

# Abstract Details

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## Abstract title:

Anti-Müllerian Hormone (AMH) is an independent marker for oocyte survival post vitrification.

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### Study question:

Is Anti-Müllerian hormone related with oocyte survival and blastocyst formation after oocyte vitrification?

### Summary answer:

AMH shows a positive significant correlation with oocyte survival. Although blastocyst formation is lower after oocyte vitrification, no correlation was found with AMH.

### What is known already:

Oocyte cryopreservation is increasingly being used for medical and social reasons. Vitrification techniques led to improved survival rates for oocytes. Recent meta-analysis demonstrated that vitrified oocytes have a good survival, fertilization and cleavage rates. However, subgroup analysis indicated better results with donor oocytes, possibly explained by the likelihood of better-quality oocytes obtained from younger women.

Nonetheless, not only age, likewise ovarian reserve seems to be correlated with oocyte competence. AMH is one of the best quantitative predictors for ovarian reserve; however, it may also play an important role on prediction of survival rate after oocyte vitrification and embryo development.

### Study design, size, duration:

Retrospective observational analysis including 487 cycles for ICSI with devitrified oocytes and/or fresh plus devitrified oocytes, performed between August 2015 and August 2018.

### Participants/materials, setting, methods:

Patients with primary or secondary infertility undergoing ICSI treatment with previous stimulations for oocyte vitrification were included. Serum AMH was measured using a fully automated assay Elecsys® (Roche). Vitrification and warming were performed with the Cryotop method (Kitazato, Biopharma). Only cycles using ejaculatory sperm were considered for the secondary objectives.

### Main results and the role of chance:

We included 487 cycles with a total of 4530 devitrified oocytes. Patient median age was  $36,2 \pm 6,08$  years (CI.95 24,3-48,1), AMH  $2,58 \pm 3,38$  ng/mL and body mass index (BMI) of  $26,5 \pm 4,59$  Kg/m<sup>2</sup>. Oocyte survival rate after vitrification was  $85,9 \pm 20,4\%$  (CI.95: 84,1-87,7%).

AMH showed a significant positive correlation (Tau's Kendall=0,091, p=0,0055) with oocyte survival rate independently of the oocyte yield, using univariate correlation analysis. The correlation between AMH and oocyte survival was also significant (OR=1,017, p=0,0475) when a multivariate model was performed including AMH, age and BMI. A ROC curve was performed and AMH cut-off value to obtain at least 70% survival rate was 1.09 ng/mL with an AUC=0.669.

Regarding embryo development in cycles including fresh and thawed oocytes for the same patient, fertilization and cleavage rate were similar between embryos from fresh and thawed oocytes (OR=0,97, p=0,496; OR=0,99, p=0,997 respectively). However, blastocyst formation was better for embryos from

fresh than thawed oocytes (OR=1,34,  $p<0,001$ ). No significant correlation was seen between fertilization, cleavage or blastocyst rate with AMH, age or BMI.

**Limitations, reasons for caution:**

The strength of the study is the number of included thawed oocytes (4,530) with AMH data for all cycles. Limitation is the retrospective design.

**Wider implications of the findings:**

As AMH shows strong positive correlation with oocyte survival, clinicians should reconsider oocyte vitrification carefully for patients with AMH below 1,09 ng/mL, especially as blastocyst formation after oocyte vitrification also seems lower. Therefore, embryo accumulation should be recommended above oocyte accumulation. Further prospective studies should confirm these findings.

**Trial registration number:**

NO

**Keywords:**

Anti-Müllerian hormone (AMH)

oocyte vitrification

Survival rate

blastocyst