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First Trimester Screening for Preeclampsia

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ABSTRACT

Preeclampsia is a common disorder that affects approximately 2 to 8 percent of pregnancies world-wide. Screening for preeclampsia in the first trimester yields high detection rates for low screen positive rates screen-positive rate (the number of patients informed that their test is abnormal). The risk of preeclampsia can be reduced by daily administration of low-dose aspirin to women at high risk of developing this disorder if treatment is started early in pregnancy.

REVIEW

Preeclampsia (PE) is a common disorder that affects approximately 2 to 8 percent of pregnancies world-wide [1]. It is a major cause of maternal, fetal, and neonatal morbidity and mortality with potentially long-term consequences for both the offspring and the mother [1-3]. The authors of a recent study reported that the short-term cost of PE to the US health care system is $2.18 billion annually [4]. In the long term, it is now apparent that women who were affected by this disorder are at high-risk of developing cardiovascular disease, cognitive impairment and other medical complications later in life [5-7].

Though PE develops in the latter half of the second trimester or in the third trimester, events that contribute to the development of PE occur much earlier in pregnancy. Management of PE, once it develops, is well described; however, the only definitive cure is delivery [2,3].

Many maternal characteristics are known to be associated with an increased risk for PE [8]. Preventive treatment with low dose aspirin (ASA) has been shown to be effective in reducing the incidence of early and severe PE and its use is recommended by USPSTF and ACOG in high-risk women [9]. There is now evidence that a higher dose of ASA (150 mg) is significantly more effective in preventing PE than the 82 mg dose that was initially used for this purpose (approximately 30 percent of pregnant women are resistant to lower doses) [10,11]. Results of a prospective multicenter double blind study (the ASPRE trial) were recently published in the New England Journal of Medicine [10]. The purpose of the study was to use the FMF algorithm to screen for PE and to evaluate whether ASA prophylaxis (150 mg of ASA at bedtime) in high-risk patients was effective. The author reported that in the ASA group, the incidence of PE prior to 34 weeks' gestation was reduced by 82 percent, and PE prior to 37 weeks' gestation was reduced by 62 percent [10]. For this preventative treatment to be effective, it must be started prior to 16 weeks' gestation; therefore, development of a screening test that performs well prior to this point was imperative [12-14].

Over the past few years, studies demonstrated that this was possible. A protocol developed by the Fetal Medicine Foundation (FMF) appears to produce the best screening performance. This protocol is based on a combination of first trimester markers that include maternal characteristics in combination with biomarkers (mean arterial pressure, uterine artery pulsatility index, pregnancy-associated plasma protein A, and placental growth factor) [15-18]. Applying this protocol worldwide at this point is difficult, especially in countries where first trimester ultrasound examinations and biochemical studies are not routinely available.

In a recently completed study, the performance of a modified FMF protocol was tested in screening for preeclampsia in the USA [19]. The authors reported that at a 5 percent screen positive rate (FP) they identified 85 percent of women who developed preeclampsia prior to 34 weeks' gestation [19]. They also identified 68 percent of women who developed preeclampsia prior to 37 weeks' gestation and 43 percent of term preeclampsia at a 10 percent FP [14]. The high detection rate of preeclampsia prior to 34 weeks' gestation was especially encouraging as this group has the highest maternal, fetal, and neonatal morbidity and mortality as well as having the highest impact on health care costs [20].

CONCLUSION

The risk of PE can be reduced by daily administration of low-dose ASA women at high-risk of developing this disorder if treatment is started early in pregnancy. It is also apparent that screening for PE in the first trimester yields high detection rates for low screen positive rates.

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