Objective
Recent studies support that osteocalcin, apart from its role in skeletal metabolism, is implicated in glucose homeostasis. The aim of this study is to examine maternal serum concentrations of osteocalcin at 11-14 weeks in pregnancies that developed gestational diabetes mellitus (GDM) and to create a first trimester prediction model for GDM.

Methods
This is a case control study in a prospective cohort of pregnant women. Maternal serum concentrations of osteocalcin were measured in 40 cases that developed GDM and 94 unaffected controls. First trimester biophysical parameters, biochemical indices, maternal-pregnancy characteristics and osteocalcin concentrations were assessed in relation to GDM occurrence.

Results
In the GDM group, first trimester osteocalcin serum concentrations were increased compared to the control group (mean= 8.81 ng/ml, SD=2.59 vs. mean= 7.34 ng/ml, SD=3.04, p=0.0058). Osteocalcin was independent of first trimester biophysical and biochemical indices. Osteocalcin alone (OR =1.21, CI: 1.02-1.43, p=0.023) was a significant predictor of GDM (Model R2 = 0.04, AUC=0.61, CI: 0.55-0.72, p<0.001). The combination of maternal and pregnancy characteristics with osteocalcin resulted in an improved prediction model for GDM (Model R2 = 0.21, AUC=0.80, CI: 0.71-0.88, p<0.001). The combined model yields a sensitivity of 72.2% for 25% false positive rate.

Conclusion
First trimester maternal serum osteocalcin concentrations are elevated in pregnancies complicated with GDM. Osteocalcin combined with maternal and pregnancy characteristics, provides an effective screening for GDM at 11 to 14 weeks.