **PRECOG RECOMMENDATION 5)**

Description	Definition	Action by midwife/GP	PRECOG
New hypertension without proteinuria after 20 weeks	Diastolic BP ≥ 90 and < 100mmHg	Refer for hospital step-up assessment within 24 - 48 hours	C
	Diastolic BP ≥ 90 and < 100mmHg with significant symptoms*	Refer for same day hospital step-up assessment	C
	Systolic BP ≥ 160 mmHg	Refer for same day hospital step-up assessment	C
	Diastolic BP ≥ 100mmHg	Refer for same day hospital step-up assessment	C
New hypertension and proteinuria after 20 weeks	Diastolic BP ≥ 90mmHg and new proteinuria ≥ 1+ on dipstick	Refer for same day hospital step-up assessment	A
	Diastolic BP ≥ 110mmHg and new proteinuria ≥ 1+ on dipstick	Arrange immediate admission	A
	Systolic BP ≥ 160mmHg and new proteinuria ≥ 1+ on dipstick	Arrange immediate admission	A
	Diastolic BP ≥ 90mmHg and new proteinuria ≥ 1+ on dipstick and significant symptoms	Arrange immediate admission	A
New proteinuria without hypertension after 20 weeks	1+ on dipstick	Repeat pre-eclampsia assessment in community within 1 week.	C
	2+ or more on dipstick	Refer for hospital step-up assessment within 48 hours	C
	≥ 1+ on dipstick with significant symptoms*	Refer for same day hospital step-up assessment	C
Maternal symptoms or fetal signs and symptoms without new hypertension or proteinuria	Headache and or visual disturbances with diastolic blood pressure less than 90mmHg and a trace or no protein	Follow local protocols for investigation. Consider reducing interval before next PRECOG assessment	C
	Epigastric pain with diastolic blood pressure less than 90mmHg and a trace of protein	Refer for same day hospital step-up assessment	C
	Reduced movements or small for gestational age infant with diastolic blood pressure less than 90mmHg and a trace or no protein	Follow local protocols for investigation of fetal compromise. Consider reducing interval before next full pre-eclampsia assessment	C

HYPERTENSION MANAGEMENT

Step 1 DIAGNOSIS	CRITERIA	CRITERIA Action by DCU Step 2	Action by DCU midwife: Step 3
No clinical suspicion of fetal compromise; No symptoms	Diastolic BP≥110mmHg OR Systolic BP≥160mmHg	**ADMIT**	
	Diastolic BP 100-109 mmHg OR Systolic < BP 160mmHg	Medical review to consider admission	
	Diastolic BP 90-99 mmHg	Blood tests relating to preeclampsia	Abnormal blood and/or Doppler results Arrange medical review
		If onset ≤ 36 completed weeks: Umbilical artery Doppler	Normal blood and/or Doppler results Allocate to named consultant **Monitor at least weekly**
New hypertension New proteinuria No clinical suspicion of fetal compromise; No symptoms	Diastolic BP ≥ 90mmHg and new proteinuria ≥2+	**ADMIT**	
	Diastolic BP 90-99 mmHg and 1+ proteinuria	Urinary PCR or 24 hour urine collection. Blood test relating to preeclampsia	PCR > 30 or significant proteinuria (with hypertension) **ADMIT**
		If onset ≤ 36 completed weeks: Umbilical artery Doppler	Abnormal blood and/or/ Doppler results Arrange medical review PCR < 30 or no significant proteinuria and normal blood and Doppler results Allocate to named consultant. Monitor at least weekly.
New proteinuria **without** HTN No clinical suspicion of fetal compromise; No symptoms	1+ on dipstick	Urinary PCR or 24 hour urine collection	PCR > 30 or significant proteinuria Arrange medical review PCR < 30 or no significant proteinuria Arrange community assessment within one week.
	2+ or more on dipstick	Blood tests relating to preeclampsia Arrange 24 hour urine collection	Abnormal blood tests and/or Doppler or significant proteinuria Arrange medical review
		If onset ≤ 36 completed weeks: **Umbilical artery Doppler**	Normal blood/Doppler results; no significant Proteinuria Allocate to named consultant. Monitor at least weekly.

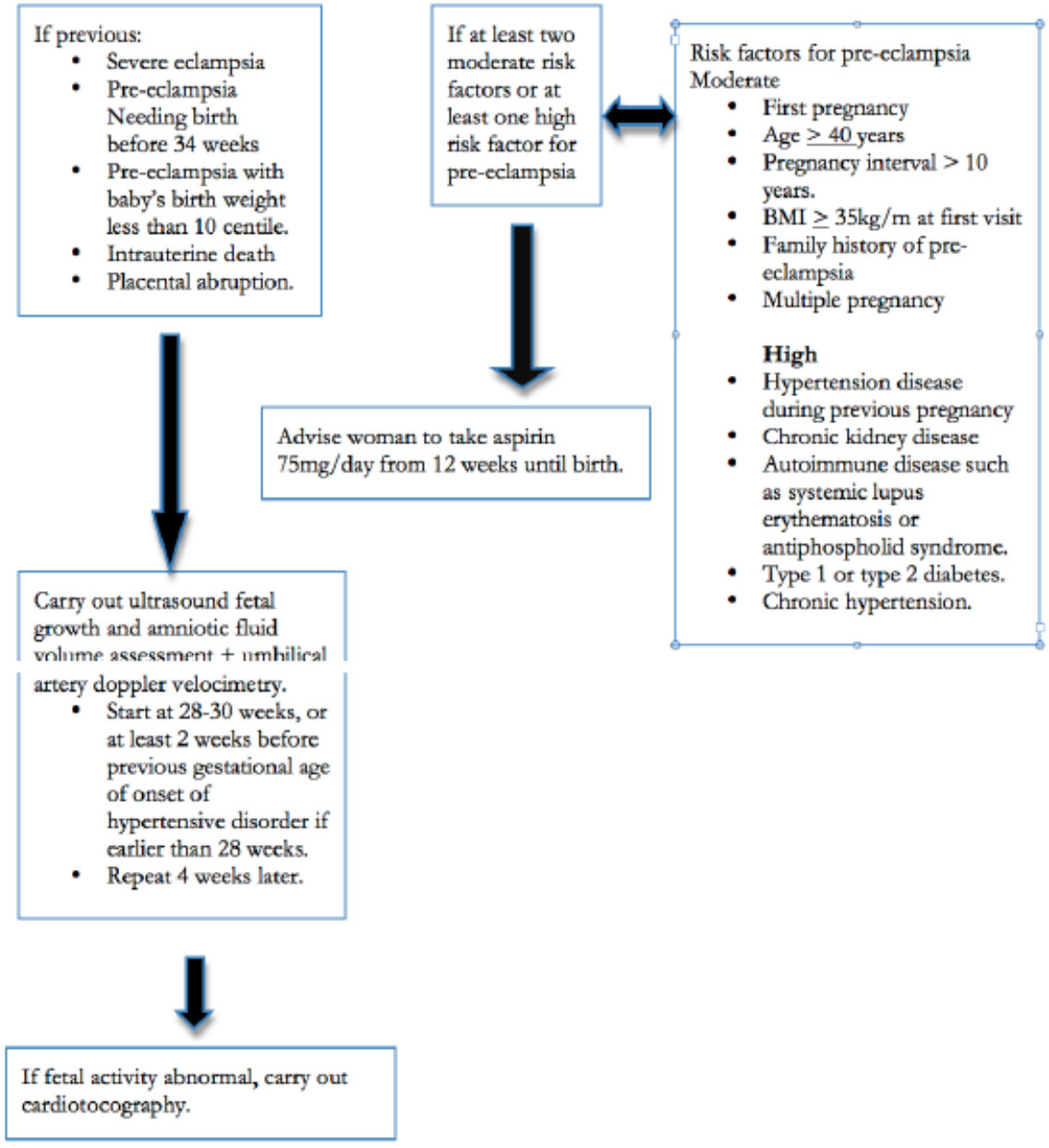
Guideline: Department of O&G, RIPASH; 2012



Guideline: Department of O&G, RIPASH; 2012

Moderate and high risk of pre-eclampsia

Antenatal care and fetal monitoring



Guideline: Department of O&G, RIPASH; 2012

1 : Hypertension Detected at Booking Visit

A. Preliminary assessment

- Women in whom hypertension is detected during routine ante-natal care should first undergo **preliminary assessment** to ascertain that the hypertension is not merely spurious.
- Where possible, this assessment period may best take place in the woman's own home.
- Hypertension is **not** confirmed during **preliminary assessment** unless it is observed to be sustained over a period of at least 4 hours

B. Assessment for the presence of the following risk factors:

The presence of one or more risk factors at booking justifies referral for specialist input into antenatal care.

Ref (PRECOG) preeclampsia in the community guideline

- first pregnancy,
- previous preeclampsia,
- more than 10 years since last pregnancy,
- body mass index more than 35 *kg/m2,*
- first degree family history of preeclampsia,(mother or sister)
- Initial diastolic blood pressure of 80 mm Hg, or more
- proteinuria at booking (300 *mg/L* or more positive proteinuria on more than one occasion or more than 300 mg in 24 hours),
- multiple pregnancy, or
- underlying medical conditions associated with preeclampsia including pre-existing hypertension and presence of antiphospholipid antibodies.
- Primigravid state 10% will develop gestational hypertension and only up to 7% will develop pre-eclampsia
- Multigravida pregnant by a different partner
- History of increased blood pressure before conception or in a previous gestation, especially before week 34 or when the patient is multiparous .
- Prior pre-eclampsia in a pregnancy by the same partner
- Family history of pre-eclampsia in a first-degree relative
- Age younger than 18 years or older than 35 years
- **Placental/fetal risk factors for preeclampsia**
  Multiple gestations, Hydrops fetalis Gestational trophoblastic disease .
  Triploidy
- Obesity.
- Renal disease. Underlying renal vascular or renal parenchymal disease especially SLE and antiphospholipid syndrome
- Essential hypertension. Pre-gestational Diabetes. Autoimmune disease, Collagen vascular disease .
- Thrombophilic state. Severe alloimmunisation

BOOKING VISIT
ASSESS RISK FACTORS

BEFORE 20 WEEKS' GESTATION

- Molar pregnancy and multiple pregnancy should be excluded.
- Investigations done to differentiate between primary, and secondary hypertension and Those with pre-existing chronic hypertension or renal disease should be managed during pregnancy by an obstetrician with access to a specialist physician. (GRADE C)

Young women with pre-existing or early gestational hypertension are among the population with secondary hypertension .(e.g., renal disease, renovascular hypertension, primary aldosteronism, Cushing's syndrome, and pheochromocytoma).
Patients Presenting with Hypertension < 20 Weeks Gestation
Most women presenting with hypertension <20 weeks gestation have essential hypertension or are known hypertensives under the care of primary physicians and screened for secondary hypertension.
Young women with pre-existing or early gestational hypertension are among the population with secondary hypertension .(e.g., renal disease, renovascular hypertension, primary aldosteronism, Cushing's syndrome, and pheochromocytoma
Further evaluation with noninvasive testing may be warranted, especially when there is suspicion of those forms of secondary hypertension that are associated with more maternal and fetal complications.
The same data obtained for high-risk women presenting with normal blood pressure is helpful in determining whether further increments in pressure in the third trimester represent the "physiologic" increments or the onset of superimposed preeclampsia.
Since these fetuses are at higher risk for the development of intrauterine growth restriction, early baseline sonography for dating and fetal size is also indicated for these patients.

Risk assessment at every visit

ASSESSMENT: AFTER 20 WEEKS' GESTATION

FOLLOW ------ Follow flow chart

- All women should have access to a day assessment unit. (Grade A)
- The presence of one or more risk factors at booking justifies referral for specialist input into antenatal care.
- All women with blood pressure greater than 140/90 mmHg with or without proteinuria should be referred to a day assessment or obstetric unit. (Grade A)
- The presence of asymptomatic proteinuria on dipstick should be followed by 24-hour urine assessment for renal disease. A
- All women with persistent proteinuria, even in the absence of hypertension, should be referred for further investigation. (Grade A)
- Women should be referred to a hospital-day assessment unit or similar facility for step-up care once screened positive, and test results should be obtained within 24 hours for further management

- Pregnant women with a headache of sufficient severity to seek medical advice, or with new epigastric pain, should have their blood pressure measured and urine tested for protein, as a minimum

Checklist for Day Care Unit for HIGH Risk Pregnancy

Before a pregnant woman leaves her initial DCU assessment, give information leaflet so that she will understand the :

a) signs and symptoms of preeclampsia, clinical features of severe pre-eclampsia (in addition to hypertension and proteinuria) are:
    - symptoms of severe headache
    - visual disturbance
    - epigastric pain and/or vomiting
    - liver tenderness
    - abnormal liver enzymes (ALT or AST rising to above 70 iu/l)
    - platelet count falling to below 100 x 106/l
    - signs of clonus
    - HELLP syndrome
    - Pailloedema
b) the rate at which it may develop and
c) the potential seriousness of her situation

Checklist

- To report and act on any new symptoms that she may notice herself.
- Encourage her to self-monitor on hand held notes or a DCU summary from her assessment. (BP recordings/symptoms)
- A follow up appointment: time, date, place written on small card.
- Allocation to a named consultant.
- An agreed mechanism by which she will be informed of her test results and discuss any change to her antenatal care plan within 24 hours.
- She is made to understand that she can be proactive in following up any results and arranging a follow up appointment if the contact arrangements do not work.

