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ARTICLE

Rapid policy change to single-embryo transfer while maintaining pregnancy rates per initiated cycle

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Abstract Public financing of IVF aims at increasing access to treatment while decreasing the expenses associated with multiple pregnancies. Critics argue that it is associated with lower pregnancy rates. This study compared cycles performed during 2009 (before implementation of Quebec's public IVF programme; period I) to those performed in the year following implementation (period II) in a single IVF centre. First fresh cycles in period I (499 women) and first fresh cycles (815 women) along with their corresponding first vitrified–warmed transfer (271 women) in period II were evaluated. From period I to period II, single-embryo transfer increased from 17.3% to 85.0% ($P < 0.001$), multiple ongoing pregnancy rate decreased from 25.8% to 1.6% ($P < 0.001$) and ongoing pregnancy rate decreased from 31.9% to 23.3% ($P = 0.001$). During period II, the ongoing pregnancy rate per vitrified–warmed embryo transfer was 19.2%, leading to a cumulative ongoing pregnancy rate per initiated cycle of 29.7%, which was not different to the pregnancy rate per fresh cycle during period I (31.9%). To conclude, Quebec's public IVF programme decreased multiple pregnancy rates while maintaining an acceptable cumulative ongoing pregnancy rate, a more precise outcome to evaluate the impact of public IVF programmes.

KEYWORDS: assisted reproductive treatment, IVF, multiple pregnancy, public policy, single-embryo transfer

Introduction

Public financing of assisted reproductive technology is intended to increase access to fertility treatments by reducing the financial burden to patients. In counterpart, governments aim to reduce the health expenses associated with multiple pregnancies attributable to the use of assisted reproductive technology. Although comprehensive government initiatives are associated with greater utilization of fertility treatments and lower rates of multiple pregnancies (Bissonnette et al., 2011), critics of public financing argue that public programmes are also associated with lower

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pregnancy rates (Gleicher, 2011). Many countries have implemented legislation to regulate assisted reproductive technology, encouraging the practice of single-embryo transfer (SET) through public funding (Maheshwari et al., 2011). In Canada, the only province that totally covers the costs of treatment is Quebec (Bissonnette et al., 2011). The subject of how many embryos is safe and proper to transfer and the best way to regulate this decision continues to generate debate and no unanimity has been reached to date (Gleicher, 2011; Johnson et al., 2011; Khalaf et al., 2011).

SET is the most effective approach to reduce the incidence of multiple pregnancies after assisted reproductive treatment (ESHRE, 2001). However, most of the studies evaluating the outcomes of SET have shown lower pregnancy rates when comparing with double-embryo transfer (DET; Pandian et al., 2009). Nonetheless, the principal weakness of these studies is not taking into account that most SET are not elective. Elective SET requires the selection of good prognosis patients and the transfer of the best high quality embryo (De Sutter et al., 2003). Studies that have compared elective SET with DET have not found differences in terms of pregnancy rates among both groups (De Sutter et al., 2003; Dhont, 2001; Gerris et al., 2004). Moreover, in regards to health expenses, a prospective economic study demonstrated that the transfer of a single top-quality embryo is substantially cheaper than DET in women $<$38 years of age in their first IVF cycle (Gerris et al., 2004).

Public financing of assisted reproductive technology usually covers three or more treatment cycles. Therefore, to evaluate the effectiveness of these programmes, cumulative pregnancy rates per initiated cycle are more relevant than the pregnancy rates per fresh cycle (Thurin-Kjellberg et al., 2009). As part of this strategy, DET should be compared with SET including the resulting first cryopreserved embryo transfer.

Starting on 5 August 2010, all costs related to IVF have been covered by the Quebec Public Health Insurance Plan. The programme covers three stimulated cycles of IVF or up to six cycles in the case of modified natural cycles. The law states that only one embryo may be transferred at a time. Under very specific conditions (embryo quality and age) the law does allow for clinicians to transfer a maximum of two embryos if the woman is aged 36 and a maximum of three embryos or two blastocysts if the woman is aged 37 or over (Gouvernement de Québec, 2010). The objective of the programme was to reduce the number of multiple pregnancies resulting from IVF from 30% to 5% (Gouvernement de Québec, 2012).

OVO clinic is a private centre affiliated with the University of Montreal. The Quebec funding programme leaves the patient with the choice of going to a private or hospital-based centre with no difference in the cost to the couple.

The aim of the present study is to evaluate the impact of the Quebec public IVF programme with emphasis on a strict SET policy, in terms of utilization, pregnancy rates and multiple pregnancies comparing those IVF cycles performed in the OVO clinic during 2009 to those cycles performed during the first year following implementation of the new Quebec public IVF programme.

Materials and methods

Study population

Two time periods were compared. Period I includes information from IVF cycles performed at the OVO clinic during 2009, before implementation of the new public IVF programme. Period II comprises IVF cycles performed at OVO clinic during the first year following implementation of the new Public IVF programme (from 5 August 2010 to 4 August 2011). Excluded from the analysis are the 6 months between the two periods because the treated population changed considerably as the programme was announced and many couples decided to wait for gratuity.

OVO clinic is a leading centre in North America performing modified natural IVF (Kadoch et al., 2011) and this technique represents more than 25% of the IVF activity in this centre. Nonetheless, for the purpose of calculating time-limited cumulative pregnancy rates including the resulting first cryopreserved embryo transfer cycle (Daya, 2005), only the first cycles of stimulated IVF cycle during both periods, additional to the first cryopreserved cycle in period II, were analysed. Around 30% of the couples had previous undergone IVF cycles before the studied periods; nonetheless, the number of previous cycles did not differ between both periods. In addition, cycles resulting in the cryopreservation of all embryos were excluded from the analysis since their inclusion would underestimate the per cycle pregnancy rates (i.e. 13/512 (2.5%) during period I and 62/877 (7.1%) during period II; Yovich and Junk, 1999).

Stimulation protocol, oocyte retrieval and embryology procedures

Ovarian stimulation protocols, including long gonadotrophin-releasing hormone (GnRH) agonist, short GnRH agonist and GnRH antagonist, were selected based on physician preference and patient characteristics. The long GnRH agonist was mainly used during the first period (53.4%), while the GnRH antagonist was the main protocol prescribed during period II (52.2%). Egg retrieval was performed 36 h after the administration of human chorionic gonadotrophin. Insemination was performed using standard IVF or intracytoplasmic sperm injection when indicated. Embryo culture was performed using standardized procedures. Embryo transfer was performed under ultrasound guidance on day 3 or at the blastocyst stage depending on cycle-specific characteristics.

Cryopreservation

Embryo quality characteristics were applied when selecting suitable embryos for cryopreservation based on individual clinic protocols. Embryo development parameters were strictly applied in order to eliminate embryos with very low potential (ALPHA-ESHRE, 2011; Steer et al., 1992). Vitrification was used for cryopreservation. Cleavage-stage vitrified–warmed embryos were transferred in 98.2% of the cases.