Fertility at midlife

The need for fertility at midlife is on the rise due to delayed childbearing especially in career-oriented women, who may be either having late marriages or planning childbearing after they have stabilized in their careers. Increased rate of divorce with remarriage also adds to the number of women who opt for fertility beyond the age of 40.

It is a well-known fact that fertility diminishes with age and success rates after assisted reproduction also diminish with age.[1] This is due to various factors, but in almost 50% of women diminished ovarian reserve has been established as the cause. Poor ovarian reserve[2] can be due to various reasons, but age plays a very important role beyond 37 years. This varies with different ethnicities, with Asian women showing an overall lower age at which ovarian reserve diminishes.[3] A recent study by Iglesias *et al.*[4] demonstrated a 6-year gap between the ovarian reserve in Indian women versus Spanish women at the same chronologic age. Hence, we should expect a lowered fertility potential at the same age in women of Indian ethnicity as compared to Caucasian women. The ovarian reserve of infertile women could also diminish due to genetic causes, endometriosis, autoimmune disorders, chemo/radiotherapy taken for treatment of cancer, and iatrogenically due to any pelvic surgery which affects the blood supply to the ovaries.[5]

Various protocols for ovulation induction during assisted reproduction technology (ART) have been utilized to improve pregnancy rates in midlife women, with no concrete evidence available on the most ideal protocol to use. Various adjuvants have been added to these protocols, with no adjuvant universally showing superior results. The only adjuvants with some value have been the use of weak androgens[6] prior to initiating ovulation induction, growth hormone during ovarian stimulation,[7] and the use of mitochondrial nutrients which seem to have an important role to play in aging oocytes.

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Currently, in women who do not show good ovulation patterns on maximal ovarian stimulation, or in those who have repeated failed ART cycles with their own eggs, use of donor oocytes gives the best results. Data from the American Society of Reproductive Medicine show a pregnancy rate of 46.6% in women <35 years of age and a pregnancy rate of only 19.5% above the age of 40 years after assisted reproduction in fresh embryo cycles. On the other hand in women who adopted donor oocytes, the pregnancy rate was 56.6% at the age of 40 years.[2] Since age has such an impact on fertility, women are keen to have their babies at a younger age in order to avoid difficult ART cycles later which affects growth in their careers. Results of studies comparing pregnancy rates with fresh eggs versus vitrified (frozen) eggs are similar[8] hence many consider freezing then fertility by freezing their eggs or embryos at a younger age, and use them later when they are ready to have their babies.

The use of donor oocytes prevents a woman from having her own biological child, as the donor oocyte does not contain her own genes. To overcome this, a mitochondrial donation has been recently approved by the Human Fertilisation and Embryology Authority of UK. This latest technology of transferring mitochondria from the cytoplasm of a young donor oocyte from which the donors nucleus is removed and the nucleus of a midlife woman is injected.[9] This allows a midlife woman to have her own DNA in the environment of a younger egg. The technique is called "Mitochondrial Spindle Transfer" or MST. This can also be extended to an embryo when it is called the pronuclear transfer. This wonderful technology offers the opportunity to a midlife woman to have her own genetic child.

The tremendous advances in ART have been able to offer women the possibility of playing both roles well - that of being career women and wonderful mothers!

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