Guideline: Department of O&G, RIPASH; 2012

Organization and protocols

Consultant care and involvement in service provision

- An obstetrician-led special interest team of appropriate size and composition should be set up in each unit.
- Junior staff should be prevented from being exposed to potentially dangerous clinical situations of which they have little experience.
- A single senior clinician should have responsibility for the overall management of each case, in particular for fluid balance, and advise on difficult cases should be forthcoming.
- The early involvement of consultant obstetricians in the management of women with suspected or proven pre-eclampsia and eclampsia is essential.
- There should be early engagement of intensive care specialists in the care of women with severe pre-eclampsia

Transfer of patients

- Women with severe pre-eclampsia should have early referral to a specialist centre. A woman should not be transferred unless it is considered safe to do so and she has been stabilized. (Grade C).
- Severe, life-threatening hypertension must be treated effectively
- Management protocols should recognize the need to avoid very high systolic blood pressures associated with the risk of intracerebral haemorrhage.

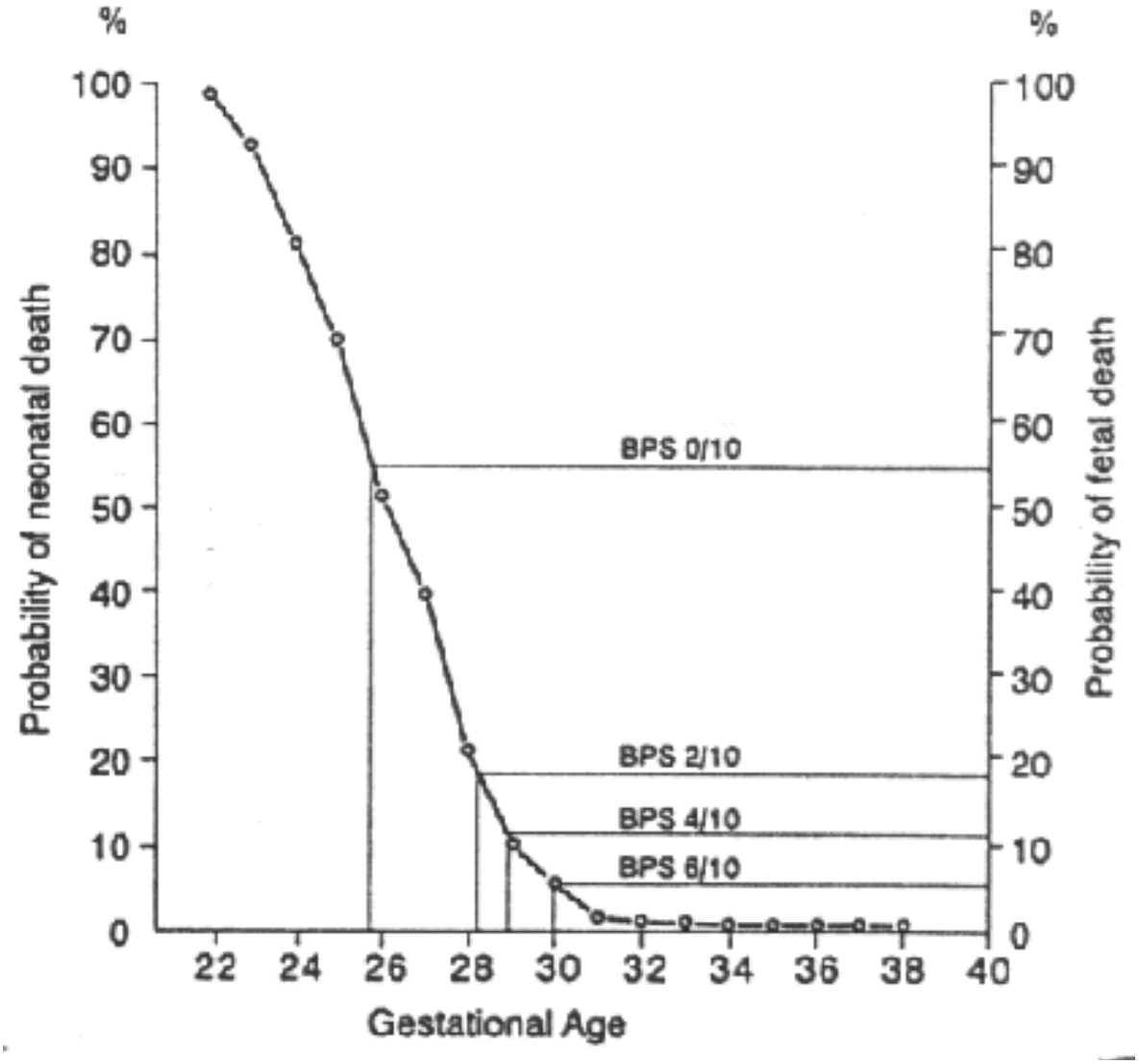
The objectives of therapy for pre-eclampsia

- Delivery is always appropriate therapy for the mother but may not be so for the fetus.
- For maternal health, the goal of therapy is to prevent eclampsia as well as other severe complications of pre-eclampsia.
- Delivery induction is not indicated for a preterm fetus with no evidence of fetal compromise in women with mild disease.
- <u>There are two important corollaries of this statement.</u>
    - First, any therapy for pre-eclampsia other than delivery must have as its successful end point the reduction of perinatal morbidity and mortality.
    - Second, the cornerstone of obstetric management of pre-eclampsia is based on whether the fetus is more likely to survive without significant neonatal complications in utero or in the nursery.

ONGOING FETAL AND MATERNAL SURVEILLANCE

- Severity, timing, progression and onset of clinical features are unpredictable.
- Management of women with preeclampsia less than 32 weeks should be restricted to centres with facilities for pre-term birth.
- Serial surveillance of maternal and fetal well-being is recommended

THE BIOPHYSICAL PROFILE

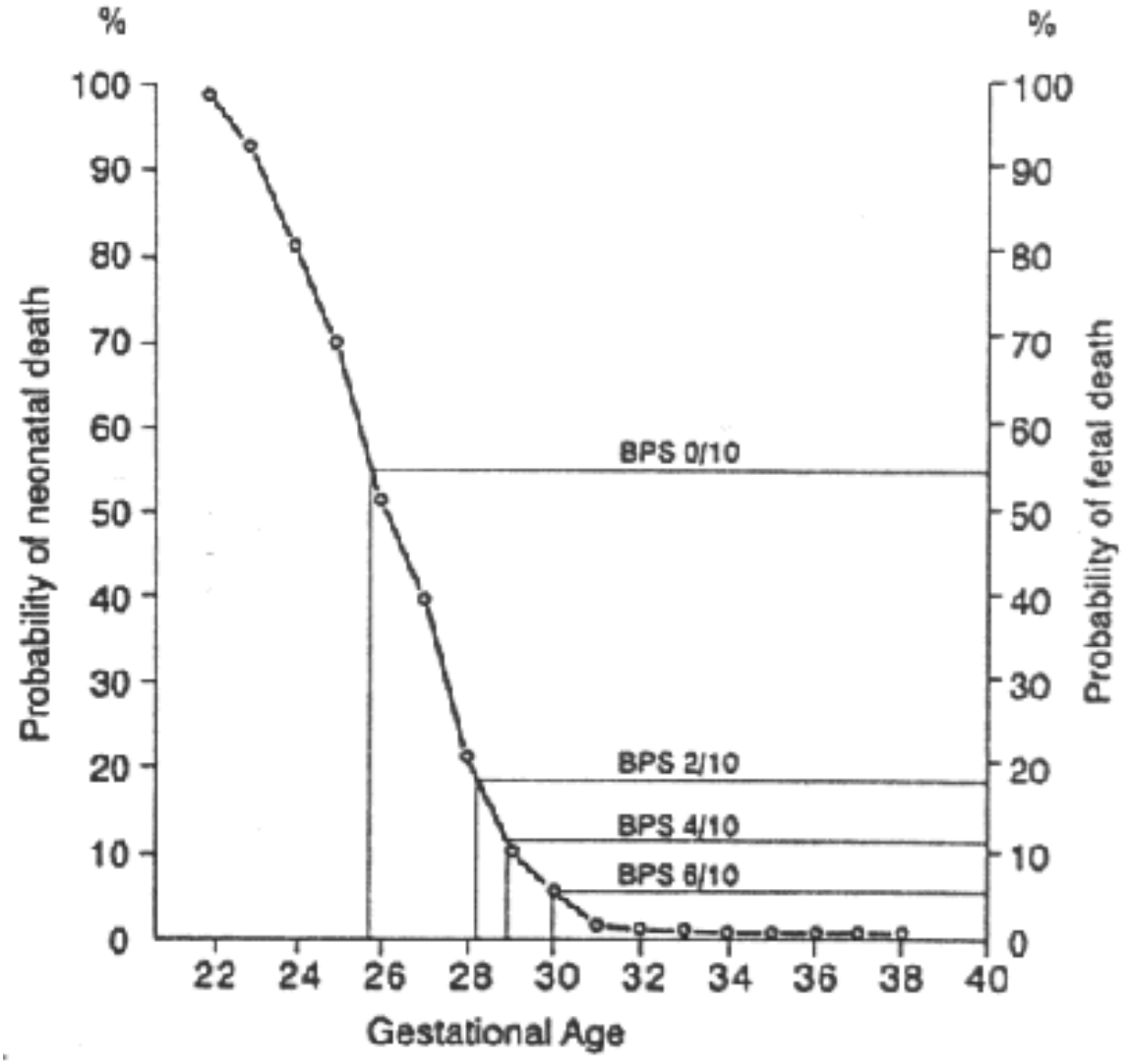


BIOPHYSICAL PROFILE

- examines fetal body movement, breathing movement, tone, and amniotic fluid volume and heart rate variability by CTG :
- Thirty minute real time ultrasound observation of ≥four parameters:
  1) Fetal Breathing Motions (0-2)
  2) Fetal Extremity/Trunk Movement (0- 2),
  3) Fetal Tone - Flexion/Extension – Return to Flexion (0-2),
  4) Amniotic Fluid Qualitative
     - >2cm. Pocket (0-2).
     - Total 6-8 / 8 Reassuring.
     - False (-) < 1%,

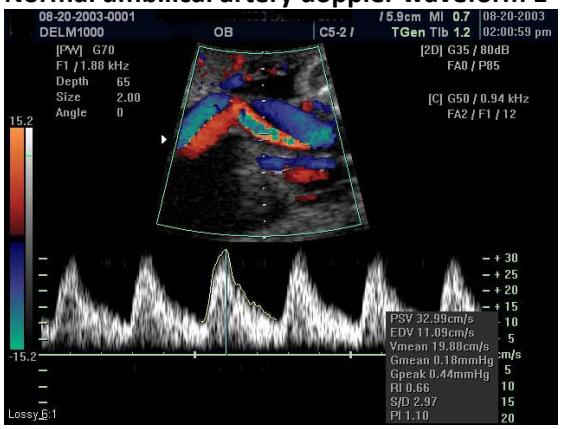
DOPPLER VELOCIMETRY

- False (+) 60-15% 1 Parameter,
- 1.8% Two Parameters

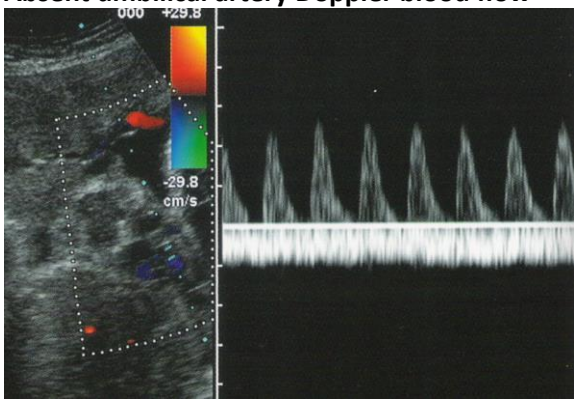


Doppler assessment, using absent or reversed-end diastolic flow, improves neonatal outcome and serial investigations of this and other fetal vessels can be used to follow pregnancies under treatment and optimise deliver.

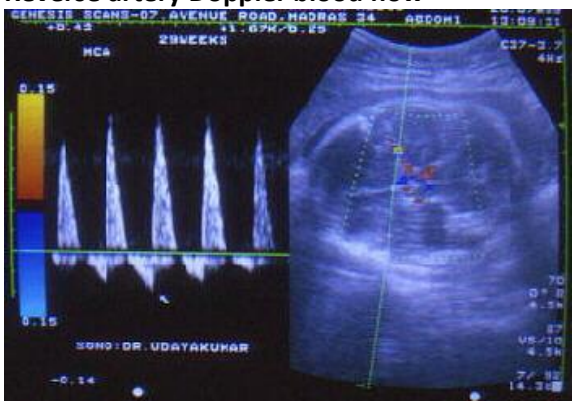
Normal umbilical artery doppler waveform 1



Absent umbilical artery Doppler blood flow



Reverse artery Doppler blood flow



Collective uncertainty for umbilical artery Doppler

Umbilical artery Doppler	Gestation (completed weeks)					
	24–25	26–28	29 - 30	31–32	33–34	35–36
Reversed EDF	wait	???	deliver	deliver	deliver	deliver
Absent EDF	wait	wait	???	???	deliver	deliver
EDF Severely reduced	wait	wait	wait	???	???	deliver
EDF moderately reduced	wait	wait	wait	wait	wait	???

Guideline: Department of O&G, RIPASH; 2012

FETAL SURVEILLANCE

- Daily fetal movement counts and
- Periodic fetal NST and BPP.
- Weekly or biweekly testing is appropriate in most women.
- Daily testing is indicated in women with severe disease.
- Results will affect clinical decision making.

