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Guidelines For The Management Of Hypertensive Disorders In Pregnancy

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Nomenclature of hypertensive disorders in pregnancy

1) **Pre-eclampsia.**
   a) Mild.
   b) Severe.
2) **Eclampsia.**
3) **Chronic hypertension.**
   a) Antedating the pregnancy.
   b) Manifesting prior to 20 weeks in the absence of history of hypertension, multiple gestation, and molar pregnancy.
4) **Chronic hypertension with superimposed pre-eclampsia.**
   a) Mild superimposed pre-eclampsia.
   b) Severe superimposed pre-eclampsia.
5) **Transient hypertension of pregnancy or gestational hypertension.**
6) **Unclassified**

Definitions

1) **Hypertension:** (on two occasions 6 hours apart – patient is resting). Either one of the following three is sufficient for the diagnosis of hypertension.
   a) Blood pressure greater than 140/90.
   b) Rise in systolic pressure of 30mmHg or diastolic pressure of 15mmHg above previously established base line during the patient's prenatal visits.
   c) Mean arterial pressure of 105mmHg or higher at any gestational age
      i) Patients with mean arterial pressure >95mmHg during the second trimester experience increased perinatal morbidity and mortality (maternal and fetal).
2) **Proteinuria:** (clean catch specimen in the absence of acute nephritis)
   a) Qualitative: ++ in a random specimen obtained at any time in pregnancy or postpartum.
   b) Quantitative: >300 mg / L in a 24-hour urine collection.

3) **Edema:** (dependence edema in pregnancy is normal and suggestive of normal maternal blood volume expansion – subsides with bed rest for 12 hours)
   a) Any edema that persists after 12-hours of bed rest.
   b) Generalized edema including lower and upper extremities, trunk and face not subsiding after 12-hours of bed rest.
4) **Mean arterial pressure**: is the sum of the diastolic BP and 1/3rd of the pulse pressure [Diastolic BP + 1/3(Systolic BP-Diastolic BP)].
5) **Pre-eclampsia:** the presence of hypertension with proteinuria, (with or without edema) diagnosed after 20 weeks in a patient with no prior history of hypertensive or renal disorders. Rarely pre-eclampsia may develop prior to 20 weeks in patients with multiple gestations, underline nephropathy, severe hydrops and in patients with molar pregnancy.
6) **Eclampsia:** is the occurrence of one or more convulsions, not attributable to other cerebral conditions such as epilepsy or cerebral hemorrhage, in a patient with pre-eclampsia.
7) **Chronic Hypertension:** the presence of hypertension prior to pregnancy (with or without anti-hypertensive treatment) or the development of hypertension during the pregnancy but prior to 20 weeks in the absence of other predisposing factors.
8) **Hypereflexia:** the presence of brisk patellar or other reflexes with clonus. A substantial change from a previously hypoactive reflexes may be considered hypereflexia even in the absence of clonus.
9) **Subjective symptoms:** frontal headache, epigastric pain or discomfort, visual disturbances (scotomata and blurred vision) and vomiting should not be considered part of the definitions of hypertensive disorders in pregnancy. However, these symptoms may herald the arrival of eclampsia and their presence should provoke immediate initiation of convulsion prophylaxis with $MgSO_4$.
10) **Severe pre-eclampsia:** in any patient with established pre-eclampsia, any one of the following is sufficient to classify the condition as severe pre-eclampsia. This applies to pre-eclampsia and superimposed pre-eclampsia.
    a) Systolic BP >160mmHg or diastolic BP > 110mmHg.
    b) Proteinuria > 3g in a 24-hour urine collection or >= +++ in a random clean catch urine specimen.
    c) Pulmonary edema with or without cyanosis.
    d) Elevated liver enzymes with evidence of deficient coagulation mechanisms with or without epigastric pain.
    e) Severe thrombocytopenia (platelets < 50,000 / mm^3) in a patient with any degree of hypertension and any degree of proteinuria.
    f) A subjective symptom such as frontal headache, visual disturbances, and hypereflexia in the presence of pre-eclampsia is sufficient to classify the condition as severe.
11) **Mild pre-eclampsia:** any patient with pre-eclampsia that does not meet the criteria for severe pre-eclampsia.
12) **HELLP syndrome:** the presence of **H**emolysis, **E**levated **L**iver enzymes and **L**ow **P**latelets. These patients may have mild hypertension not exceeding 150/90 with or without mild proteinuria. *Do not confuse patients with HELLP syndrome with*

patients with severe pre-eclampsia and thrombocytopenia with or without elevated liver enzymes.

