

Hypertensive disorder in pregnant women receiving fertility treatment

Soheila Arefi

Fellowship in infertility

Avicenna Research Institute



- ▶ Hypertensive disorders (HDs) as the most prevalent medical problem during pregnancy, predispose the patient to a lot of comorbidities and may even cause maternal or fetal death.
- ▶ HDs are somewhat more common in women receiving fertility treatments regardless of pathophysiologic correlation of infertility and hypertension or older age and chance of multiple pregnancies.
- ▶ The incidence of gestational hypertension was 8.9% among women without infertility treatments, and 15.8% among women undergoing infertility treatments.



- ▶ Pathologic basis of infertility like polycystic ovaries and endometriosis, must be considered as a cause of or in correlation with hypertension. In these conditions, hypertension may simply occur due to associated obesity or insulin resistance, androgen excess, sympathetic nerve over activity and chronic use of oral contraceptives

Bentley-Lewis R et al ,Endocrinol Metab Clin North Am. 2011

Mu F, et al Hypertension. 2017



- ▶ The most common medications which are used for treatment of female infertility are clomiphene, metformin, aromatase inhibitors like letrozole, human chorionic gonadotropins (hCG) like menotropin, dopamine agonists like bromocriptine and gonadotropin-releasing hormone (GnRH) agonists like leuprolide which is used in GnRH protocol and consists of progesterone and estradiol. Among these, letrozole, leuprolide and estradiol can induce hypertension with a prevalence rate of 5-8% , 8% and 3-7% , respectively.

letrozole: drug information. 2017

Leuprolide: drug information. 2017

Estradiol (systemic): Drug information. 2017



- ▶ It is well known that estrogen-containing medications can induce hypertension in premenopausal women, but the mechanisms are not fully understood. Supraphysiologic concentrations of estrogen and its effect on increment of angiotensinogen and insulin-like growth factor I production by liver, increased sympathetic activity and increased expression of angiotensin subtype 1 (AT1) receptor in the kidneys, are the possible mechanisms

Ashraf MS, Vongpatanasin W, Curr Hypertens Rep. 2006



- ▶ Tollan et al. showed a statistically significant decrement in both systolic and diastolic BP during ovarian stimulation for IVF, most probably due to decreased level of adrenalin.

Tollan A, et al, Scand J Clin Lab Invest. 1993



- ▶ Furthermore, chronic hypertension can cause poor egg quality; also, many hypertensive women suffer from obesity which is mostly a result of excessive estrogen production which can lead to infertility. Antihypertensive medications like angiotensin receptor inhibitors (ARBs) and calcium channel blockers typically affect male fertility rather than female ones.



- ▶ Preeclampsia is the consequence of a maternal immune reaction against paternal antigens expressed in the placenta.
- ▶ Elevated risks of preeclampsia observed in women treated for infertility stem from the underlying disorder rather than from the infertility treatments themselves.

Need JA et al, Journal of Reproductive Immunology. 1983



- ▶ It has been suggested that the association between infertility treatments and gestational hypertension stems from an underlying disorder, such as immune maladaptation, that would increase the risk of both infertility and preeclampsia.

Geis W, et al ,Clin Obstet Gynecol. 2001



- ▶ Intracytoplasmic sperm injection in couples where the number of sperm cells available during intercourse is negligible, or intrauterine insemination with donor sperm, oocytes or embryos, might increase the risk by triggering an immune reaction in women without prior desensitization.

Smith GN, et al, Am J Obstet Gynecol. 1997



- ▶ Regarding the role of specific treatments, some studies have suggested a particularly elevated risk of preeclampsia associated with ICSI and gamete donation.

Wang JX, et al ,Lancet. 2002



- ▶ In a meta- analytic study which was done in Germany, oocyte donation was also reported as a risk factor for HDs in pregnancy and this effect was possibly mediated through immunological processes and ovarian dysfunction

Pecks U, et al ,Dtsch Arztebl Int. 2011



- ▶ It has also been shown that hypertension is the main cause of perinatal and maternal morbidity and mortality including intrauterine growth retardation (IUGR), Hemolysis, Elevated Liver enzymes, and Low Platelet count (HELLP) Syndrome, renal impairment, premature labor, neonatal intensive-care-unit admission, caesarean section, placental abruption, perinatal death and maternal convulsion.

Hypertension in pregnancy: NICE guidance.2013



Thank you