On-going fetal surveillance

Classification	Modality	Frequency
Gestational Hypertension	-USS for fetal growth/ AFI/ Doppler	At time of diagnosis and 3-4 weekly
Preeclampsia	-USS for fetal growth/ AFI/ Doppler -CTG	At time of diagnosis and 2-3 weekly -Twice weekly
Preeclampsia with fetal growth restriction	-CTG -USS for fetal growth/ AFI/ Doppler	-Twice weekly -On admission and 2nd weekly.
Chronic hypertension	-Early dating USS -USS for fetal growth/ AFI/ Doppler	-First trimester -Third trimester, 4th weekly

MATERNAL SURVEILLANCE

Classification	Modality	Frequency
Gestational hypertension	-Urinalysis for protein -Preeclampsia bloods	1-2 per week. -Weekly
Preeclampsia	-Urinalysis for protein -Preeclampsia bloods	-At the time of diagnosis and if non proteinuric, repeat daily. -Twice weekly or more if unstable.
Chronic hypertension	-Urinalysis for protein -Preeclampsia bloods	-Each visit -If sudden increase in BP or new proteinuria

Hospitalisation and bed rest are of unproven value in the management of mild, non-proteinuric gestational hypertension. (Grade A)

Place of Management :

Monitoring and management of non-proteinuric gestational hypertension is often best undertaken (in terms of both clinical- and cost-effectiveness) on a day-care DCU or community basis.
(GRADE B) 12/21/2012

Baseline Laboratory Studies for Women at High Risk for Preeclampsia

- Hemoglobin Hematocrit Platelet count
- Serum creatinine Serum uric acid 24-hour collection for urine protein (if random dipstick measurements are 1+ or greater)

Women with a history of severe early onset pre-eclampsia, especially if associated with growth restriction or late fetal loss, should be screened for antiphospholipid syndrome and the implications for future pregnancies should be discussed. (Grade B)

Women who had early severe pre-eclampsia or pre-eclampsia associated with fetal growth restriction, stillbirth or abruption, may be tested for INHERITED THROMBOPHILIA.:hyperhomocysteinuria, factor V Leiden, protein S, protein C and antithrombin (AT) deficiency but the implications for future pregnancies have yet to be determined. (Grade C)

Patients with thrombophilia screen positive should be offered aspirin and heparin or LMWH.
Serial estimations for reduced liquor volume is also associated with placental insufficiency and fetal growth restriction and can detect fetal compromise

Anti-hypertensive drug treatment

- Antihypertensive treatment is not usually indicated for women with non-proteinuric gestational hypertension.
- Where diastolic BP > 100mmHg or where the disease has arisen at < 32 weeks gestation consideration may be given to antihypertensive therapy. (Grade A)
- When anti-hypertensive drugs are used, methyldopa may be considered as the most appropriate first-line agent although other drugs, eg labetalol, which may be preferred by some clinicians are acceptable alternatives. (GRADE B)
- Although delivery is the definitive treatment for gestational hypertension, mild, nonproteinuric disease does not, in itself, constitute an indication for induction of labour. (Grade C)
- Close monitoring of fluid intake and urine output is mandatory.
- Preloading the circulation with 400-500ml colloid prior to regional anaesthesia or vasodilatation with hydralazine may reduce the risk of hypotension and fetal distress.
- There is little properly controlled evidence about the effects of either volume expansion or diuretic therapy for women with pre-eclampsia

Class of antihypertensive	Drug	Starting dose	Maximum dose
Centrally acting	Methyldopa	250mg tds / qds	3 G
Aβ blocker	Labetolol	100-400 mg tds	1600mg
Calcium channel blocker	Nifedipine LA Nifedipine SR or retard	30mgOD 10-30 mg	90 MG OD Up to 4 times a day.
Vasodilator	Hydrallazine	10mg BD 25mg 6-hrly	75mg 6-hrly

Avoid very high systolic blood pressures associated with the risk of intracerebral haemorrhage.
Clinical protocols identify a systolic blood pressure above which urgent and effective antihypertensive treatment is required. Severe, life-threatening hypertension must be treated effectively.

Guideline: Department of O&G, RIPASH; 2012

Drugs for acute severe hypertension

Drug	Dose	Route	Onset of Action
Nifedipine	5-10 mg capsule	Oral	10-20 minutes Repeat after 30 mins
Hydralazine	5-10 mg	IV bolus	20 minutes Repeat after 20 minutes
Labetalol	20-50 mg	IV bolus over 2 mins	5 minutes Repeat after 15-30 mins

HYDRALLAZINE REGIME

When severe hypertension of diastolic BP 110 mmHg is detected in the AN Wards and hydralazine is ordered: the following guideline must be followed.

- Hydralazine IV bolus must be given by a doctor.
- IV access must be secured and appropriate fluid management
- normal saline 0.9% at 83ml/Hr
- Patient must be kept in a High Dependency area with close and frequent monitoring of BP with a manual mercury sphygmomanometer every 20-30 minute as per severe PE protocol after the injection.
- Patient must not be allowed out of bed for toilet even if she insists and she must be made to understand the risk to her and her baby of sudden onset of hypotension after the IV hydralazine.
- When hypotension occurs it should be detected early and appropriately fluid therapy instituted with full support from the nursing staff and other doctors should be called in if needed.
- CTG monitoring should be started and continuous monitoring instituted in order to detect early signs of fetal distress.
- At no time should a patient who has received hydralazine bolus be left unattended.
- Continue monitoring BP 4 hourly once it has settled.

If conservative management is planned then further assessment of the fetus with ultrasound measurements of fetal size, umbilical artery Doppler and liquor volume should be undertaken.

Serial assessment will allow timing of delivery to be optimised.
Cardiotocography (non-stress test) is the mainstay of fetal monitoring can be repeated regularly.

SEVERE LABILE HYPERTENSION
[escape from blood pressure control]
For those patients with severe preeclampsia

1. PLANNED DELIVERY ON THE BEST DAY IN THE BEST WAY

FOR patients with no end organ damage and no symptoms, these are likely to be patients with essential hypertension] the following guideline is used until 30 weeks-34 weeks

Cardiac Physician has outlined the management of ". Ref: Hypertension/Cardiology support for Obstetrics &Gynaecology patients ".dated 23.1.05.

- Antenatally if BP is uncontrollable induction of labour is indicated or delivery by LSCS if cervix unfavourable.
- Specialist or SMO to contact during office hours DR Moncy or DR Nair or who is in charge of female wards.
- Enquiry may be made to EXT 227 in his absence or to CARDIOLOGY CENTER 2226458.
- Urgent referrals to be requested and discussed at SMO/Specialist level
- Follow up

- Patients will continue to be referred to MCH after discharge and referred back if indicated according to post-partum protocol.
- For follow up of patients with severe hypertension seen antenatally or postnatally by cardiologist review appointment should be arranged with the cardiologist on where and when the patient should be seen.
- If no appointment is given with the cardiologist OB/GYN team will follow up with own Specialist if PIH and with HRC if under HRC team

First line Methyldopa up to 1Gm 4 times a day
Labetolol 400 mg tds or 300 mg qds.

If asthmatic add oral hydrallazine starting from 10mg to 25 mg BD, to 75 mg qds.
Nifedipine LA 30 mg OD
[Note Nifedipine retard and slow release are not available in Brunei]

If uncontrollable deliver .Paediatric counselling to patient.

- Diuretics are not usually given in pregnancy
- They are safe and efficacious agents, can markedly potentiate the response to other antihypertensive agents, and are not contraindicated in pregnancy except in settings where uteroplacental perfusion is already reduced (pre-eclampsia and intrauterine growth restriction).
- Pregnancy does not preclude use of diuretic drugs to reduce or control blood pressure in women whose hypertension predated conception or manifested before mid-pregnancy.

Patients .Hydrochorothiazide 50mg/day {USA}
Bendroflumithiazide 5-10mg/day.

Decisions about the timing of delivery

- Decision making on whether the infant will fare better in utero or in the nursery, and whether the mother's condition will tolerate continued pregnancy.

- Proposed indications for delivery :
  1. Even if the maternal and fetal conditions appear stable, all women with mild disease preeclampsia should be considered for induction and delivery at 38 weeks' gestation if the cervix is favourable, and by 40 weeks
  2. if it is not.
  3. Delivery should be considered in women who have severe pre-eclampsia beyond 32-34 weeks' gestation
  4. .Gestation of 30 weeks is acceptable for fetal salvage and Paediatric counselling must be sought.
  5. Dexamethasone can be started if delivery anticipated
  6. Prolonged antepartum management in women with severe pre-eclampsia is possible in a select group of women with fetal gestational age between 23 and 32 weeks.
  7. Delivery in these preterm pregnancies is indicated by worsening maternal symptoms, laboratory evidence of end organ dysfunction, or fetal deterioration.
  8. Vaginal delivery is preferred and, if maternal and fetal conditions allow, labour induction should be carried out aggressively when the decision to deliver is made, even if the cervix is unripe
  9. .Magnesium sulphate is the anticonvulsant drug of choice in the treatment of eclampsia.

INTRAPARTUM MANAGEMENT

In the acute setting, an initial assessment with cardiotocography should be undertaken.
This gives information about fetal wellbeing at that time but does not give any predictive information.

Women in labour with severe pre-eclampsia should have continuous electronic fetal monitoring.

FLUID MANAGEMENT:

- Fluid therapy should be limited to maintenance crystalloid (85ml/h or urine output in preceding hour plus 30ml). (Grade C recommendation)
- Fluid restriction is advisable to reduce the risk of fluid overload in the Intrapartum and postpartum periods. In usual circumstances, total fluids should be limited to 80 ml/hour or 1 ml/kg/hour and. central monitoring is essential.
- The regime of fluid restriction should be maintained until there is a postpartum diuresis, as oliguria is common with severe pre-eclampsia
- If there is associated maternal haemorrhage, fluid balance is more difficult and fluid restriction is inappropriate.
    - [RCOG Guideline No. 10]

  After delivery, high dependency care should be continued for a minimum of 24 hours. (Grade C recommendation)

Post natal care

- Anti-hypertensive medication should be continued after delivery as dictated by the blood pressure.
- It may be necessary to maintain treatment for up to 3 months, although most women can have treatment stopped before this.
- Women with persisting hypertension and proteinuria at 6 weeks may have renal disease and should be considered for further investigation.
- Clinicians should be aware that up to 44% of eclampsia occurs postpartum, especially at term, so women with signs or symptoms compatible with preeclampsia should be carefully assessed.
- An assessment of blood pressure and proteinuria by the general practitioner at the 6 weeks postnatal check is recommended. If hypertension or proteinuria persists then further investigation is recommended.

Treating Hypertension during Lactation

- Breast feeding (BF) encouraged, DONE safely with certain limits on antihypertensive drug choices.
- All studied antihypertensive agents are excreted into human breast milk; Differences in the milk/plasma ratio are related to lipid solubility and extent of ionization of the drug at physiologic pH.
- Breast-fed infants of mothers taking antihypertensive agents should be closely monitored for potential adverse effects.
- In mildly hypertensive mothers who wish to breast feed for a few months, the clinician may consider withholding medication, with close monitoring of blood pressure. After discontinuation of nursing, antihypertensive therapy can be reinstituted.
- For patients with more severe BP elevation and taking a single antihypertensive agent, the clinician may consider reducing the dosage, then closely observing both the mother and the infant.
- No short-term adverse effects have been reported from exposure to methyldopa or hydralazine.
- Although the Committee on Drugs considers atenolol compatible with breast feeding, this blocker, as well as metoprolol and nadolol, appears to be concentrated in breast milk. This property is not shared by propranolol or labetalol; for that reason these agents have been recommended if a blocker is indicated.
- No data on calcium channel blockers and lactation have been reported.
- Diuretics may reduce milk volume and suppress lactation.

GUIDELINES FOR MANAGEMENT OF POST-PARTUM HYPERTENSION

- Pre-eclampsia can present in the post-partum period up to 3-4 weeks after delivery.
- Over 50% of post-partum preeclampsia present after the second post-partum day.
- Post-partum hypertension should be treated and women with pre-eclampsia may need to stay in hospital longer than 4 days.
- Women who have had are at increased risk of recurrent pre-eclampsia and of subsequent CVS and CNS morbidity.