Management of Hypertensive Disorders in Pregnancy

Chronic hypertension: patients with chronic hypertension are at increased risk for superimposed pre-eclampsia, intrauterine growth restriction (IUGR), abruptio, preterm delivery and poor perinatal outcomes. The following guidelines should apply to all patients known to have chronic hypertension.

1) On the first visit:
   a) Document condition and try to define etiology.
      i) Renal vascular.
      ii) Autoimmune pathology.
      iii) Acute or chronic glomerulonephritis.
      iv) Essential hypertension.
   b) Obtain base line reflex evaluation and document in the prenatal chart.
   c) Obtain 24-hour urine collection for protein and creatinine clearance.
   d) In patients with nephropathy obtain fundoscopic exam to assess vascular damage.
   e) Discuss with the patient the significance of the condition upon the pregnancy outcome and explain the plan of action.
   f) If autoimmune disorders are evident or suspected consider the following:
      i) Obtain anti-phospholipid antibodies.
      ii) Obtain uterine artery Doppler as soon as possible (as early as 12 weeks) to assess the quality of trophoblastic development. Patients with pathologic Doppler should be referred for perinatal consult.
   g) Review current anti-hypertensive medications to assure safety during pregnancy:
      i) Perform a toxicology search and document in the chart the safety of the medications.
      ii) Change or adjust medications as indicated to maximize maternal benefit with the least risk to the fetus.
      iii) Treat only patients with systolic BP>150 or diastolic BP>100mmHg.
         (1) Attempt to maintain a BP level of 120-150/80-100mmHg.
   h) Obtain base line laboratory studies:
      i) CBC with differential.
      ii) EKG (in patients with long standing hypertension requiring anti-hypertensive medications).
      iii) Consider cardiology consult if cardiac disease is suspected or the EKG indicates cardiac pathology.
      iv) Obtain 24-hour urine for protein and creatinine clearance.
      v) If obesity is present, obtain diabetes screen at 15-16 weeks or at the time of the first visit in case of late registrants.
   i) Obtain dating ultrasound ASAP.
2) Advise patient to increase her bed rest at mid-day for about 2-hours if possible.
3) Educate the patient about the signs and symptoms of superimposed pre-eclampsia.

4) Schedule ultrasound for Level II and Doppler studies at about 22 weeks.
   a) Repeat growth assessment every 4-5 weeks if growth normal and every 2 weeks if growth trend is abnormal (declining growth trend or IUGR).
5) Antepartum fetal well being assessment according to local prevailing guidelines: NST or biophysical profile and complete fetal Doppler (Middle cerebral artery, descending aorta, and umbilical artery looking for brain sparing).
6) During labor observe patient closely for signs or symptoms of superimposed pre-eclampsia. Treat aggressively with $MgSO_4$ if indicated. The majority of patients (75 %) who develop eclampsia do so from the moment they are admitted to the labor room.
7) In the postpartum period, adjust the medication appropriately and reassess the patient's blood pressure in 1-2 weeks at the office or best, have the patient obtain a manometer and check her BP at home and report the values to you.
8) Discuss appropriate means of contraception.

Pre-eclampsia and superimposed pre-eclampsia: when pre-eclampsia is diagnosed, the severity of the condition should be defined according to the previously set criteria.

