

Trophoblastic Injury: New Etiological and Pathological Concept of Preeclampsia

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Aim. To analyze published data related to modern insight in the etiology of preeclampsia.

Methods. We analyzed 38 published articles on the etiology of preeclampsia. The articles were identified by a combined search of PubMed database of the National Library of Medicine, USA, by using the key words “preeclampsia” and “cause/etiology”. Full-text articles were retrieved from the library of Hamamatsu University School of Medicine and Japan’s library network.

Results. According to the reports, vasospasm and vascular endothelial injury were two major pathological conditions of preeclampsia. They could be classified into 4 types of uteroplacental circulation failure: 1) disturbance in the circulation from the aorta to the uterine artery, 2) disturbance in the circulation of the spiral artery, 3) disturbance in the circulation of the intervillous space, and 4) disturbance in the circulation of the uterine vein reflux disorder. Major vessel bed of the uteroplacental unit consists of trophoblast, not of endothelial cells. Moreover, the trophoblast has many cellular functions, such as endothelial, immune, neural, and hormonal, resulting in production of various vasoactive substances. Thus, trophoblastic injury induced by uteroplacental circulation failure could affect and deteriorate the systemic circulation of the mother, resulting in preeclamptic symptoms.

Conclusion. The development of preeclampsia could be envisioned as a series of events from uteroplacental circulation failure to trophoblastic injury to vascular endothelial injury or vasospasm. The concept of “trophoblastic injury attributable to the uteroplacental circulation failure” can be a signpost for further investigations into the etiology of preeclampsia and type-specific treatment of preeclampsia.

Key words: endothelial cell injury; etiology, preeclampsia; placenta; trophoblast; uteroplacental circulation; vasospasm