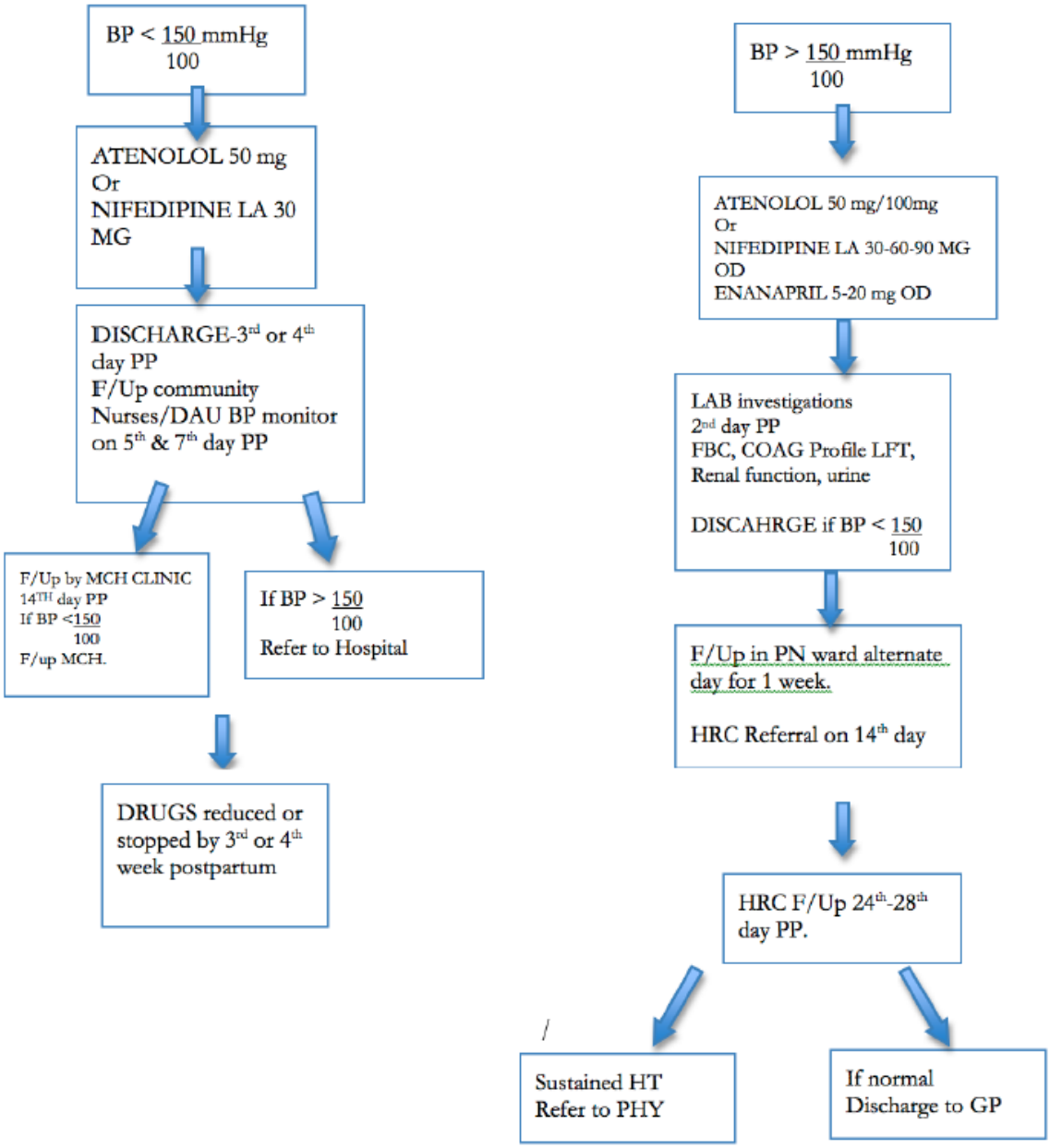
The blood pressure of patients with severe hypertension should be monitored closely following delivery.

Labetelol infusion can be stopped on day-1 and continue oral labetelol 200mg TDS on day-2. If BP remains more than 150/100, add atenelol on day-2/3 and it is also appropriate to give nifidipine LA 30/60/90 mg od. ACE inhibitors like captopril, enalapril can also be given if needed. Oral Hydrallazine 25-50 mg 6- hourly can be given if BP remains high.

Suggested drug regime for post-partum hypertension:

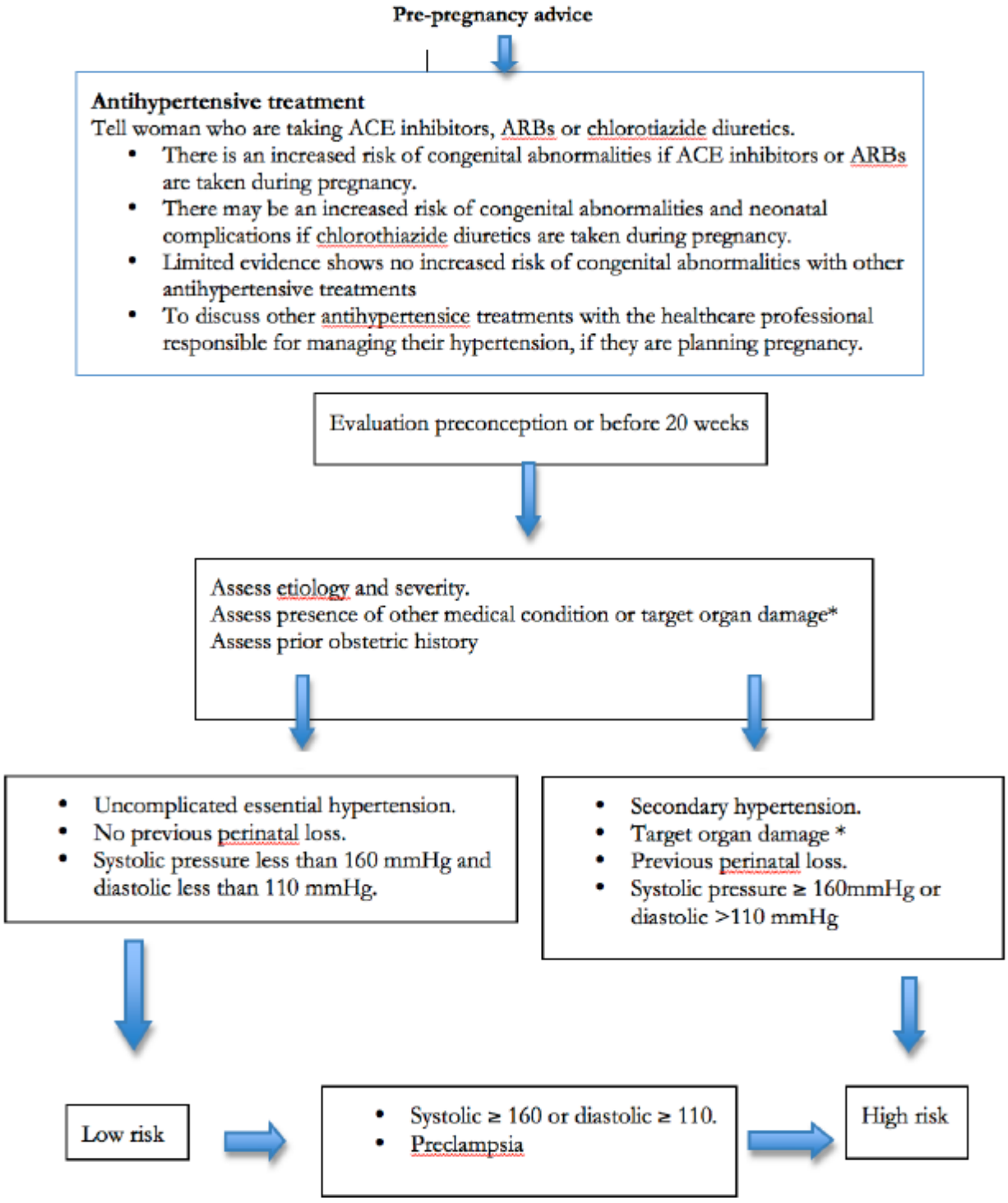
1. Nifidepine LA (30-60-90 mg daily)
2. Atenolol (25-100 mg daily)
3. Enalapril (5-20 mg twice daily)
4. Captopril 12.5mg BD
5. Continue labetolol if used antenatally for short term.

POSTPARTUM HYPERTENSION MANAGEMENT AND FOLLOW UP



Guideline: Department of O&G, RIPASH; 2012

Chronic Hypertension



* Left ventricular dysfunction, retinopathy, dyslipedemia, maternal age above 40 years, microvascular disease, stroke.

Guideline: Department of O&G, RIPASH; 2012

Antenatal care

Consultations

- Schedule additional appointments based on individual needs.

Timing of birth

If BP <160/110 mmHg with or without antihypertensive treatment:

- Do not offer birth before 37 weeks.
- After 37 weeks, timing of and maternal and fetal indications for birth should be agreed between woman and senior obstetrician.

If refractory severe chronic hypertension, offer birth after course of corticosteriods (if required) has been completed.

Antihypertensive treatment

- Stop ACE inhibitors and ARBs within 2 days of notification of pregnancy and offer alternatives.
- Offer antihypertensive treatment based on pre-existing treatment, side-effect profile and teratogenicity.
- Aim for BP <150/110 mmHg.
- Do not offer treatment to lower DBP to <80mmHg.
- If secondary chronic hypertension, offer referral to specialist in hypertensive disorders.
-

FETAL MONITORING

At 28-30 and 32-34 weeks carry out.

- Ultrasound fetal growth and amniotic fluid volume assessment.
- Umbilical artery doppler velocimetry.

If results normal do not repeat after 34 weeks unless clinically indicated.

If fetal activity abnormal carry out

- Cardiotocography.

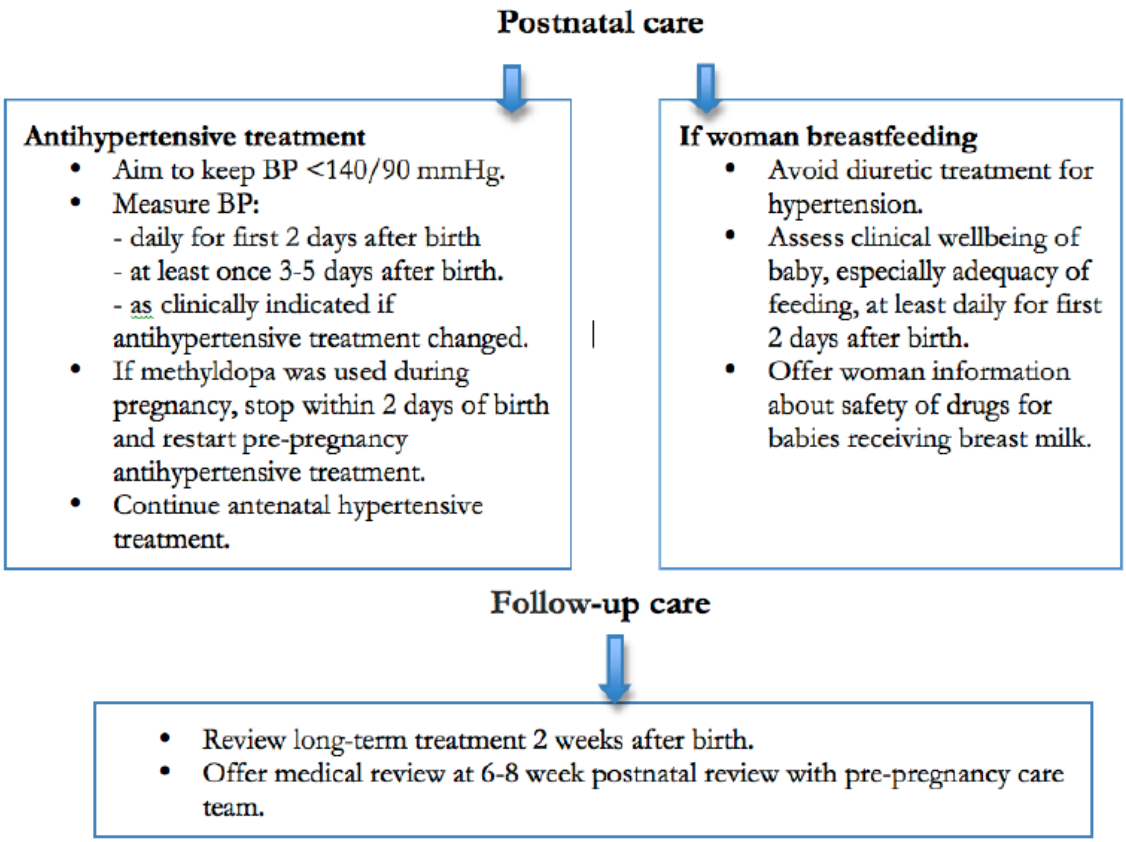
Intrapartum care

Mild or moderate hypertension (BP ≤ 159/109 mmHg)

- Continue antenatal antihypertensive treatment.
- Measure BP hourly.
- Carry out haematological and biochemical monitoring according to criteria from antenatal period, even if regional analgesia being considered.
- If BP stable do not routinely limit duration of second stage.

Severe hypertension (BP ≥ 160/110 mmHg)

- Continue antenatal antihypertensive treatment.
- Measure BP continually.
- If BP controlled within target ranges do not routinely limit duration of second stage.
- If BP does not respond to initial treatment advise operative birth.



Treating Hypertension That Persists Postpartum

- Oral antihypertensive agents may be required after delivery to help control maternal BP, in particular, for women who were hypertensive before pregnancy.
- Patients with Chronic hypertension can develop encephalopathy, heart failure and pulmonary oedema, and renal failure in the postpartum period.
- Risk factors include underlying cardiac disease, Chr. renal disease, superimposed PE in the second trimester, placental abruption complicated by DIC, and requirement for multiple antihypertensive agents.
- Acute hypertensive changes induced by pregnancy usually dissipate rapidly, within the first several days after delivery.
- Resolution of hypertension is more rapid in patients with gestational hypertension and may lag in those with PE, especially those with longer duration and greater extent of renal impairment. This delay in resolution may reflect the time needed for endothelial recovery.

- If pre-pregnancy BP were normal or unknown, it is reasonable to
  - Stop oral medication after 3-4 weeks
  - Observe BP at 1- to 2-week intervals for 1 month,
  - Then at 3- to 6-month intervals for 1 year.
  - If hypertension recurs, it should be treated.

Long-term health risks

Future risk	Hypertensive disorder		
	Gestational hypertension	Pre-eclampsia	Severe pre-eclampsia, HELLP syndrome or eclampsia
Gestational hypertension in future pregnancy	Risk ranges from about 1 in 6 (16%) to about 1 in 2 (47%).	Risk ranges from about 1 in 8 (13%) to about 1 in 2 (53%).	
Pre-eclampsia in future pregnancy	Risk ranges from 1 in 50 (2%) to about 1 in 14 (7%).	Risk up to about 1 in 6 (16%). No additional risk if interval before next pregnancy < 10 years.	If birth was needed before 34 weeks risk is about 1 in 4 (25%). If birth was needed before 28 weeks risk is about 1 in 2 (55%).
Cardiovascular disease	Increased risk of hypertension and its complications.	Increased risk of hypertension and its complications.	Increased risk of hypertension and its complications.
End-stage kidney disease		If no proteinuria and no hypertension at 6–8 week postnatal review, relative risk increased but absolute risk low. No follow-up needed.	
Thrombophilia		Routine screening not needed.	

