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# Fertility of heifers after superovulation and embryo collection – breaking the myth

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There exists a myth among farmers in Finland, that superovulation and embryo flushing can jeopardize further reproductive performance of embryo donors. Data of 866 heifers of Holstein and Ayrshire breeds, which had undergone superovulation and embryo collection on Finnish dairy farms (donor group) were analyzed. The control group (n=824) consisted of untreated herd mates, which had their first service at the same time period as the donors. The average age at first service was 16.1 and 15.5 months for donors and controls, respectively. The following reproductive parameters were analyzed: first service conception rate, services per conception, length of the breeding period, and culling due to infertility. Independent samples t-test was used to analyze the differences between the groups.

Conception rate at the first service was similar in both groups, 52.2 and 52.1% for donors and controls, respectively. When donors were separated into two groups according to their embryo production, conception rate was 43.5% for those which didn't produce any viable embryos (n=92) and 53.5% for those which produced embryos (n=720). Double inseminations (>1 AI per estrus) were performed for 8% of the donors and 4% of the controls. Because of the higher frequency of double inseminations in the donor group, consecutively a more services per conception were required for donors compared to the controls (1.95±1.35 vs. 1.73±1.05, $P<0.001$). However, there was no difference in the duration of the breeding period for donors and controls (26.2±43.8 and 25.3±48.1, $P=0.693$). Within the donor group, 6.2% of heifers never calved and were culled. In the control group, 10.3% of heifers were culled without a preceding calving.

These findings indicate that farmers need not to be concerned of embryo production being a risk for reproductive performance of donor dairy heifers. More services per conception were needed after superovulation, but this was because of more double AIs. The reason(s) for increased frequency double AIs in the donor group were not investigated in this study. It is possible that the farmers' fertility management strategies were different for donors, as they were slightly older at the time of first service compared to their herd mates and represent the top animals of the herd, resulting to multiple AIs in order to ensure the pregnancy possibility. Also, the estrous behavior after a superovulatory treatment could be more vague and thus timing of insemination more difficult to predict. Further research is needed to investigate if there is a relationship between viable embryo production and conception rate, as the poor-responding donors showed a lower conception rate at first service. However, the most important parameter from the practical and economical point of view, the time from first service to conception, was similar for the donors and untreated controls. Also, superovulation didn't increase the risk of the heifer being culled before first calving.

**Keywords:** superovulation, reproductive performance, embryo donor