Association between sFlt-1/PlGF ratio and incidence of Intrauterine Growth Restriction (IUGR) in preeclampsia pregnancies.

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Objective

To review the **association between sFlt-1/PlGF ratio** (soluble Fms-like tyrosine kinase 1/ Placental Growth Factor) and the **incidence of Intrauterine Growth Restriction** (IUGR) in pregnant women with diagnosis of **Preeclampsia**.

Methods

A **retrospective study** was carried out in our Maternal-fetal Medicine Unit at the tertiary hospital **Parc Taulí University Hospital,** Sabadell (Barcelona), in singleton pregnancies with **diagnosis of Preeclampsia between January 2018 and December 2022**.

Patients were classified in two groups according to the maximum sFlt-1/PlGF ratio value determined during the gestation. The first group included patients with **low or intermediate sFlt-1/PlGF ratio** (<85 if <34 weeks and <110 if ≥34 weeks); the second group included patients with **high or very high ratio** (≥85 if <34 weeks and ≥110 if ≥34 weeks). **Incidence of intrauterine growth restriction** (IUGR) was analysed in each group.

IUGR was defined as estimated fetal weight below the 3rd percentile for its gestational age or between 3rd and 10th percentile added to abnormal Doppler. IUGR was classified in **type I** if uterine arteries pulsatility index (PI) was >95th percentile, middle cerebral artery PI was <5th percentile or cerebroplacental index (CPI) was <5th percentile; **type II** if diastolic umbilical artery flow was absent; **type III** if reverse diastolic umbilical artery flow or ductus venosus PI was >95th percentile; and **type IV** if reverse ductus venosus flow.

Results

From a total of **297 patients** with diagnosis of preeclampsia**, 144** with at least **one sFlt-1/PlGF ratio** determination during pregnancy were included. 68 (47%) and 75 (53%) patients were included in the low or intermediate ratio group and high or very high ratio group, respectively.Mean age was 33.7±6.55 (mean±SD) years old and mean BMI was 27.5 ±6.79 Kg/m2. 85 patients (59%) were nulliparous and 123 (85%) got pregnant spontaneously. With regard to the majority human race, 63% were white and 21% South-American. Regarding established preeclampsia risk factors, 45 women (**47%**) presented **high risk first trimester preeclampsia screening**, 28 patients (**19%**) had already had **previous preeclampsia**, 28 (**19%**) had **arterial hypertension** prior to gestation, only 16 (11%) of them smoked, 15 (15%) had pathological uterine arteries at first trimester and 22 (28%) at the second trimester. Mean gestational age at **diagnosis** of preeclampsia was **34.8 ±3.56 weeks**. 40 women **(28%)** developed **early Preeclampsia** and 60 **(42.1%)** developed **severe Preeclampsia**. Mean gestational age at **delivery** was **35.7 ±2.12 weeks**, with an **induction rate** of **79,86%** (115). In 91.3% (105) of them, the indication of induction was preeclampsia, and in 3.4% (4) was IUGR.

	Low or intermediate sFlt-1/PlGF ratio	High or very high sFlt-1/PlGF ratio	Statistical significance (p)
IUGR	**12% (8)**	**38% (29)**	**p=0.002**
Type I	87.5% (7)	79% (23)	
Type II	12.5% (1)	-	
Type III	-	17.24% (5)	
Type IV	-	3.4% (1)	

IUGR was present in **25.69% (37)** of the cases, being in 81.08% (30) of them type I, 2.7% (1) type II, 13.51% type III (5) and 2.7% (1) type IV. The incidence of **SGA was 3.5%** (5).

The **incidence of IUGR was statistically higher** in patients with **high or very high sFlt-1/PlGF ratio** compared to those with low or intermediate sFlt-1/PlGF ratio, **38% vs 12% (p=0.002).**

In normal or intermediate sFlt-1/PlGF ratio group, the incidence of type I and II IUGR was 87.5% and 12.5% respectively. No cases of type III or IV IUGR were seen. In high or very high sFlt-1/PlGF ratio group, the incidence of type I, III and IV IUGR was 79%, 17.24% and 3.4%, respectively. No cases of type II IUGR were seen.

Conclusion

In women with preeclampsia, the **elevation of sFlt-1/PlGF ratio is significantly associated with a higher incidence of IUGR**, which supports the presence of **placental dysfunction** as the common etiology of these conditions. Furthermore, this association increases with a major degree of placental insufficiency.