Introduction

- Most hypertensive disorders that occur during pregnancy develop for the first time in the second half of pregnancy.
- New hypertension can occur without significant proteinuria (gestational hypertension) or with significant proteinuria (pre-eclampsia).
- Hypertensive disorders during pregnancy can occur in women with chronic hypertension (pre-existing hypertension).
- Hypertensive disorders during pregnancy carry risks for the woman and are among the leading causes of maternal death in the UK.
- Hypertensive disorders also carry a risk for the baby in terms of higher rates of perinatal mortality, preterm birth and low birth weight.

Woman-centred care

Treatment and care should take into account women's individual needs and preferences. Good communication is essential, supported by evidence-based information, to allow women to reach informed decisions about their care. Follow advice on seeking consent from the Department of Health or Welsh Assembly Government if needed. If the woman agrees, families and carers should have the opportunity to be involved in decisions about treatment and care.

Drug information

Drug names are marked with * if they do not have UK marketing authorisation for the indication in question at the time of publication (August 2010). Informed consent should be obtained and documented.

It is assumed that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients. Drugs for which particular attention should be paid to the contraindications and special warnings during pregnancy and lactation are marked with † and detailed on page 20.

Key priorities for implementation

Reducing the risk of hypertensive disorders in pregnancy

- Advise women at high risk of pre-eclampsia to take 75 mg of aspirin* daily from 12 weeks until the birth of the baby. Women at high risk are those with any of the following:
  - hypertensive disease during a previous pregnancy
  - chronic kidney disease
  - autoimmune disease such as systemic lupus erythematosis or antiphospholipid syndrome
  - type 1 or type 2 diabetes
  - chronic hypertension.

Management of pregnancy with chronic hypertension

- Tell women who take angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs):
  - that there is an increased risk of congenital abnormalities if these drugs are taken during pregnancy
  - to discuss other antihypertensive treatment with the healthcare professional responsible for managing their hypertension, if they are planning pregnancy.
- In pregnant women with uncomplicated chronic hypertension aim to keep blood pressure lower than 150/100 mmHg.

Assessment of proteinuria in hypertensive disorders of pregnancy

- Use an automated reagent-strip reading device or a spot urinary protein:creatinine ratio for estimating proteinuria in a secondary care setting.

Management of pregnancy with gestational hypertension

- Offer women with gestational hypertension an integrated package of care covering admission to hospital, treatment, measurement of blood pressure, testing for proteinuria and blood tests as shown on pages 10–12.

Management of pregnancy with pre-eclampsia

- Offer women with pre-eclampsia an integrated package of care covering admission to hospital, treatment, measurement of blood pressure, testing for proteinuria and blood tests as shown on pages 13–15.
- Consultant obstetric staff should document in the woman's notes the maternal (biochemical, haematological and clinical) and fetal thresholds for elective birth before 34 weeks in women with pre-eclampsia.
- Offer all women who have had pre-eclampsia a medical review at the postnatal review (6–8 weeks after the birth).

Key priorities for implementation *continued*

Advice and follow-up care at transfer to community care

- Tell women who had pre-eclampsia that their risk of developing:
  - gestational hypertension in a future pregnancy ranges from about 1 in 8 (13%) pregnancies to about 1 in 2 (53%) pregnancies
  - pre-eclampsia in a future pregnancy is up to about 1 in 6 (16%) pregnancies
  - pre-eclampsia in a future pregnancy is about 1 in 4 (25%) pregnancies if their pre-eclampsia was complicated by severe pre-eclampsia, HELLP syndrome or eclampsia and led to birth before 34 weeks, and about 1 in 2 (55%) pregnancies if it led to birth before 28 weeks.

Definitions

Chronic hypertension Hypertension present at booking visit or before 20 weeks, or that is being treated at time of referral to maternity services. Can be primary or secondary in aetiology.

Degrees of hypertension

Mild Diastolic blood pressure 90–99 mmHg, systolic blood pressure 140–149 mmHg.
Moderate Diastolic blood pressure 100–109 mmHg, systolic blood pressure 150–159 mmHg.
Severe Diastolic blood pressure ≥ 110 mmHg, systolic blood pressure ≥ 160 mmHg.

Eclampsia Convulsive condition associated with pre-eclampsia.

Gestational hypertension New hypertension presenting after 20 weeks without significant proteinuria.

Pre-eclampsia New hypertension presenting after 20 weeks with significant proteinuria.

Severe pre-eclampsia Pre-eclampsia with severe hypertension and/or with symptoms, and/or biochemical and/or haematological impairment.

Significant proteinuria See 'Assessment of proteinuria', page 6.

Offer birth means to offer elective early birth through induction of labour or by caesarean section if indicated.

Abbreviations

ACE inhibitor	angiotensin-converting enzyme inhibitor
ALT	alanine aminotransferase
ARB	angiotensin II receptor blocker
AST	aspartate aminotransferase
BMI	body mass index
BP	blood pressure
DBP	diastolic blood pressure
FBC	full blood count
HELLP	haemolysis, elevated liver enzymes and low platelet count

Reducing the risk of hypertensive disorders in pregnancy

Symptoms of pre-eclampsia

- Tell women to seek advice from a healthcare professional immediately if they experience any of:
  - severe headache
  - problems with vision such as blurring or flashing before eyes
  - severe pain just below ribs
  - vomiting
  - sudden swelling of face, hands or feet.

[This recommendation is adapted from 'Antenatal care: routine care for the healthy pregnant woman' (NICE clinical guideline 62)[1]].

Lifestyle interventions

- Offer advice on rest, exercise and work in line with 'Antenatal care: routine care for the healthy pregnant woman' (NICE clinical guideline 62)[1].

Pharmacological interventions

- Do not use the following to prevent hypertensive disorders in pregnancy:
  - nitric oxide donors
  - progesterone
  - diuretics
  - low molecular weight heparin.

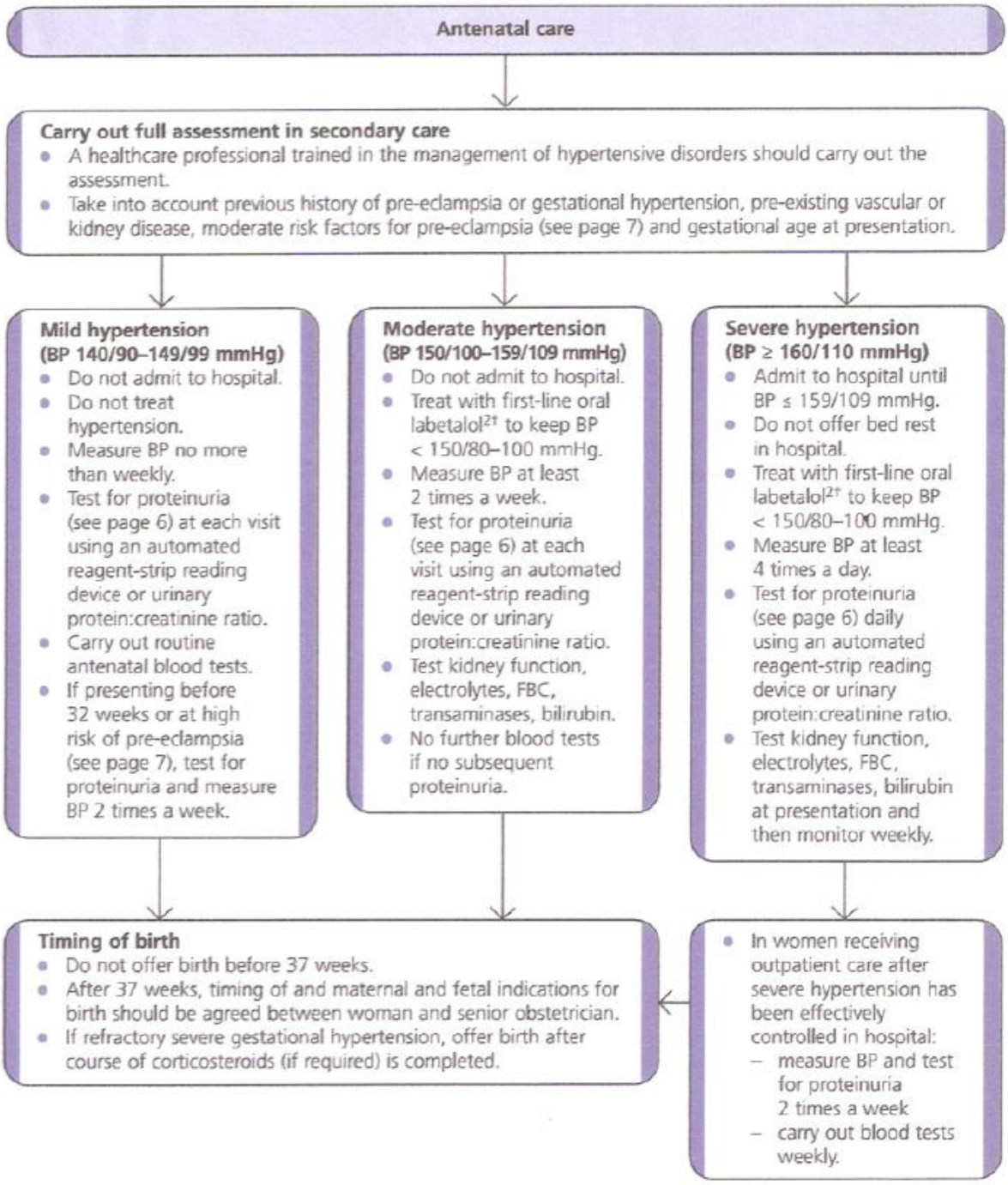
Nutritional supplements and diet

- Do not recommend the following solely with the aim of preventing hypertensive disorders during pregnancy:
  - taking supplements of magnesium, folic acid, antioxidants (vitamins C and E), fish or algal oils, or garlic
  - restricting salt intake.

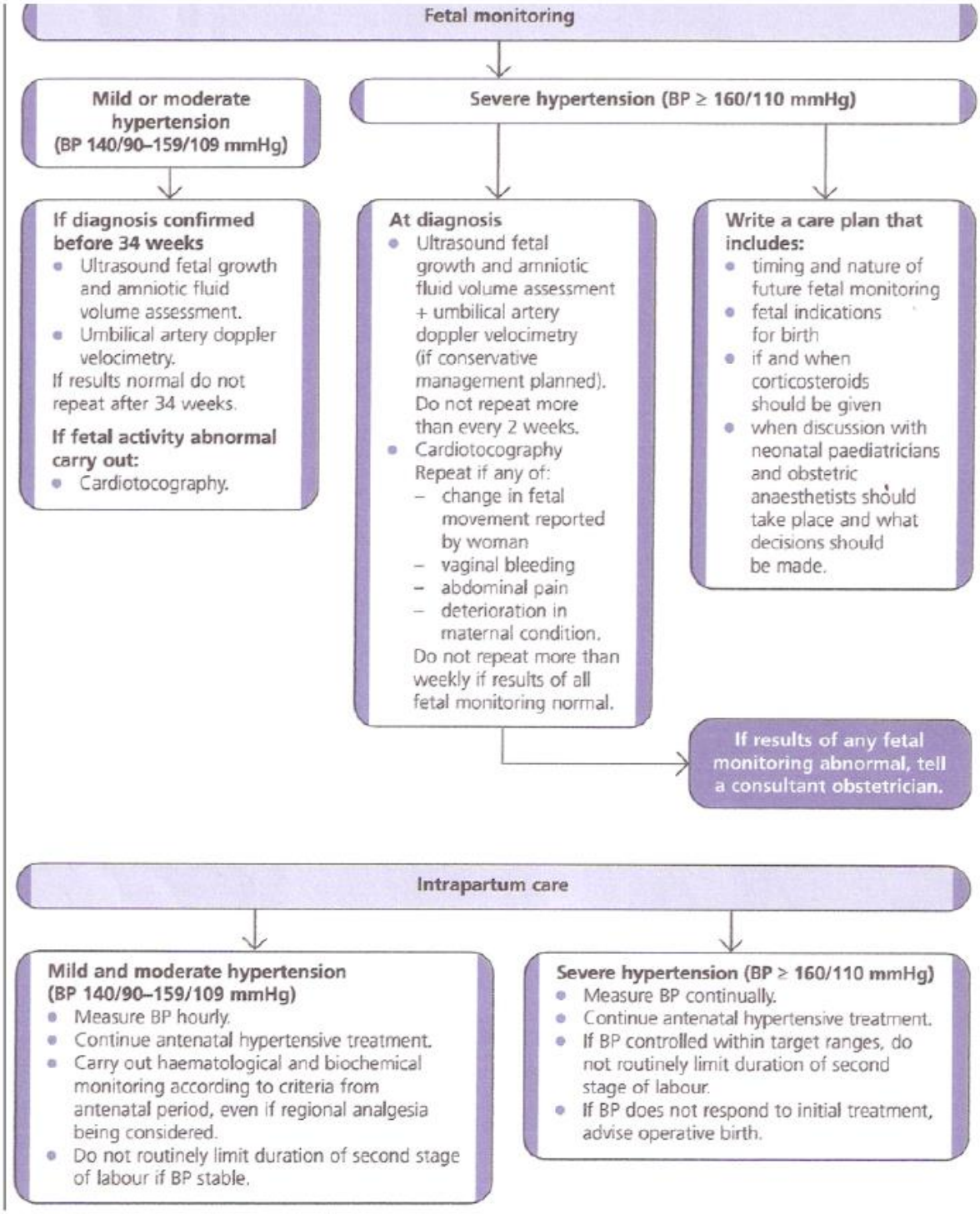
Assessment of proteinuria

- Use an automated reagent-strip reading device or a spot urinary protein:creatinine ratio to estimate proteinuria in secondary care.
- If an automated reagent-strip reading device shows proteinuria ≥ 1+, use a spot urinary protein:creatinine ratio or 24-hour urine collection to quantify proteinuria.
- Diagnose significant proteinuria if urinary protein:creatinine ratio > 30 mg/mmol or a validated 24-hour urine collection result shows > 300 mg protein.
- Where 24-hour urine collection is used to quantify proteinuria, there should be a recognised method of evaluating completeness of the sample.

