AMH-based individualised ovarian stimulation improves live birth in a typical IVF programme

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Summary

Q: Does individualisation of ovarian stimulation according to AMH levels improve performance within a typical IVF programme?

A: Individualisation of ovarian stimulation according to AMH levels improves live birth and other performance markers, an effect likely mediated by more appropriate dosing.

Introduction

The Anti-Mullerian Hormone (AMH) is considered as one of the gold-standard ovarian reserve tests, which can accurately predict the level of response to ovarian stimulation even during the first IVF cycle. However, it is still not clearly established whether tailoring stimulation according to AMH has indeed a beneficial effect on important IVF outcomes or which should be the optimal approach to individualisation.

The aim of this study was to evaluate the benefit of AMH-based individualisation on performance within a typical IVF programme.

Materials and Methods

Data from nulliparous couples undergoing their first IVF cycle from October 2012 to December 2014 were prospectively collected. During the study period, a single blood test for AMH levels was gradually introduced before the first treatment. The choice of stimulation (rFSH dose, protocol) was determined by the physician, taking into account female characteristics and, if available, AMH levels. Comparisons were undertaken between AMH and non-AMH groups, using regression analysis that adjusted for usual confounders (age, BMI, cause of infertility, year of treatment).

Results

Compared to the non-AMH group, the AMH group experienced higher live birth rates per cycle (36% vs 30%, OR 1.332 95%CI 1.057-1.678, 1689 patients).

Fewer women in the AMH group experienced suboptimal stimulation (≤3 oocytes)(8% vs 14%, OR 0.480 95%CI 0.338-0.681). The same women were more likely to have high-quality embryos available for cryopreservation (53% vs 41% OR 1.648 95%CI 1.320-2.058).

No differences were detected in the incidence of ovarian hyper-response (≥15 oocytes) or cycle cancellation due to OHSS risk. A non-significant decrease in the incidence of moderate-to-severe OHSS was experienced with individualisation (0.9% in the AMH group versus 1.8% in the non-AMH group).

Lower starting rFSH doses were prescribed when AMH levels were available (<150iu daily in 50% AMH vs 30% non-AMH, OR 1.759 95%CI 1.379-2.243 and >225iu daily in 2% AMH vs 9% non-AMH, OR 0.243 95%CI 0.136-0.435). Interestingly, the antagonist protocol was less popular within the AMH group (5% vs 12%, OR 0.342 95%CI 0.229-0.512).
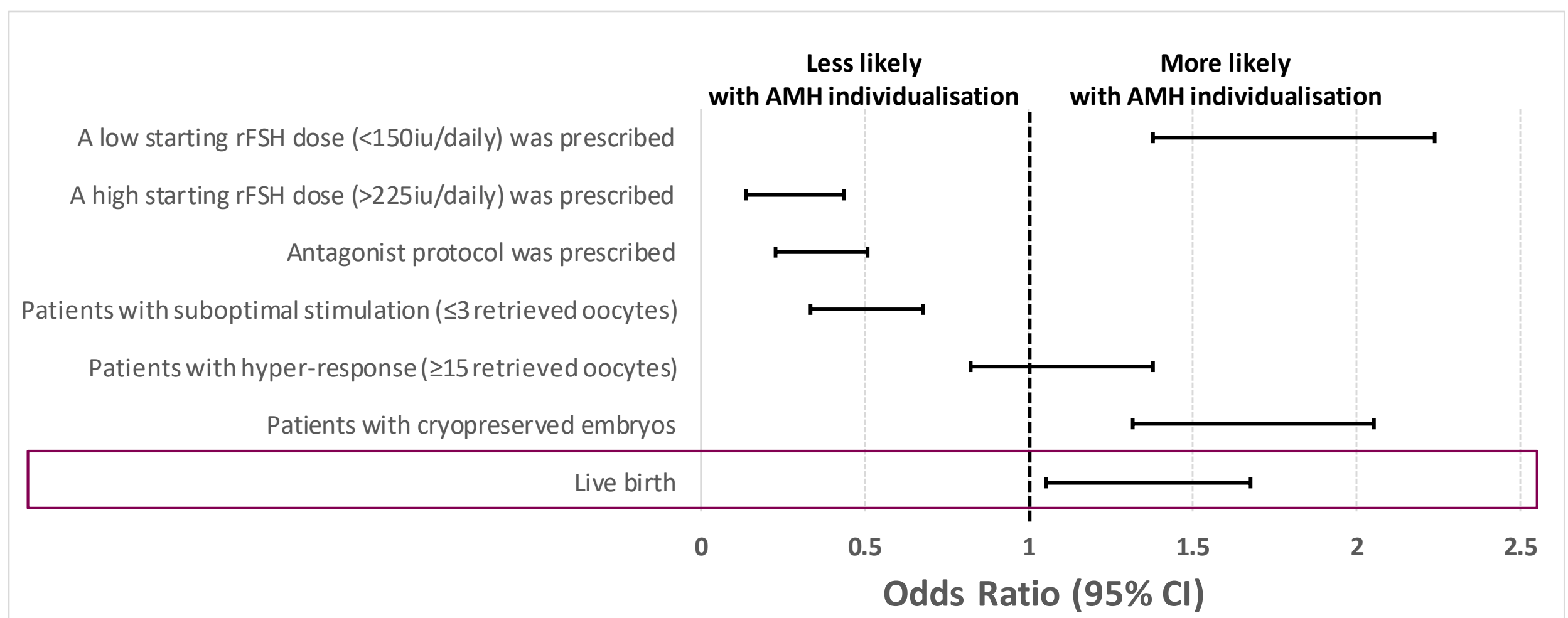
Strengths & Weaknesses

The non-randomised nature of this study is an obvious weakness. However, a number of clinically relevant confounding variables have been accounted for during the analysis, which promotes confidence in the validity of the results. Another strength of the study is that it has been prospectively conducted in the pragmatic setting of a typical IVF programme, where ovarian reserve testing in the form of AMH was gradually introduced over the course of 2 years. Consequently, its findings are expected to be readily applicable to other clinics who attempt such a transition.

Wider implications of findings

AMH-individualised ovarian stimulation can improve success of the IVF programme, which could be mediated via more appropriate rFSH dosing. In contrast with previous studies where individualised stimulation promoted the use of the antagonist protocol for women at the low and high end of expected ovarian response, this is the first study to demonstrate the benefit of avidly using low gonadotrophin starting doses, mainly in the context of the long downregulation protocol. Considering that couples welcome individualisation during IVF and there is also potential for reducing cost, individualised ovarian stimulation warrants further study and application.

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