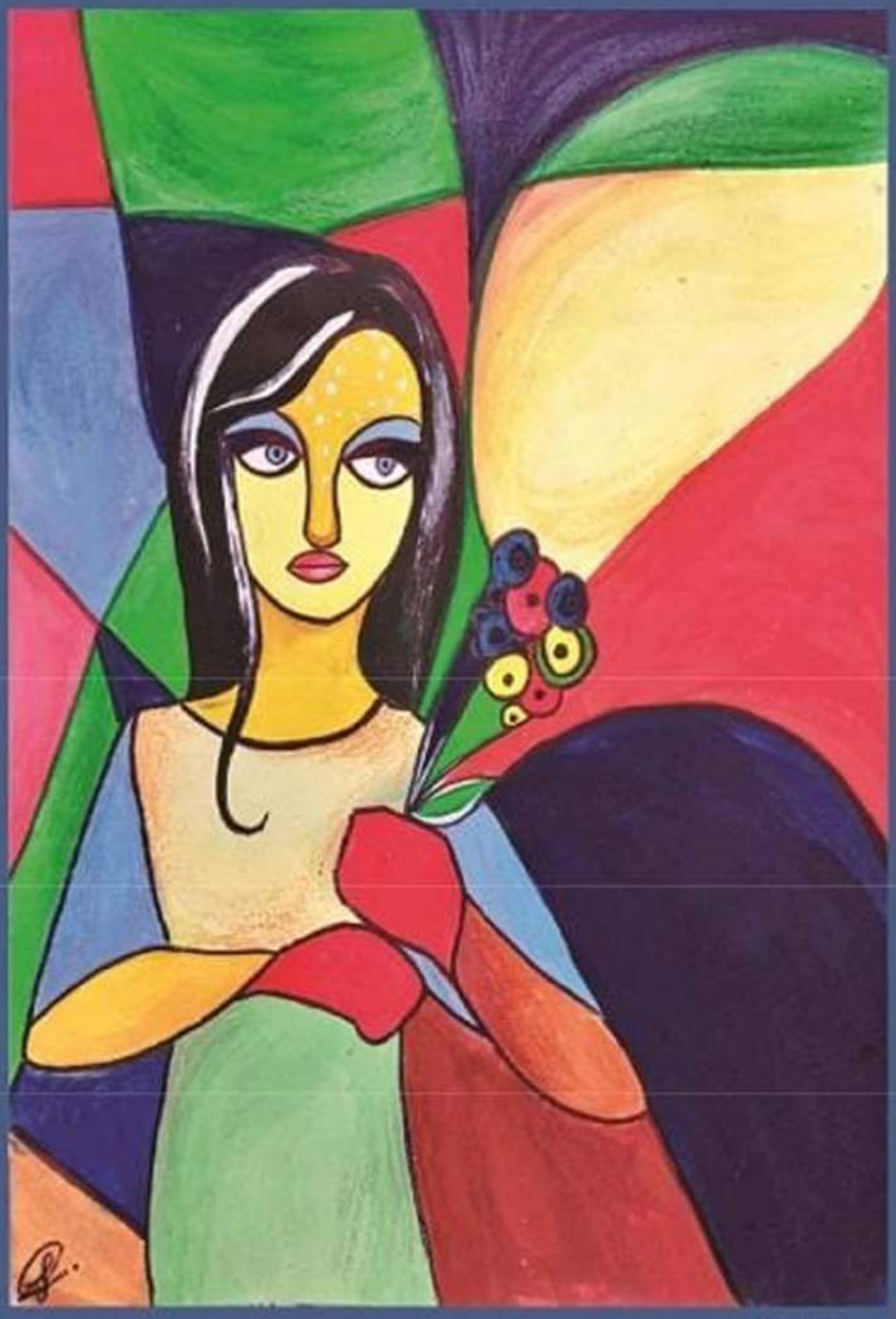

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ART AND HYPERTENSIVE DISORDERS OF PREGNANCY

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INTRODUCTION

Since the field of assisted reproductive technologies (ART) has expanded, more than ten million children have been born as the result of IVF. The estimated annual increase is half a million children. Hypertensive disorders of pregnancy (HDP) occur in about 10% of all women around the world. In Asia and Africa, nearly 1/10th of all maternal deaths are associated with HDP. Artificial reproductive technique is also considered as a risk factor among all other risk factors for (HDP) of (RR–1.8, 95%CI).Various factors can be involved in relation to hypertensive disorders of pregnancy and ART.