Gestational hypertension



Guideline: Department of O&G, RIPASH; 2012



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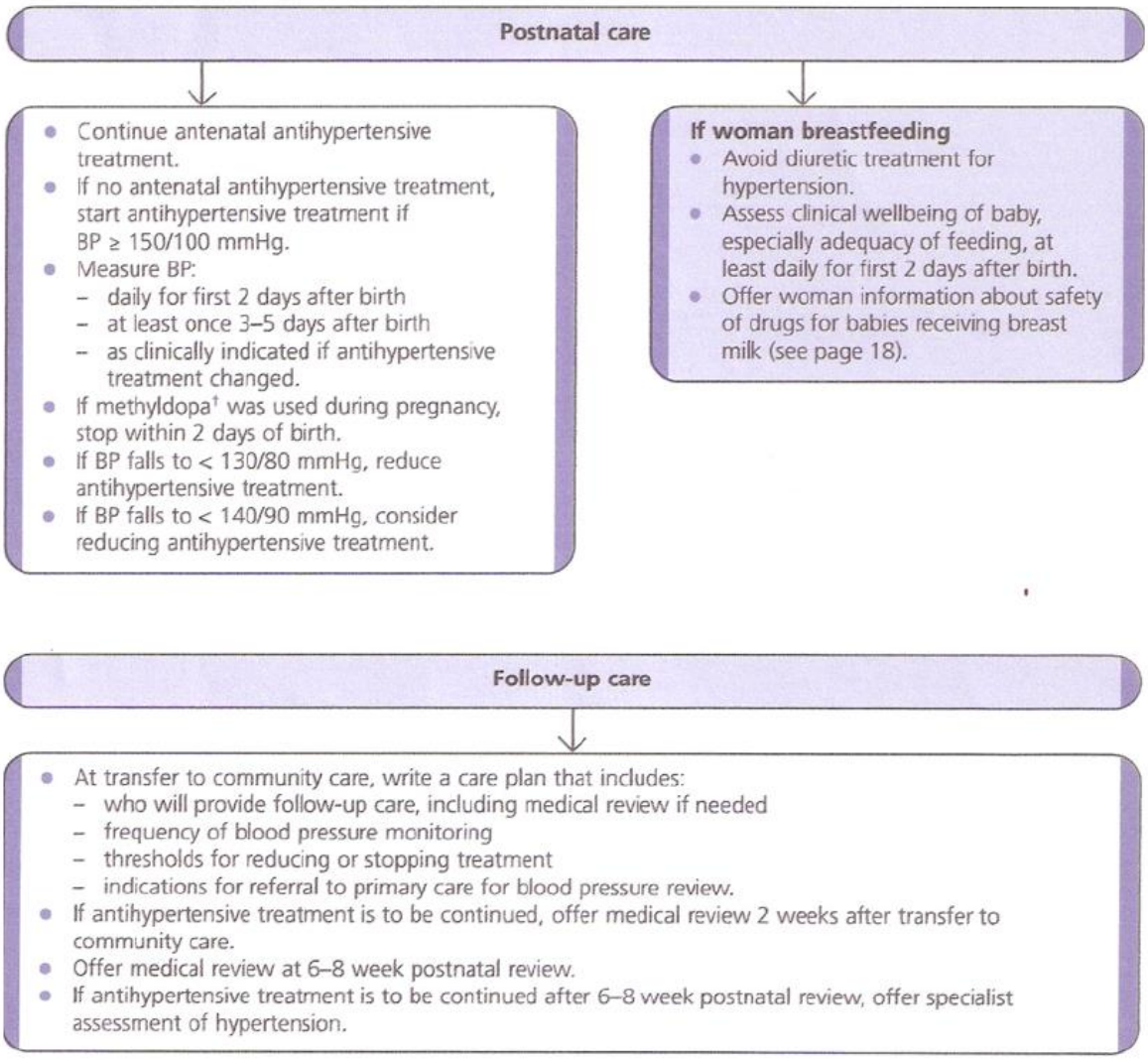
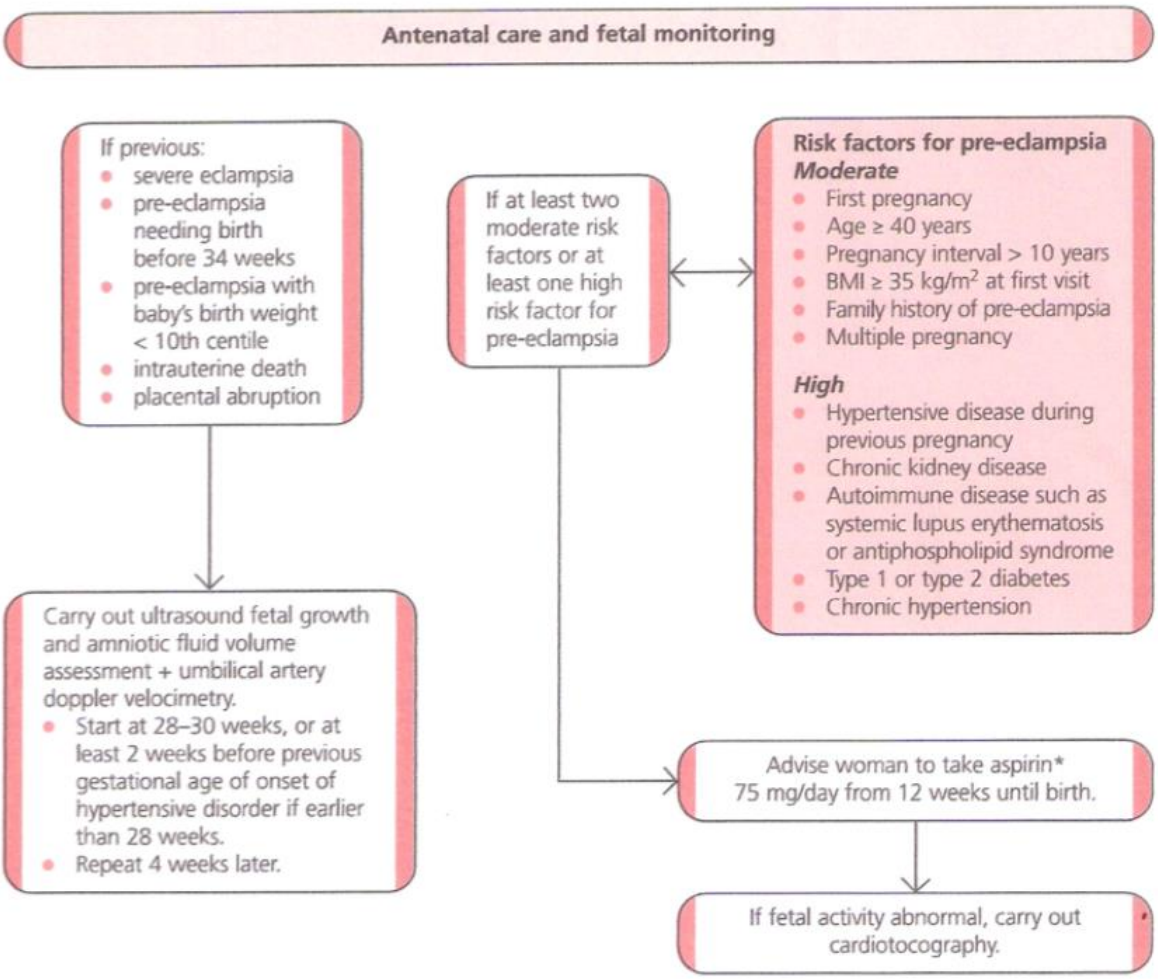
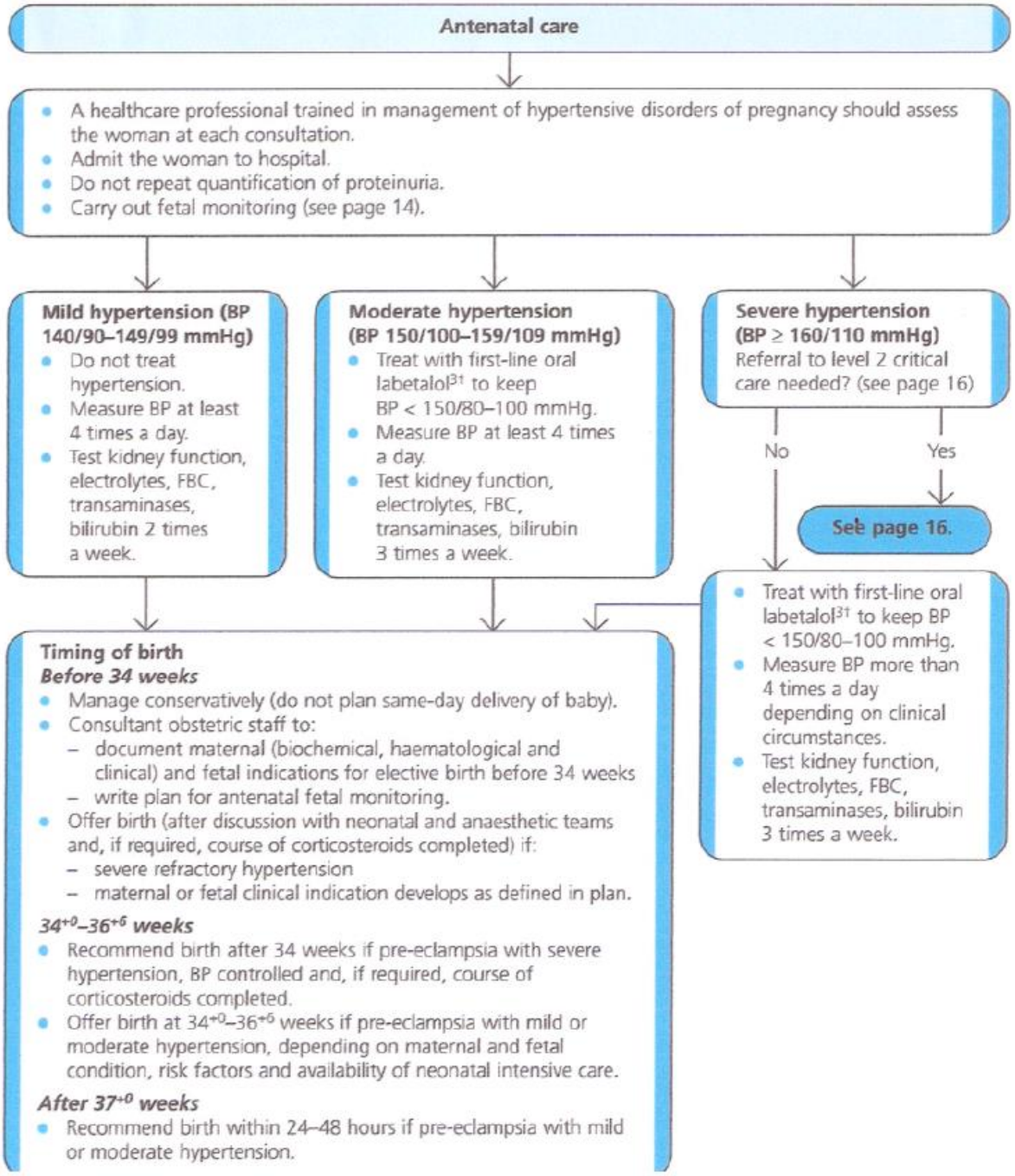

Postnatal care
Continue antenatal antihypertensive treatment.
If no antenatal antihypertensive treatment, start antihypertensive treatment if BP ≥ 150/100 mmHg.
Measure BP:
– daily for first 2 days after birth
– at least once 3–5 days after birth
– as clinically indicated if antihypertensive treatment changed.
If methyldopa† was used during pregnancy, stop within 2 days of birth.
If BP falls to < 130/80 mmHg, reduce antihypertensive treatment.
If BP falls to < 140/90 mmHg, consider reducing antihypertensive treatment.
If woman breastfeeding
Avoid diuretic treatment for hypertension.
Assess clinical wellbeing of baby, especially adequacy of feeding, at least daily for first 2 days after birth.
Offer woman information about safety of drugs for babies receiving breast milk (see page 18).
Follow-up care
At transfer to community care, write a care plan that includes:
– who will provide follow-up care, including medical review if needed
– frequency of blood pressure monitoring
– thresholds for reducing or stopping treatment
– indications for referral to primary care for blood pressure review.
If antihypertensive treatment is to be continued, offer medical review 2 weeks after transfer to community care.
Offer medical review at 6–8 week postnatal review.
If antihypertensive treatment is to be continued after 6–8 week postnatal review, offer specialist assessment of hypertension.

