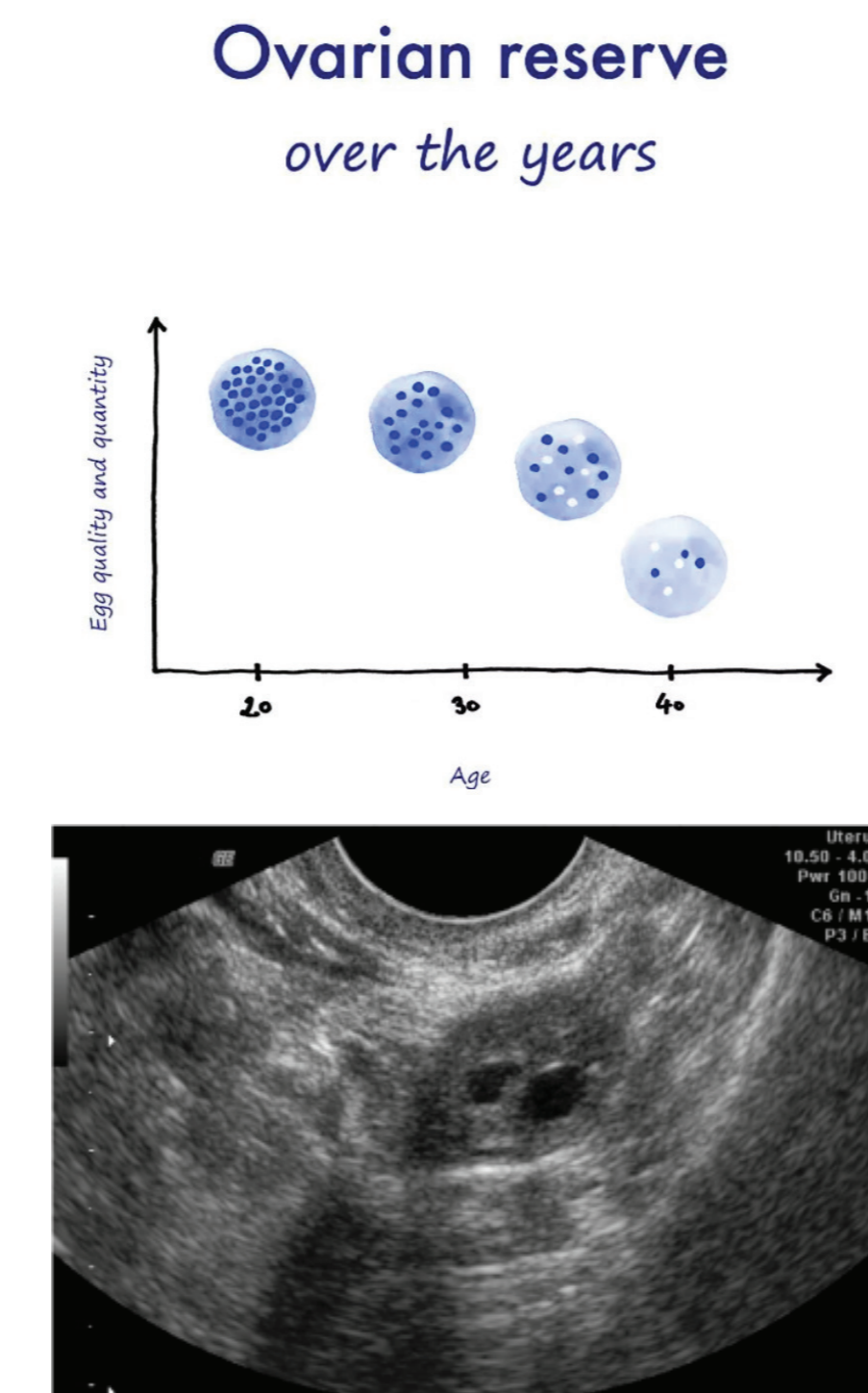




## Background

- Ovarian reserve - Capacity of ovaries to produce oocytes in quantity and quality
- Markers of ovarian reserve -
  - Hormone levels (AMH, FSH, LH) and TVS pelvis for Antral follicle count (AFC)
  - Predictors of oocyte yield following controlled ovarian stimulation and oocyte retrieval
- Causes of low ovarian reserve -
  - Advanced maternal age, Premature ovarian failure
  - Genetic disorders • Surgical - Prior ovarian surgery • Pelvic pathology - Endometriosis, Pelvic adhesions • Iatrogenic - Radiation, Chemotherapy, Smoking
- Couple seeking for fertility treatment -
  - Shocking response for couple
  - Experience low self-esteem, stigma, and depression
  - Option of donor eggs further adding stress to them
  - Still want to go for self-eggs even after knowing the reduced success rate with self-eggs
  - In these couples, the option of embryo pooling gives the better success rate for pregnancy