1. Larger proportion of multiple births
2. Immunological intolerance in donor gametes and embryos
3. Higher body weight
4. Advanced maternal age
5. Absent corpus luteum in programmed and oocyte donation cycles (modifiable)
6. Altered hormonal profile due to – ovarian stimulation, cycle substitution and technology itself.
7. Various ART procedures
   - FRESH CYCLES
   - FET CYCLES
   - EMBRYO BIOPSY FOR PGS
   - DONOR GAMETES

FRESH CYCLES AND HDP: Low levels of estrogen in early pregnancy allow for migration of extravillous trophoblasts into uterine spiral arteries with artery remodeling. If estrogen is elevated prematurely, extravillous trophoblast invasion of spiral arteries is suppressed. Supraphysiological hormonal levels in early pregnancy lead to impaired trophoblastic invasion. Superovulation alters the expression of genes critical to endometrial modeling during early implantation.

FROZEN EMBRYO TRANSFER (FET) AND HDP : Improved cryopreservation techniques and growing practice of single embryo transfer (SET) and improved pregnancy rates has lead to an increase in the incidence of frozen embryo transfer. A potential factor in developing hypertension during FET is the type of endometrial preparation. A specific analysis comparing HRT versus natural cycles in FET found that HRT cycles lead to an increased risk of HDP compared to natural cycles, adjusted odds ratio 1.78. It is the number of corpus luteum that differs in natural (one CL), fresh cycles (supraphysiological number of CL), absent CL in artificially programmed cycles and donor oocyte cycles. Corpus luteum is important for the production of vasoactive substances like relaxin and VEGF which are important for the initial placentation.

GAMETE DONATION AND HYPERTENSION: Oocyte donation is becoming a common standard practice for patients with reproductive disorders, diminished ovarian reserve, or advanced maternal age due to its relatively high success rate and comparable live delivery rates in comparison to autologous IVF pregnancies. Pregnancies achieved from oocyte, sperm or embryo donation are unique, since they have resulted from donor gametes that are immunologically foreign to the mother. Fetal HLA-C is different from maternal HLA-C because it also expresses paternal HLA-C cells. When donated oocytes

are used the trophoblastic HLA-C is less recognizable for the immunological system of the mother because it is completely allogenic. This can lead to an altered functioning of the uterine natural killer cells. This is supported by the increased risk of HDP in primiparous women and after the change of paternity in multiparous women.

EMBRYO BIOPSY AND HDP: The use of preimplantation genetic testing (PGT) is increasing rapidly. Current indications for PGT include aneuploidy assessment for recurrent pregnancy loss, advanced maternal age, sex selection, human leukocyte antigen-matched siblings and testing for genetic disorders such as unbalanced translocations and single gene mutations. Because trophectoderm biopsy removes cells that are destined to form the placenta, there is potential for increased risk of adverse pregnancy outcomes that are associated with abnormal placentation. Abnormal initial placentation has been strongly suggested to be involved in later development of pre-eclampsia and restricted fetal growth.

CONCLUSION: As ART and FET rate has increased, our safety concerns, about the procedures has also increased. Patient BMI should be optimised before doing embryo transfer. The chances of multiple pregnancies should be reduced by performing more of single embryo transfer (SET). Whenever possible, FET should be performed in a natural, modified natural or ovulation induction cycle (rather than an artificial cycle). Knowing the possible relationship between infertility treatment and HDP specific care plans and interventions should be developed to decrease the incidence and subsequently the risk of maternal morbity and mortality.

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