Available online at www.sciencedirect.com
ScienceDirect
Molecular Aspects of Medicine 28 (2007) 227–244
MOLECULAR ASPECTS OF MEDICINE
www.elsevier.com/locate/mam

Review

Serum markers for predicting pre-eclampsia

Marc U. Baumann, Nick A. Bersinger, Daniel V. Surbek *

Department of Obstetrics and Gynecology, University of Berne, Effingerstrasse 102, CH-3010 Berne, Switzerland

Received 18 April 2007; accepted 18 April 2007

Abstract

Pre-eclampsia, a pregnancy-specific disorder, contributes substantially to perinatal morbidity and mortality of both, mother and newborn. An increasing number of biochemical agents were evaluated as markers for predicting pre-eclampsia. None of them has been proved to be of clinical value yet. Much effort has been put into assessing novel potential markers and their combination with other screening methods such as Doppler sonography. The purpose of this review is to reflect the current knowledge of serum markers for predicting pre-eclampsia. So far, the most promising serum markers are placental protein 13 (PP-13), as well as soluble fms-like tyrosine kinase-1 (sFlt-1), placental growth factor (PIGF) and soluble endoglin (sEng). These markers allow screening at a relatively early stage and, most importantly, show relatively high predictive values and improved diagnostic performance if combined with first trimester Doppler sonography. Large-scale prospective studies, assessing these markers, are important to justify their clinical use in view of early intervention to prevent pre-eclampsia in the future.

Keywords: Pre-eclampsia; Serum markers; Sonography

* Corresponding author. Tel.: +41 31 632 11 03; fax: +41 31 632 11 05.
E-mail address: Daniel.Surbek@insel.ch (D.V. Surbek).

0098-2997/$ - see front matter © 2007 Elsevier Ltd. All rights reserved.
doi:10.1016/j.mam.2007.04.002

Contents

1. Introduction

Pre-eclampsia is a pregnancy-specific systemic disorder affecting up to 8% of all pregnancies (Walker, 2000; Sibai et al., 2005). Pre-eclampsia is defined as hypertension and proteinuria, which can lead to edema, impaired perfusion of the uteroplacental unit and subsequently to fetal growth restriction. Pre-eclampsia contributes substantially to perinatal morbidity and mortality of both, mother and newborn. Albeit various investigations have been undertaken, the underlying etiology of pre-eclampsia remains unclear. It is, however, generally accepted that the pathophysiology of pre-eclampsia is characterized by a cascade of impaired early trophoblast invasion, decreased placental perfusion, placental ischemia, oxidative stress, and consequentially impaired placental factors (dysbalance in angiogenic and prothrombotic factors) which are playing a key role in inducing systemic maternal endothelial dysfunction (Redman and Sargent, 2005).

To date, the sole effective therapy of pre-eclampsia is the removal of the placenta, often leading to iatrogenic preterm delivery and its sequelae. After removal of the placenta the pre-eclamptic symptoms vanish within days. Early diagnosis and timely delivery are crucial for minimizing perinatal morbidity. The identification of women at risk for development of pre-eclampsia would improve their monitoring and enable to convey them to randomized trials for evaluating prophylactic treatment. To enhance the ability to diagnose women likely to develop pre-eclampsia before the onset of the disease is therefore an important task. It would allow not only to