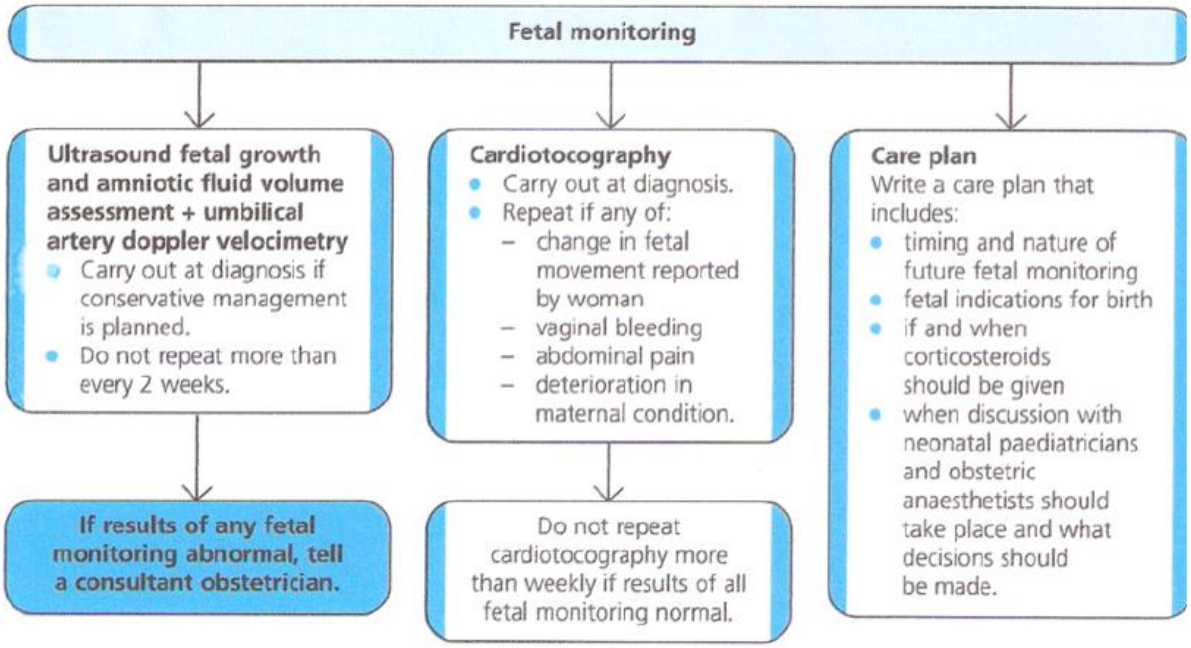
Moderate and high risk of pre-eclampsia

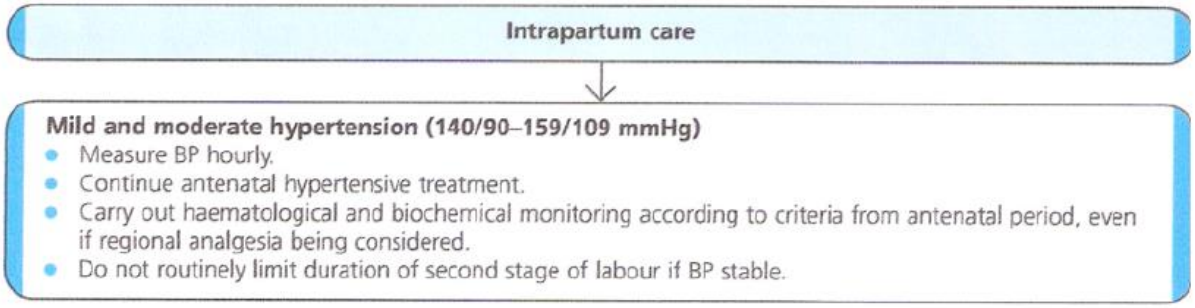


Guideline: Department of O&G, RIPASH; 2012

Pre-eclampsia







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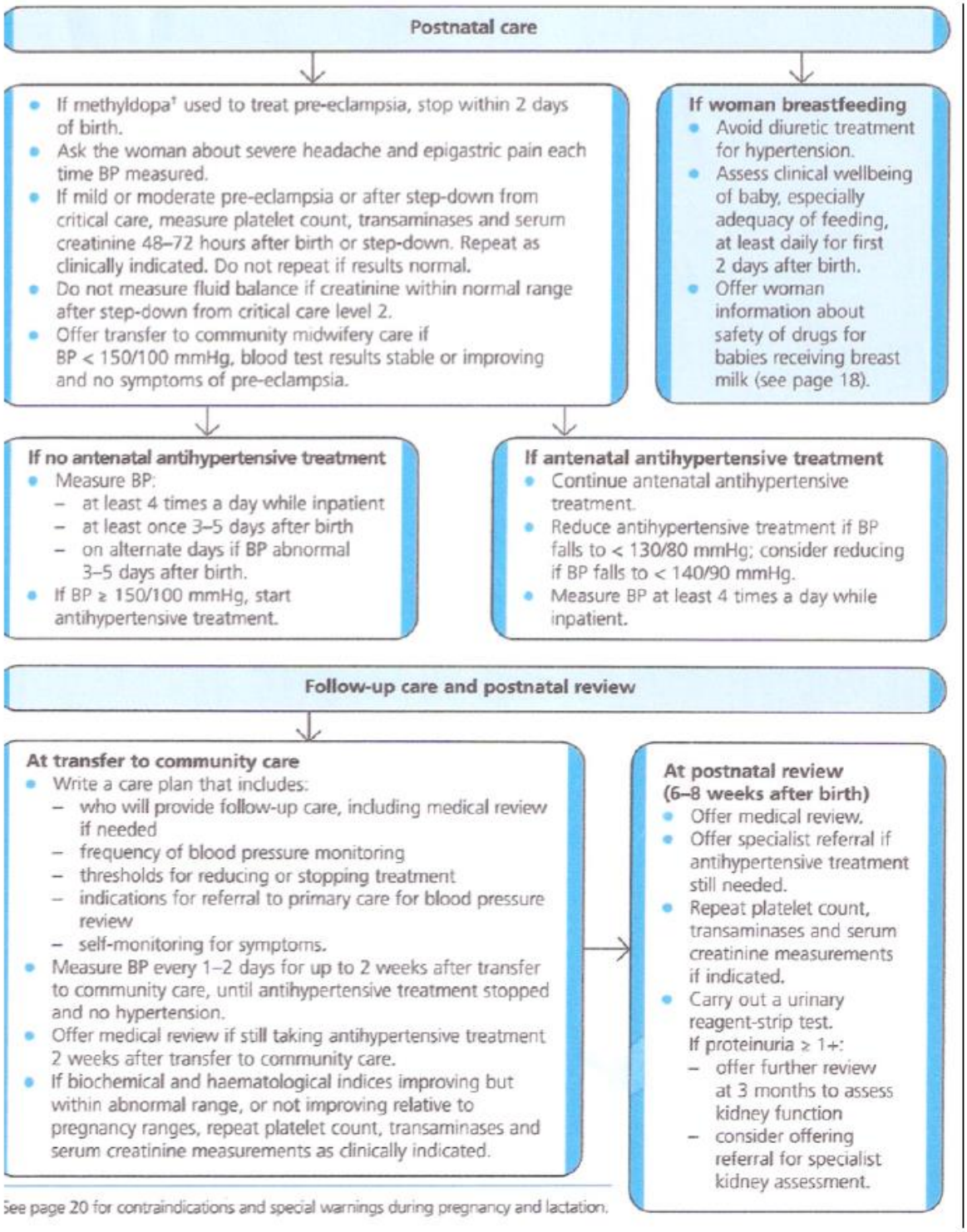
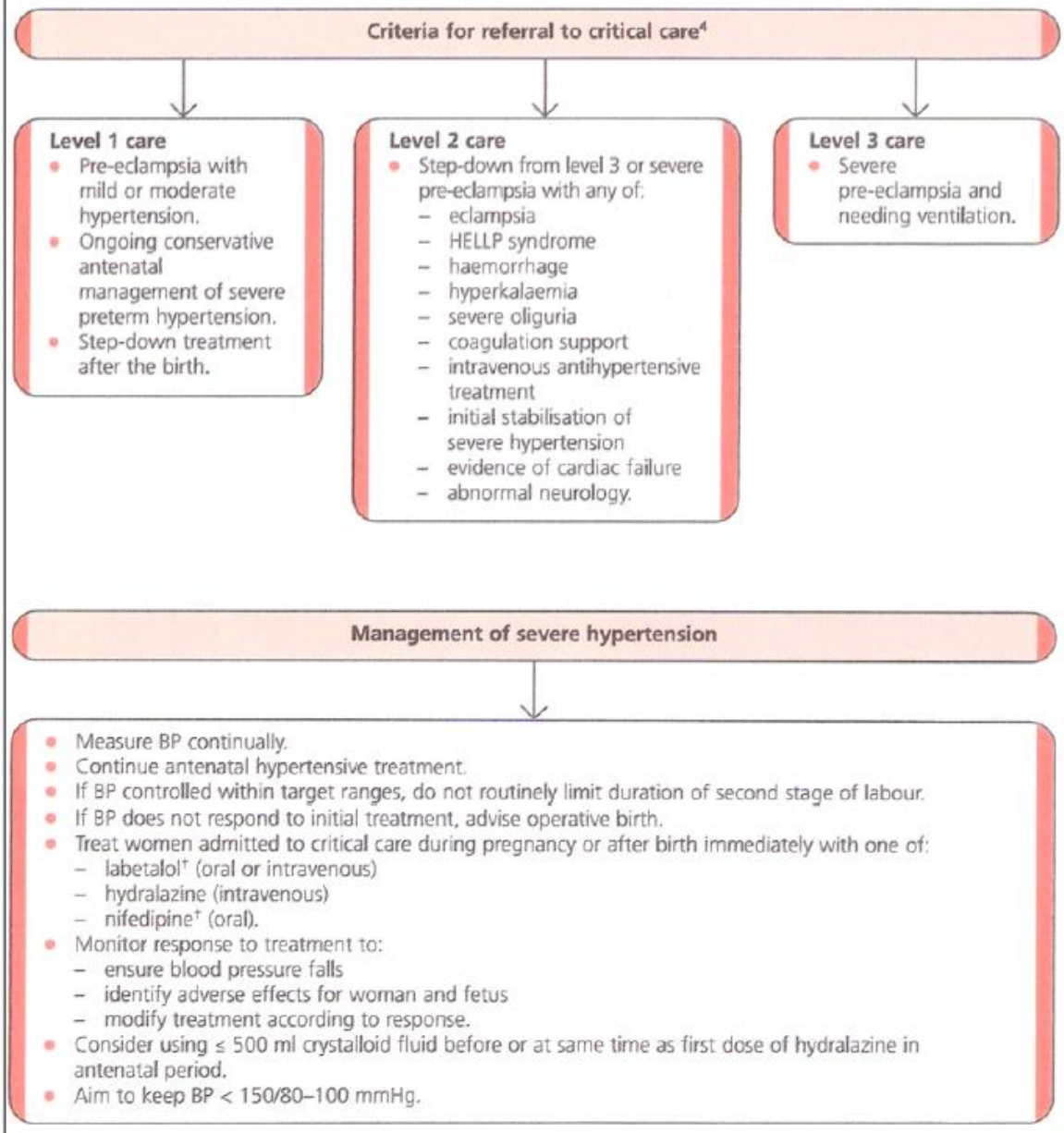


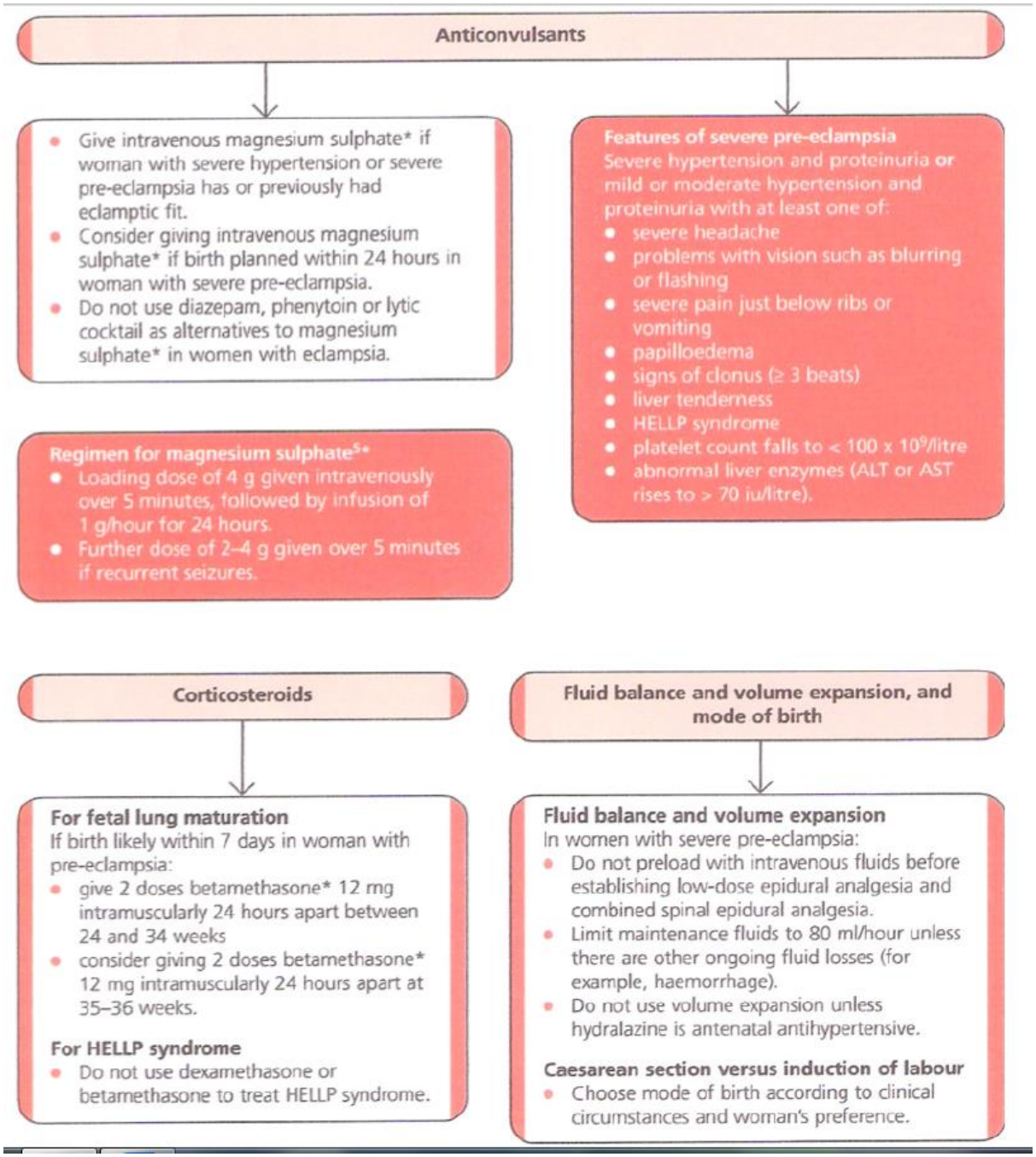
Guideline: Department of O&G, RIPASH; 2012

