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Preimplantation Genetic Diagnosis (PGD) Should Be Judiciously Indicated for Male-Factor Subfertility and ICSI Patients

Androlgy Lab Corner*

BOON CHIN HENG

From the National University of Singapore, Singapore.

In recent years, preimplantation genetic diagnosis (PGD) of embryos in clinical assisted reproduction has become increasingly widespread (Sermon et al, 2004). Besides preventing birth defects in the offspring of parents who are either sufferers or carriers of life-threatening or dehabilitating genetic diseases, PGD can also be indicated for the routine screening of chromosomal abnormalities and genetic defects in the case of patients with male factor subfertility (Ludwig et al, 2001), the majority of whom would eventually opt for ICSI treatment.

A variety of genetic defects have been linked to male factor subfertility (Griffin and Finch, 2005). These include chromosomal aneuploidy (ie, Klinefelter syndrome, cystic fibrosis transmembrane conductance regulator gene mutations, Y-chromosome microdeletions, and androgen receptor mutations). Hence, there is a risk of transmission of such genetic aberrations via ICSI, which could be prevented by PGD (Ludwig et al, 2001).

Nevertheless, the PGD procedure is particularly expensive (Geraedts et al, 2001), given the high level of specialized technical skills and medical expertise required, which substantially increases the already heavy financial burden of couples seeking fertility treatment (Garceau et al, 2002). Hence, the pertinent question that arises is whether medical professionals should routinely recommend PGD for all cases of male factor subfertility and ICSI. What is needed is a clear set of ethical guidelines for the judicious application of this technically complex and expensive procedure on patients who neither suffer nor carry life-threatening and debilitating genetic diseases.

Adequate counseling would certainly be required for the patient to make an informed decision on whether to proceed with PGD. Prior to this, genetic screening of peripheral blood (Haidl et al, 2001) or even testicular tissue (Stipoljev et al, 2005) should be utilized as the first line of diagnostic testing to provide the necessary information on which the decision can be based. If genetic aberrations are detected, the patient must then be informed of the chances of transmission to their offspring and whether such inherited defects are life-threatening or debilitating. For example, men with Y-chromosome microdeletions lead relatively normal healthy lives other than having defective spermatogenesis (Katagiri et al, 2004). If PGD is chosen to exclude embryos with genetic aberrations, the patient must then be duly notified of the lower cumulative chances of conception due to the reduced number of embryos available for transfer.

Other diagnostic options which are technically less complex and cheaper should also be presented to the patient, such as the various techniques of prenatal screening (Eisenberg and Wapner, 2002) for detecting chromosomal anomalies and genetic defects, i.e., amniocentesis, chorionic villus biopsy, and ultrasonography. Of course, these carry the attendant risk and trauma of an induced abortion should the decision be made to terminate a fetus that has been diagnosed with a genetic defect. Additionally, the patient must also rightfully be informed that the PGD procedure is not without inherent risks. Even with proper training and accreditation of technical skills, there is still a small chance of damaging the embryo, which could in turn compromise the chances of conception. In the long run, human error is inevitable even with the most skilful pair of hands, given the high degree of manual dexterity required for embryo biopsy.

Correspondence to: Dr Boon Chin Heng, From the National University of Singapore, Singapore.

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