

Biomarkers of oxidative stress and the assessment of uterine perfusion – early detection of preeclampsia

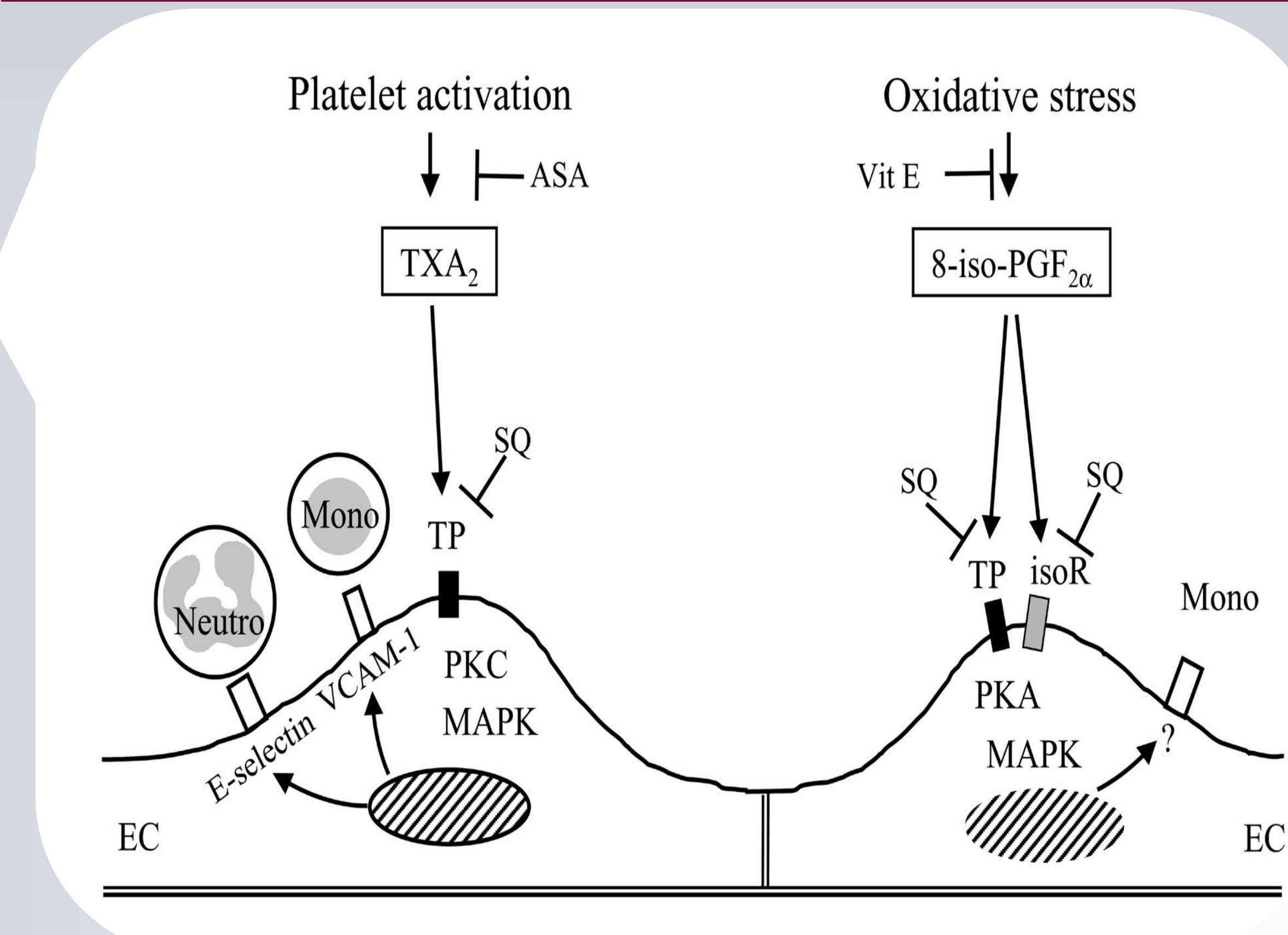
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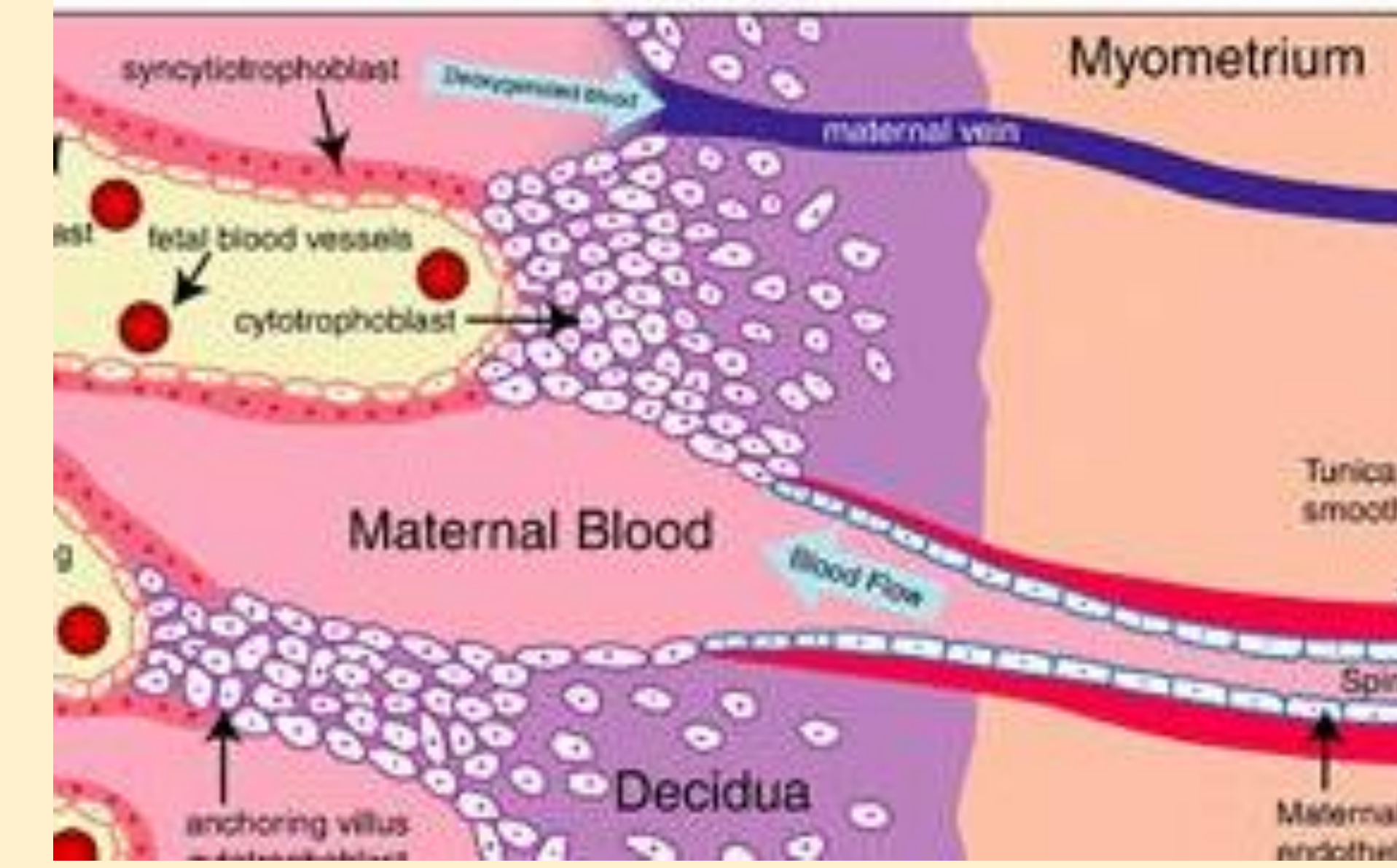
INTRODUCTION