Severe hypertension, severe pre-eclampsia and eclampsia in critical care



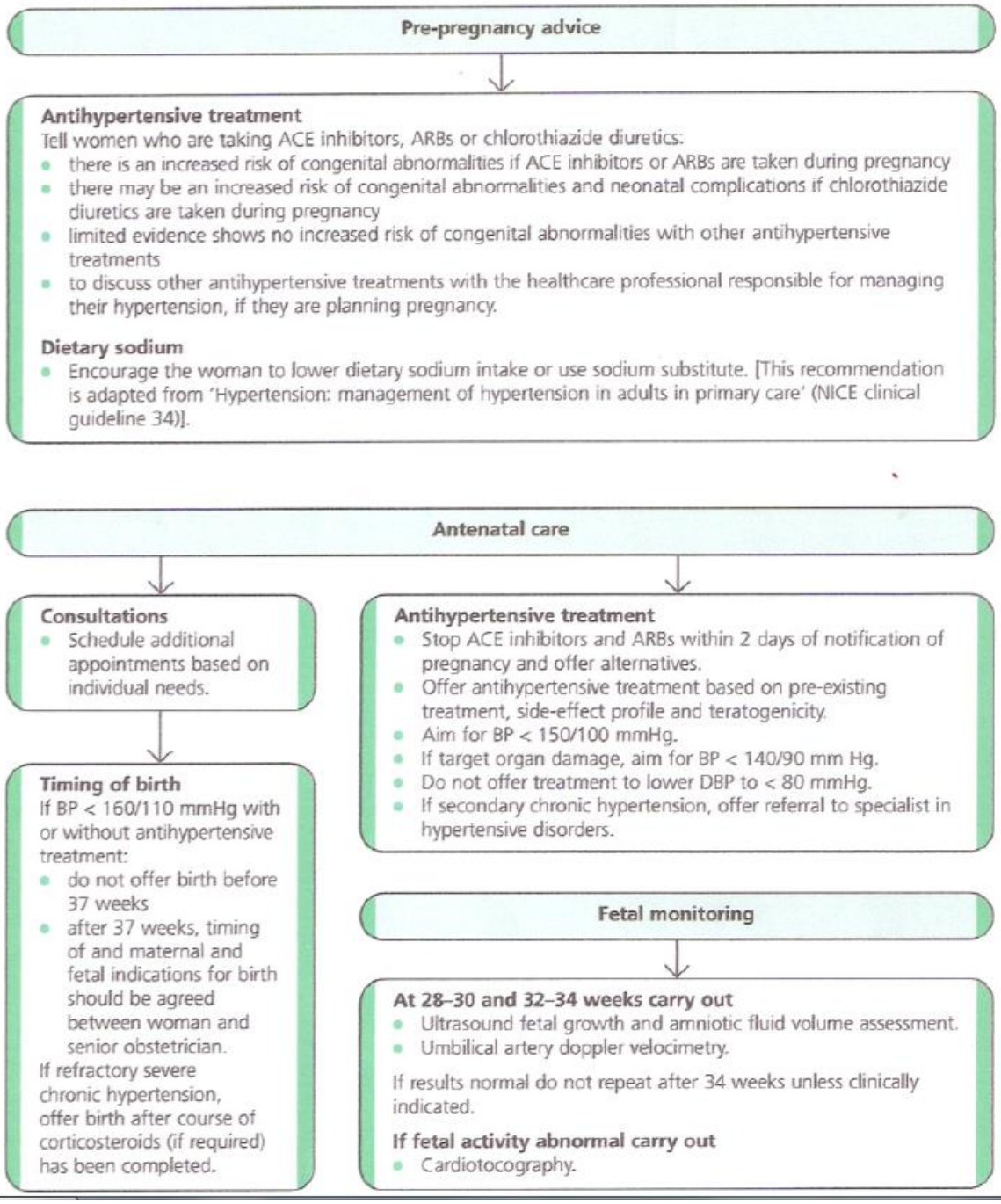
[4] Adapted by the Guideline Development Group from Intensive Care Society (2002) Standards and Guidelines.
† See page 20 for contraindications and special warnings during pregnancy and lactation.

Guideline: Department of O&G, RIPASH; 2012

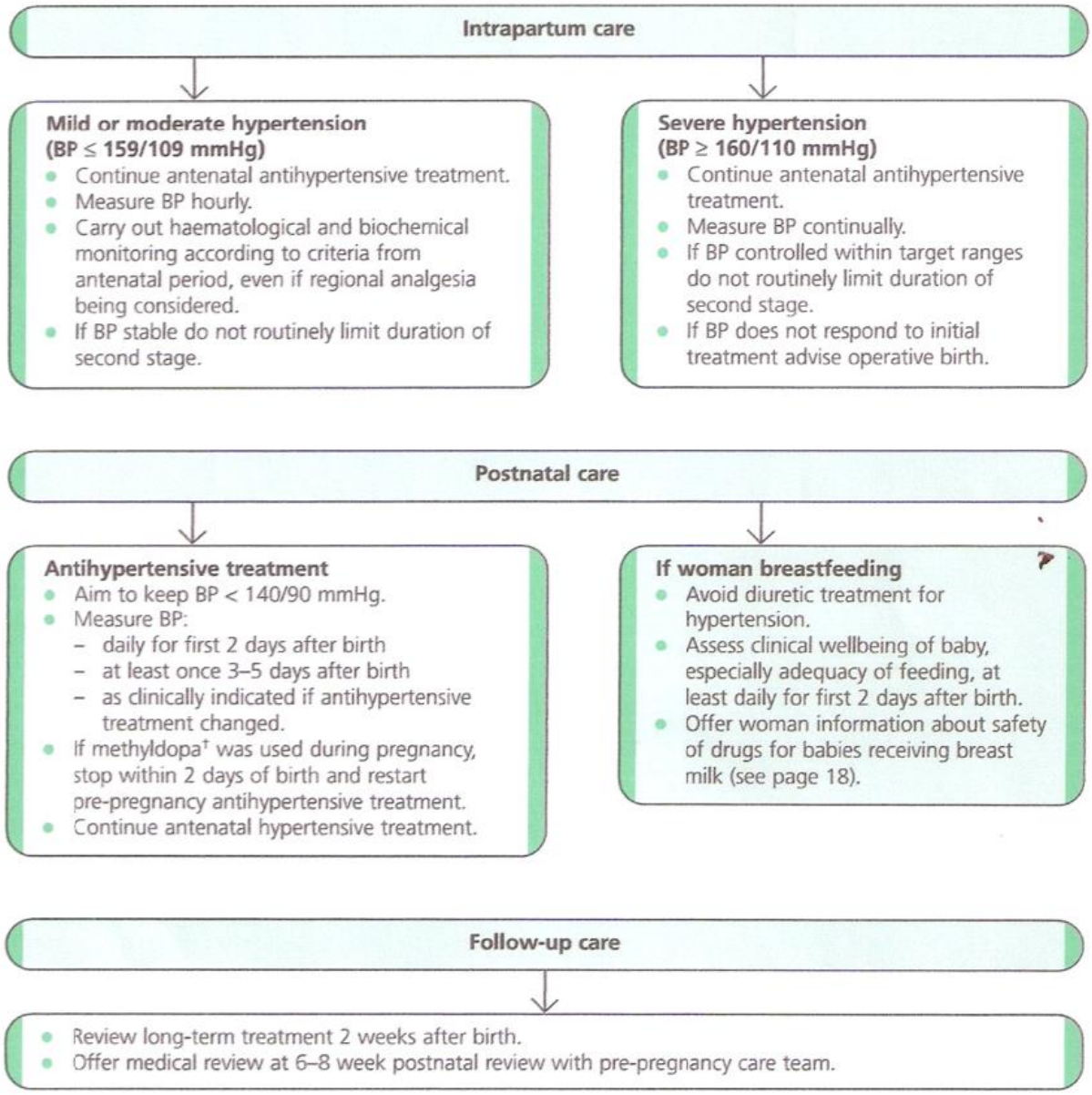


Guideline: Department of O&G, RIPASH; 2012

Chronic hypertension



Guideline: Department of O&G, RIPASH; 2012



Guideline: Department of O&G, RIPASH; 2012

Advice for women, their community midwives and primary care physicians

Breastfeeding

- Tell women that the following drugs have **no known adverse effects** on babies receiving breast milk:
  - labetalol†
  - nifedipine†
  - enalapril†
  - captopril†
  - atenolol†
  - metoprolol†.
- Tell women that there is **insufficient evidence on the safety** of the following drugs in babies receiving breast milk:
  - ARBs
  - amlodipine
  - ACE inhibitors other than enalapril† and captopril†.

Weight management

- Advise women who have had pre-eclampsia to achieve and keep BMI 18.5–24.9 kg/m^2 before next pregnancy (in line with 'Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children' [NICE clinical guideline 43]).

Long-term health risks

Future risk	Hypertensive disorder		
	Gestational hypertension	**Pre-eclampsia**	**Severe pre-eclampsia, HELLP syndrome or eclampsia**
Gestational hypertension in future pregnancy	Risk ranges from about 1 in 6 (16%) to about 1 in 2 (47%).	Risk ranges from about 1 in 8 (13%) to about 1 in 2 (53%).	
Pre-eclampsia in future pregnancy	Risk ranges from 1 in 50 (2%) to about 1 in 14 (7%).	Risk up to about 1 in 6 (16%). No additional risk if interval before next pregnancy < 10 years.	If birth was needed before 34 weeks risk is about 1 in 4 (25%). If birth was needed before 28 weeks risk is about 1 in 2 (55%).
Cardiovascular disease	Increased risk of hypertension and its complications.	Increased risk of hypertension and its complications.	Increased risk of hypertension and its complications.
End-stage kidney disease		If no proteinuria and no hypertension at 6–8 week postnatal review, relative risk increased but absolute risk low. No follow-up needed.	
Thrombophilia		Routine screening not needed.	

Drug information

Atenolol is licensed for the treatment of hypertension and is already used widely in UK postnatal obstetric practice, but the SPCs (August 2010) advise that anticipated benefit be weighed against the possible risks of its use in the first and second trimesters of pregnancy, and in women who may become pregnant or who are breastfeeding. Informed consent to the use of atenolol in these situations should be obtained and documented.

Captopril is licensed for the treatment of hypertension and is already used in UK postnatal obstetric practice, but the SPC (August 2010) advises that it is contraindicated in the second and third trimesters of pregnancy and in lactation, and that is not recommended during the first trimester of pregnancy. Informed consent to the use of captopril in these situations should be obtained and documented.

Enalapril is licensed for the treatment of hypertension and is already used widely in UK postnatal obstetric practice, but the SPC (August 2010) advises that it is contraindicated in the second and third trimesters of pregnancy and that it is not recommended during the first trimester of pregnancy or in breastfeeding for preterm infants and for the first few weeks after delivery. Informed consent to the use of enalapril in these situations should be obtained and documented.

Labetalol is licensed for the treatment of hypertension, including during pregnancy and is already used widely in UK obstetric practice, but the SPC (August 2010) advises that it should only be used during the first trimester of pregnancy if the potential benefit outweighs the potential risk, and that breastfeeding is not recommended. Informed consent to the use of labetalol in these situations should be obtained and documented.

Methyldopa is licensed for the treatment of hypertension and is already used widely in UK obstetric practice, but the SPC (August 2010) advises that its use in women who are, or may become, pregnant or who are breastfeeding their newborn infant requires that anticipated benefits be weighed against possible risks. Informed consent to the use of methyldopa in these situations should be obtained and documented.

Metoprolol is licensed for the treatment of hypertension and is already used widely in UK postnatal obstetric practice, but the SPCs (August 2010) advise that anticipated benefit be weighed against the possible risks of its use in women who are pregnant or breastfeeding. Informed consent to the use of metoprolol in these situations should be obtained and documented.

Nifedipine is licensed for the treatment of hypertension and is already used widely in UK obstetric practice, but the SPCs (August 2010) advise that it is contraindicated in pregnancy before week 20, or that it should not be administered during the entire pregnancy or in women who may become pregnant. It also advises that nifedipine should not be used during breastfeeding. Informed consent to the use of nifedipine in these situations should be obtained and documented.