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AMPATH LAB UPDATE

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First Trimester Pre-eclampsia Screening Including Placental Growth Factor (PLGF)

Pre-eclampsia (PE) is a major cause of maternal and neonatal morbidity and mortality, especially at early-onset (delivery at <34w gestation). Complications of PE include intracranial haemorrhage, HELLP syndrome, eclampsia, pulmonary oedema, renal failure, abruptio placentae, foetal growth restriction, intrauterine foetal death and preterm birth. Maternal future risks include cardiovascular, cerebrovascular or renal disease. Future risks to offspring born from affected pregnancies include hypertension, coronary artery disease and insulin resistance. In a South-African context, the prevalence of PE and severe PE is reported as 5.75% and 1.43% respectively. Global prevalence of PE varies between 2-5%.

All pregnancies should be screened for preterm PE in the first trimester, based on maternal risk factors and biomarkers, according to the International Federation of Gynecology and Obstetrics. The major advantage of PE screening is that high-risk patients are identified earlier, at the right time when preventative Aspirin treatment should be initiated. Aspirin started after 16w gestation does not prevent PE.

Ampath Esoteric Sciences offers first trimester screening for early onset PE in singleton and twin pregnancies.
Blood for PE screening should be collected at 11w0d-13w6d gestation. PE risk is high when the calculated risk is between 1:2 and 1:100 and is evaluated on Alpha software based on:

- Maternal parameters: Parity, previous PE, family history of PE, weight, ethnicity.
- Biochemical parameters: PAPP-A (Pregnancy associated plasma protein-A), PLGF (Placental Growth Factor). PAPP-A and PLGF are decreased in pregnancies that develop PE.
- Clinical parameters:
  - Uterine Artery Pulsatility Index (UtAPI).
  - Mean Arterial Pressure (MAP).
    Patient sits for 5 min, arm supported at heart level. Use appropriate-sized adult cuff. Measure BP twice 1 min apart. Submit average of two measurements.
    - MAP = Diastolic BP + (Systolic BP - Diastolic BP)/3.
    - MAP can be entered into Alpha software OR Systolic BP + Diastolic BP can be entered and Alpha software will calculate MAP.

Screening based on maternal factors, UtAPI, MAP, PLGF and PAPP-A is by far superior (94% detection rate, 15% false positive rate) compared to maternal factors only (63% detection rate, 19% false positive rate), at a cut-off of 1:100.

PE screening enables:

- Early detection (11-13w gestation) of patients at risk for PE, who only present clinically after 20w gestation.
- Closer maternal and foetal monitoring and timeous referral to appropriate facilities.
- Preventative treatment with low dose (~150 mg/d) aspirin from 11-14w until 36w or delivery or PE diagnosis. (ASPRE trial has shown that treatment from 11-14w reduces early PE with delivery at <32w by approximately 90% and preterm PE with delivery at <37w by 60%).
- Anti-hypertensive treatment if blood pressure increases.
- Strict control of blood pressure in chronic hypertension patients for whom aspirin treatment may not be useful.

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Options for antenatal screening including Down syndrome, Trisomy 18+13, PE and Neural Tube Defects (NTD)

- First prenatal visit at 8w-9w6d gestation:
  1. Collect blood at 8w-9w6d for **First Trimester Down Screen, FTDS,** Biochemistry risk *(Blood collection before 10w = best detection rate for Down's)*.
  2. Collect blood at 11w-13w6d for **First Trimester Pre-eclampsia Screen, FTPS**, submit NT for **FTDS2** Combined risk.
  3. Collect blood at 16w-18w (ideally) for **NTD** (possible at 14w-22w6d).
- First prenatal visit at 10w-10w6d gestation: do not collect blood, refer for blood collection when 11w-13w6d.
- First prenatal visit at 11w-13w6d gestation:
  1. Collect blood at 11w-13w6d for **First Trimester Down + Pre-eclampsia Screen, FTDPS** and submit NT for Combined risk as part of FTDPS *(Improved detection rate for Down's when PLGF included)*.
  2. Collect blood at 16w-18w (ideally) for **NTD** (possible at 14w-22w6d).
- First prenatal visit at 14w-15w6d gestation: ideally, refer for blood collection at 16w-18w, although STDS possible.
- First prenatal visit at 16w-22w6d gestation:
  1. Collect blood at 16w-18w (ideally) for **Second Trimester Down Screen, STDS** (possible at 14w-22w6d).

Mnemonic	Test	Gestation	Analytes
FTDPS	Down syndrome, Trisomy 18+13, Pre-eclampsia Combined risk, NT required	11w - 13w6d	fBhCG, PAPP-A, PLGF
FTPS	Pre-eclampsia only	11w - 13w6d	PAPP-A, PLGF
FTDS	Down syndrome, Trisomy 18+13 only Biochemistry risk, no NT	8w - 13w6d	fBhCG, PAPP-A
FTDS	Down syndrome, Trisomy 18+13 only Combined risk, NT required	10w6d - 13w6d	fBhCG, PAPP-A
FTDS2	Down syndrome, Trisomy 18+13 only Combined risk, NT required Biochemistry determined already, no additional blood collection required	10w6d - 13w6d	
STDS	Down syndrome, Trisomy 18, Neural Tube Defects	16 - 18w ideally 14w - 22w6d possible	HCG, E3, AFP
NTD	Neural Tube Defects	16-18w ideally 14w - 22w6d possible	AFP

References

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