Oxidative stress occurs in the maternal-fetal interface starting early in pregnancy. It plays a role in both normal development of the placenta and in physiology of complications: preeclampsia, miscarriage, intrauterine growth restriction, premature rupture of membranes.

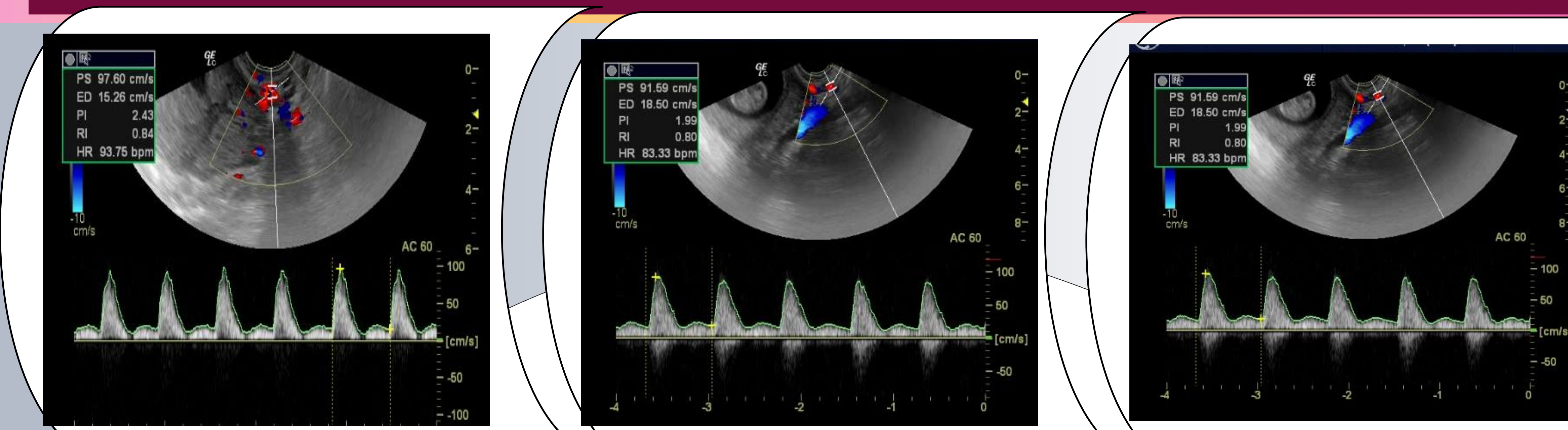
MATERIALS AND METHODS



The plasmatic level of free isoprostane 8-iso-PG F2α is reported to be higher in women with preeclampsia. The relationship between abnormal Doppler velocimetry of uterine artery and preeclampsia is well established. The sensitivity of uterine artery's examination increases as gestation approaches to 26 weeks and when persistent diastolic notch is one of the criteria for analysis. Combined data show that the pulsatility index alone or in combination with persistent notch after 24 weeks of gestation is the most predictive parameter in preeclampsia. We have included in the study 32 patients and 7 of them have developed preeclampsia. A screening protocol was performed in two stages by studying Doppler velocimetry of uterine artery and level determination of 8-iso-PG F2α, at 18-22 weeks and then at 24 weeks.