1) Mild pre-eclampsia remote from term:
   a) Compliant patients may be managed on an outpatient basis:
      i) Obtain 24-hour urine 2-3 times /week.
      ii) Baseline CBC with platelets, PT/PTT, liver enzymes and fibrinogen.
      iii) Repeat tests according to the results as frequently as necessary to assure the safety of the patient in the outpatient setting.
      iv) Initiate antepartum fetal well being assessment as noted above.
   b) Non-compliant patients should be admitted as necessary to r/o severe pre-eclampsia.
      i) Obtain 24-hour urine daily.
      ii) Baseline CBC with platelets, PT/PTT, liver enzymes and fibrinogen.
      iii) Repeat tests according to the results as frequently as necessary until severe pre-eclampsia is diagnosed or ruled out.
      iv) Initiate antepartum fetal well being assessment: refer to guidelines for fetal well being assessment (hypertensive disorders: item # 2(c) ii.
   c) If HELLP syndrome is suspected, request peripheral blood smear to look for evidence of hemolysis. Patients with help syndrome usually present with what appears to be a mild form of pre-eclampsia. Some times, they may present with symptoms consistent with upper G.I. and gallbladder disease.
2) Mild pre-eclampsia at term: initiate cervical ripening and follow with Pitocin induction.
3) Severe pre-eclampsia at all gestational ages should be treated definitively with delivery of the fetus by best means. Prior to 34 weeks administer steroids for lung maturity in addition to the following measures:
   a) The following apply to all patients regardless of gestational age:
      i) Prevent convulsions with MgSO4 as per appropriate guidelines.

1) Treat hypertension as indicated with Hydralazine. [Add 100 mg of Hydralazine in 500 ml of 0.5% NS (concentration=200 μg/ml). Set up an infusion pump and piggyback Hydralazine solution into the main IV line. Start the infusion at 200

μg/min (set the pump to an infusion rate of 60 cc/hour). Assess BP and pulse rate prior to the infusion and every 5 minutes there after].

ii) Ca^{++} channel blockers or beta-blockers may be used if Hydralazine not available (Nifedipine: 20 mg p.o. and it may be repeated 3-4 times in 30-60 minute intervals until pressure is under control.
iii) Insert Foley catheter and assess urine output hourly.
iv) Observe for signs of Mg^{++} toxicity.
v) If urine output less than 30 cc / hour:
   (1) Administer fluid challenge with rapid infusion of 500 cc LR.
   (2) Repeat once if patient's condition and or fetal condition allow.
   (3) Lack of any response indicates renal pathology and delivery should be expedited to avoid further renal damage.
   (4) Consider and be prepared to admit the patient to the SICU for invasive central monitoring.

HELLP syndrome: all patients diagnosed as having HELLP syndrome should be delivered by best means. Assess hematologic status and liver enzymes as well as the overall status of the patient. Consider the following:

1) If platelets remain above 50,000 / mm^3 , liver enzymes mildly elevated (< 500s), and overall status stable with no evidence of coagulopathy, induction of labor may be attempted. C-section should be reserved for obstetrical indications (any maternal or fetal indications other than the HELLP syndrome).
2) If the platelet count is less than 50,000 / mm^3 and /or the liver enzymes markedly elevated (>500s) and the patient is in active labor, allow SVD.
3) If the platelet count is less than 50,000 / mm^3 and /or the liver enzymes markedly elevated (>500s) and delivery is not anticipated over the next 4-8 hours or if the patient is not in labor with an unfavorable cervix, proceed with cesarean section.
4) Any evidence of coagulopathy should prompt immediate attention and correction prior to or concurrently with any operative procedure.
5) When maternal and fetal condition is stable and allows delay of delivery, the use of corticosteroids should be considered in all pregnancies less than 34 weeks.
   a) In some patients the use of corticosteroids may cause a temporary improvement of the condition with increase of the # of platelets. This should not be considered a cure since the morbidity of these "improved" patients is equally poor or worst than the typical patient with HELLP syndrome.

Eclampsia: patients with eclampsia need immediate attention for the treatment of the convulsions in addition to the control of hypertension as noted in severe preeclampsia. Self-injury prevention measures, protection of airways, and treatment of the convulsions with $MgSO_4$ according to the relevant guidelines.
Once the above is achieved, fetal status should be monitored with electronic fetal monitoring (EFM). Delivery should be planned according to the following:

1) If the fetal heart rate tracing appears reassuring with no signs of fetal compromise, delivery may be postponed until the mother is stable.
   a) For patients already in active labor progressing well, vaginal delivery should be allowed.

b) For patients not in labor, primary cesarean section should be the mode of delivery.

2) If fetal heart rate tracing indicates imminent fetal compromise (severe recurrent late deceleration, absent beat-to-beat variability, and severe bradycardia – persistent base line heart rate below 100 bpm), delivery should be accomplished as soon as maternal condition allows safe general anesthesia.