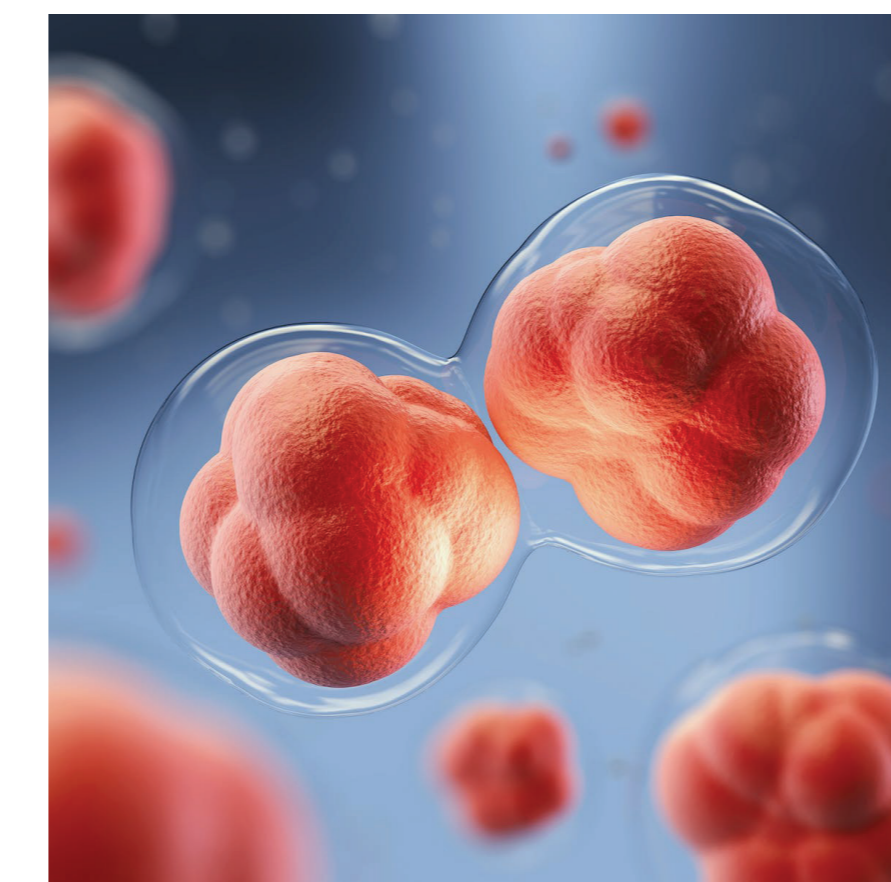


## Objective

To assess the role of embryo pooling in low ovarian reserve

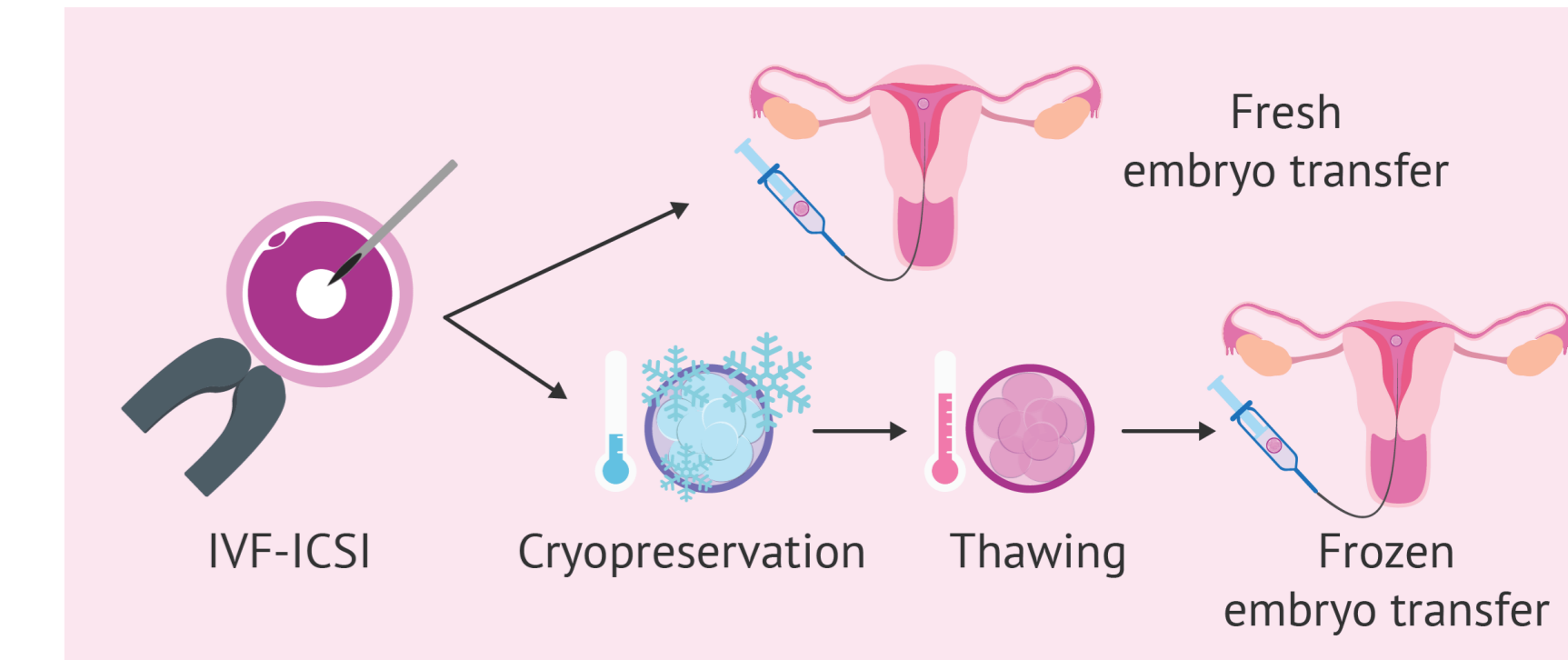
## Study Design

Retrospective analysis



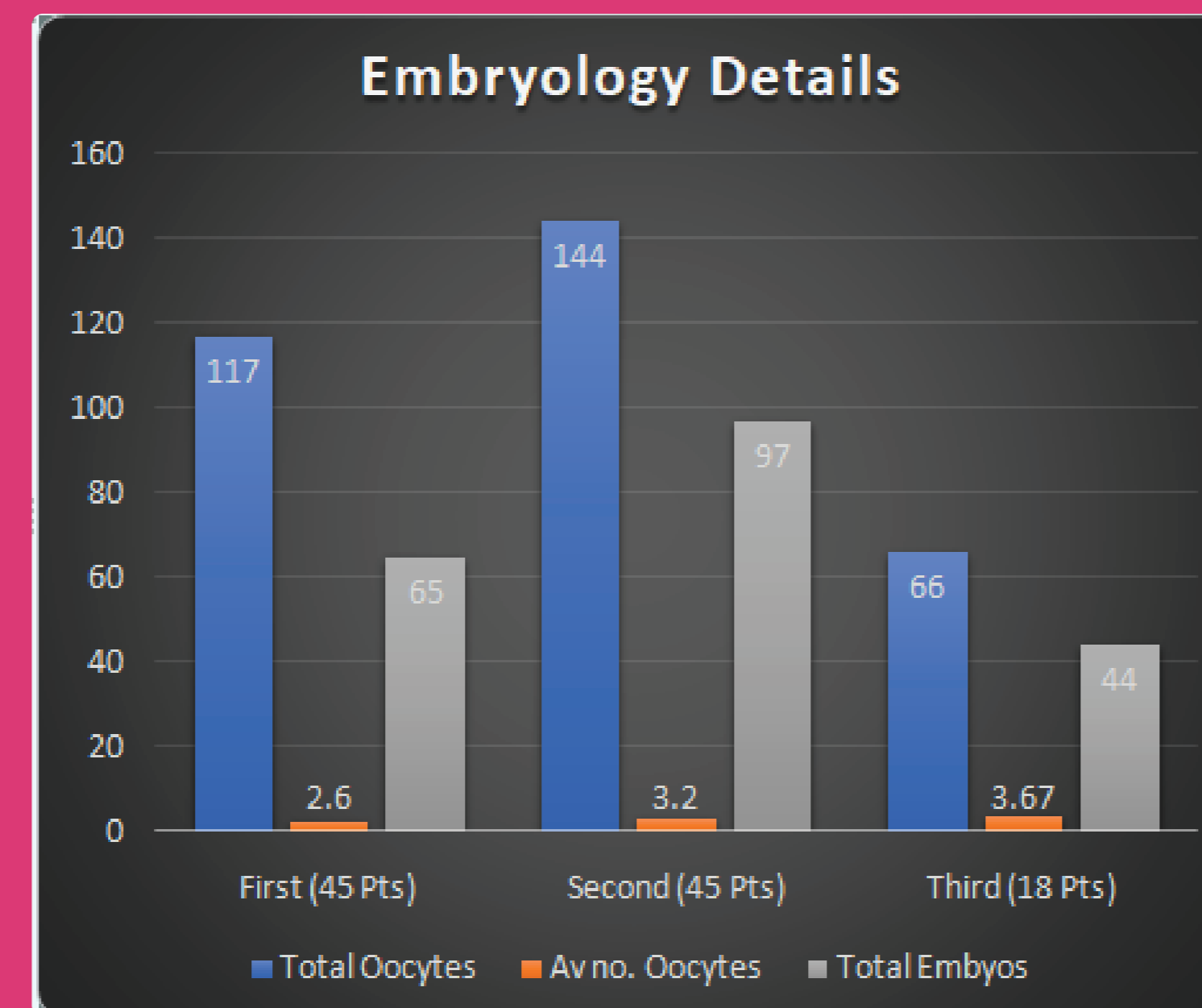
## Materials and Methods

- Subjects - 45 infertility patients
- Infertility work up
- Inclusion criteria -
  - Age b/w 28 to 42 years • Low ovarian reserve measured by AMH < 1 ng/ml or Antral follicle count (AFC) ≤ 4 • No other abnormal infertility factor
- All patients started on dehydroepiandrosterone (DHEA) supplements
- Advised -
  - IVF with high dose hormones • Pooling of embryo for 2 to 3 cycles with the criteria for getting at least 3 grade A embryos
- First ovarian stimulation with antagonist protocol using HMG 225 IU and FSH 150 IU
- Second stimulation started in immediate next cycle with long agonist protocol
- Third ovarian stimulation done with antagonist protocol after the gap of 1 month
  - Done in 18 patients out of 45 patients
  - Topical testosterone gel application for 1 month (During the gap)
- Assessment of number of total oocytes retrieved, the number and grading of embryos, pregnancy rate and clinical pregnancy rate in all the cycles