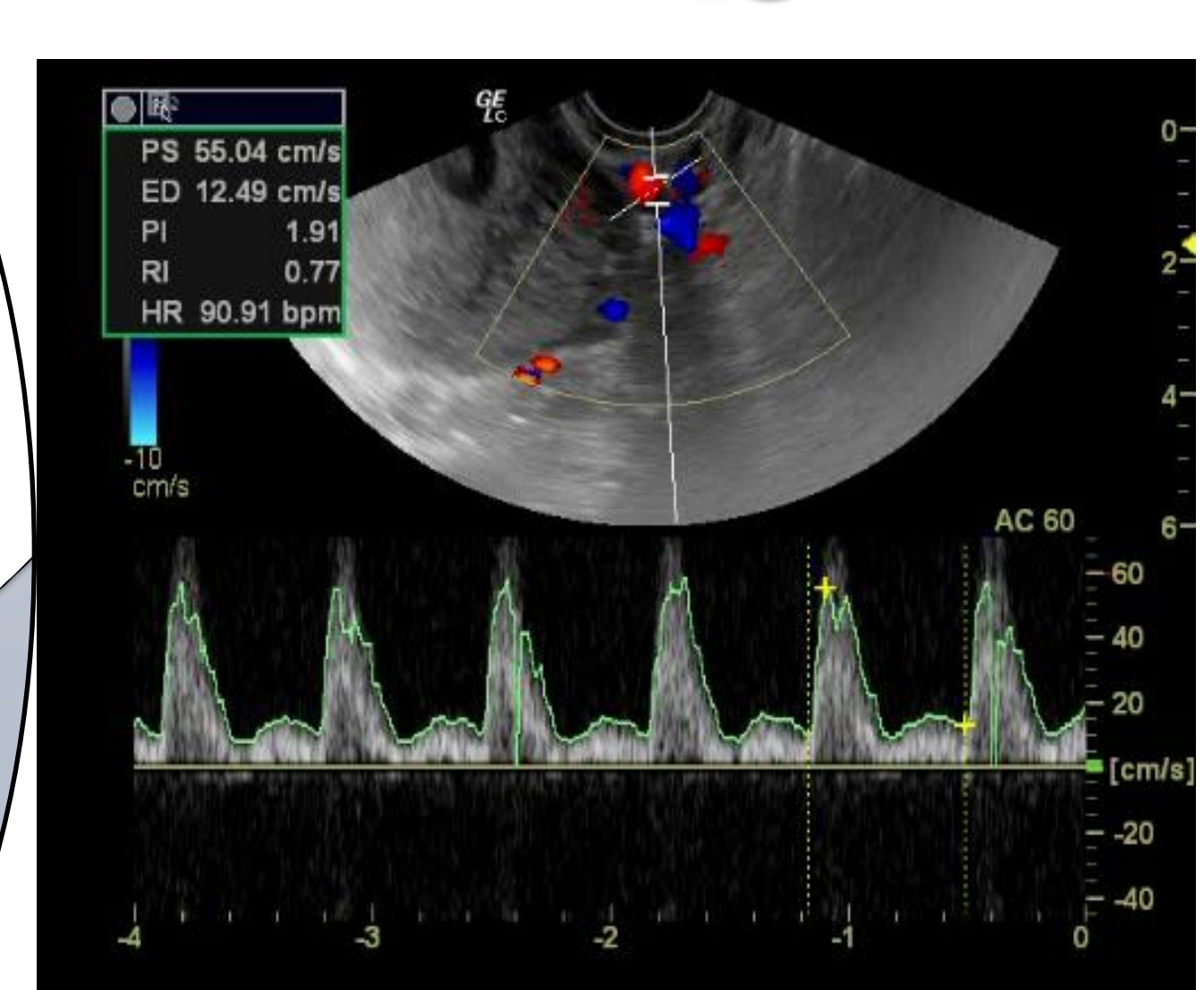
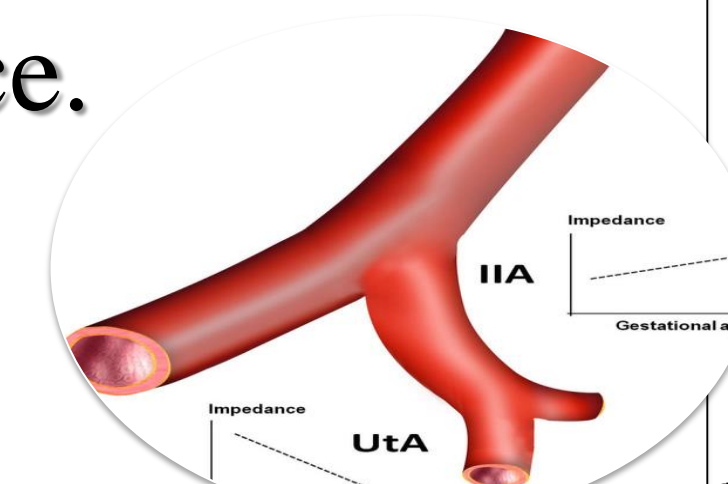


RESULTS



- We have quantified the plasmatic levels of 8-iso-PG F2α with the type of preeclampsia, and we have found that in severe preeclampsia the plasmatic levels of isoprostane were high.
- The middle value of 8-iso-PG F2α was 2670.53 pg/ml in severe preeclampsia. The assessment of Doppler velocimetry shows a persistent protodiastolic notch and a high impedance of the bilateral wave velocity.

In mild preeclampsia we calculated an average of 1112.98 pg/ml, with minimum values of 105 pg/ml and maximum values of 11,200 pg/ml. Doppler assessment highlights a persistent protodiastolic notch and a progressive decrease of impedance.



CONCLUSIONS

Because the speciality data do not support the use of Doppler sonography as a routine screening of preeclampsia, this distinction is important because a threshold level of 8-iso-PG F2α can make us suspect a pregnancy progressing to preeclampsia, or more importantly, to what type of preeclampsia, severe or mild.

As a practical applicability, the positive predictive value of 25.93% to a value of 782 pg/ml, shows that in the case of high values, there is a probability of over 25% to have an evolution to severe preeclampsia.

Negative predictive value of 95.19%, at the same threshold value, shows that if we don't have these values, the probability of progressing without major complications of preeclampsia, is over 95%, in other words, the probability of severe preeclampsia is about 5%.