## Results

- Age of the females - Between 28 to 42 years.
- In first cycle
  - Average number of oocytes - 2.6
  - 65 embryos (grade A, AB, B) formed out of 117 oocytes
- In second cycle
  - Average number of oocytes - 3.2
  - 97 embryos (grade A, AB, B) formed out of 144 oocytes
- Third cycle
  - 18 patients out of 45
  - Average number of oocytes - 3.67
  - 44 embryos (grade A, AB, B) formed out of 66 oocytes
- In 2 patients, embryo transfer not done - Poor response
- Overall pregnancy rate was 44.1% (19 out of 43 patients)
- Clinical pregnancy rate was 30.2% (13 out of 43 patients)



## Discussion

- Earlier studies
  - Low ovarian response - Subnormal follicular response meaning less number of eggs retrieved after ovarian stimulation during IVF
  - Aggressive approach towards achieving fertility
  - Sooner the treatment started, better the chances of pregnancy with self eggs<sup>1,2</sup>
  - Studied effect of repeated IVF stimulation on pregnancy rate, live birth rate in poor ovarian responders<sup>3,4</sup>
  - Maternal age, the stage and number of embryos transferred were independent impact factors affecting live-birth rate in women with DOR<sup>5</sup>
  - Studied collecting embryos in POR patients through multiple COS or natural or modified natural methods and transferring an adequate number of embryos improves PR<sup>6</sup>
- Our study
  - At least two ovarian stimulations required, third stimulation done when < 3 good embryos till second cycle
  - Younger age group showed better pregnancy rate
  - Three good embryos transferred in all cases



## References

- 1 Rasool S, Shah D. Fertility with early reduction of ovarian reserve: the last straw that breaks the Camel's back. Fertil Res Pract. 2017 Oct 11;3:15. doi: 10.1186/s40738-017-0041-1. PMID: 29046817; PMCID: PMC5637249.
- 2 Jirge PR. Poor ovarian reserve. J Hum Reprod Sci. 2016 Apr-Jun;9(2):63-9. doi: 10.4103/0974-1208.183514. PMID: 27382229; PMCID: PMC4915288.
- 3 Çelik S, Turgut NE, Cengiz Çelik D, Boynukalin K, Abalı R, Purisa S, Yağmur E, Bahçeci M. The effect of the pooling method on the live birth rate in poor ovarian responders according to the Bologna criteria. Turk J Obstet Gynecol. 2018 Mar;15(1):39-45. doi: 10.4274/tjod.62447. Epub 2018 Mar 29. PMID: 29662715; PMCID: PMC5894535.
- 4 Gu F, Ruan S, Luo C, Huang Y, Luo L, Xu Y, Zhou C. Can repeat IVF/ICSI cycles compensate for the natural decline in fertility with age? an estimate of cumulative live birth rates over multiple IVF/ICSI cycles in Chinese advanced-aged population. Aging (Albany NY). 2021 May 20;13(10):14385-14398. doi: 10.18632/aging.203055. Epub 2021 May 20. PMID: 34016792; PMCID: PMC8202897.
- 5 Huang Y, Li J, Zhang F, Liu Y, Xu G, Guo J, Zhang R, Wu Y, Liu J, Chen K, Zhao W, Wu W, Hu Y, Chen G, Zhang D. Factors affecting the live-birth rate in women with diminished ovarian reserve undergoing IVF-ET. Arch Gynecol Obstet. 2018 Nov;298(5):1017-1027. doi: 10.1007/s00404-018-4884-4. Epub 2018 Sep 19. PMID: 30232580; PMCID: PMC6182694.
- 6 Shin, J.; Kwon, H.; Choi, D.H.; Park, C.; Kim, J.H.; Kim, J.; Kang, Y.-J.; Koo, H.S. Accumulated Vitrified Embryos Could Be a Method for Increasing Pregnancy Rates in Patients with Poor Ovarian Response. J. Clin. Med. 2022, 11, 4940. <https://doi.org/10.3390/jcm11174940>



## Conclusions

- Fertility treatment of patients with low ovarian reserve
- Very challenging for fertility experts
- Embryo pooling - best option (if donor eggs not an option)
- Couples should be properly counselled regarding
  - Details of process
  - Duration of treatment
  - Success rate of procedure
- Further well-designed studies required to predict the pregnancy rate and the clinical pregnancy rate more precisely

