Practical Embryo Transfer

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Embryo transfer can be a practice builder. Interest has increased since the advent of non-surgical flushing techniques. Also non-surgical implantation techniques have made on farm transfers more practical and economical. There are a number of reasons for the popularity of embryo transfer:

1. Increased number of offspring from proven cows.
2. Grade cattle can be used as recipients to carry valuable calves to term.
3. Problem breeders can sometimes be salvaged as breeders after one or two flushes. (Therapeutic flush may be beneficial in itself)
4. Frozen embryos are an economical way of exporting genetics to another country.
5. Frozen embryos are becoming commercially available.

Embryo transfer is not for everyone. It is important to be in a group practice to avoid the day to day emergency calls. I feel that most dairy practitioners that do an average amount of fertility work are physically capable of handling both the flushing technique and transfer technique. These techniques require practice, of course, but it is something that comes quite naturally to an adept palpator. I feel that this is an area that fits in well with veterinary practice and that veterinarians are the most qualified people in the field to be performing this service. If the veterinarians don't, someone else will.

There are many different techniques to super-ovulate and flush cows. We use FSH-P to super-ovulate our donor cows. There have been problems with the purity of FSH as it also contains IH and this can raise havoc with the super-ovulation response. We give estrumate on the fourth day and breed 48 hours later; trying to do it 12 hours after the onset of standing heat. We also give GNRH at the beginning of estrus to aid in ovulation. The number of breedings depends on the fertility of the bull and the cost of the semen.

The initiation of the super-ovulation should begin between day 8-12 of the cycle with heat being day 0. The cows seem to be most responsive at this time to the FSH. Plus when the prostaglandin is given on the fourth day of the regimen it is imperative there be a CL3 present.

Day 0	—Heat	
Day 10	—A.M.	P.M.
	1.4 cc FSH	1.4 cc FSH
Day 11	—1.2 cc FSH	1.2 cc FSH
Day 12	—1.0 cc FSH	1.0 cc FSH
		2 cc estrumate to recipients
Day 13	—.8 cc FSH	.8 cc FSH
	2 cc estrumate	2 cc estrumate
Day 14	—.4 cc FSH	.4 cc FSH
Day 15	—Heat - give GNRH	
	Breed 12 hours after onset of standing heat. Usually will be in standing heat in the a.m.	
Day 22	—Flush and transfer.	

During the flush it is advisable with big cows to elevate the front of the animal. Tranquilization is optional and is something we seldom use on our donor cows. An epidural anesthetic is given using 6-7 cc of lidocane. The cow is carefully washed and dried for the collection. A Foley catheter is used and the size used depends on the diameter of the uterus. We use 21 and 24 French on our adult cows and 18 French on heifers. The Foley with a stylet (welding rod) are passed through the vagina, cervix and into the uterus. The uterus can be flushed as a whole body or each horn can be flushed individually. This is our preference. Once the catheter is passed up the horn from 1 to 2 inches, the stylet is removed and the cuff is inflated.

The horn is then flushed with phospate buffered saline containing bovine serum albumen plus antibiotics and antimycotics. The uterus will hold from 30-75 cc of fluid media and will feel like a 45-50 day pregnancy. It is important to stretch the endometrial folds to loosen all embryo. The flush media can be collected in various containers. We have elected to use a filter which allows the fluid to pass through but not the embryos. After the flush the solution is poured into searching dishes and the embryos are then identified, isolated, and classified. In our procedure we remove the Foley catheter and re-insert the stylet to avoid accidently putting the stylet through the side of the catheter. After the flush we always give prostaglandins to aid in the return of estrus and this usually takes 5-10 days.

After the eggs are isolated and washed they are either prepared for transfer to recipients or are prepared for freezing. It is important for the client to have excellent heat observation and records on the recipients. We try to use only the recipients that were observed in heat with the donor, although we will make exception to that rule if necessary. We will use recipients that were in heat 24 hours either way from the donor. The embryos are packaged in 1/4 cc straws and are transferred to recipients using an IMV side delivery cassou gun. Since using this gun we have had very little difficulty even in heifers. Epidural or tranquilization are optional in the recipients also. We try to pass the cassou gun as far up the horn on the CL3 side as possible without discomfort to the animal. At the time of deposition we remove the gun slightly.

The embryos to be frozen are mixed with a freezing solution and prepared for freezing. We use a freezer designed by Dr. Peter Eldsen. It is very simple and has served us well.

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We have successfully frozen and thawed and obtained subsequent pregnancies.

During the above mentioned procedure it is very important to keep good records. This holds for both the donor and recipients. The donor has to be blood typed and the recipients must be recorded carefully both with the quality of embryo she received and into which horn it was implanted. The records become even more important when embryos are frozen, especially if the embryos are exported or sold. The people receiving these embryos must know what they have when the straw is examined.

Equipment Needed

1. Foley catheter—(Vet Concepts)
2. Stylet—welding rod
3. Y Junction—(Vet Concepts)
4. E-T Fluid dispenser—(Vet Concepts)
5. Emcon Filter—(Vet Concepts)
6. Delbeco's Phospate Buffered Saline—(GIBCO)
7. Antibiotic Antimycotic—(GIBCO)
8. E-T Dishes—(Vet Concepts)
9. Cassou Guns—(IMV)
10. 1/4 cc straws—(Vet Concepts or IMV)
11. Air Flight syringe—(Vet Concepts)

There are many variations in the types of equipment that can be used. These pieces are not the cheapest but they are convenient and sterile. Personal preference will dictate the equipment you wish to use. We do re-sterilize our Foley catheters using ethylene oxide. It is important that equipment sterilized with ethylene oxide be allowed to air a month if possible because there has been research to show the ethylene oxide may be toxic to embryos. This is also true of monoject syringes with the rubber tipped plunger. The oxidizing agent on the rubber has also been shown to be toxic to embryos. Therefore you should use air-tight syringes or sterilized monoject syringes.

One of the most crucial areas of embryo transfer is the grading of the embryos. Proper classification is essential to the evaluation of the success of your transfer program. This is an area where fledgling embryologists will often times fail. The common urge is to transfer every embryo you find no matter what it looks like. This should be avoided and you should grade carefully and select your transferable embryos and freezing embryos cautiously.

Another important area is the quality of the recipient. Virgin heifers are fine as are open cows that have had no reproductive problems. They should be in a good plane of nutrition and be fully vaccinated. Parasite control should be current and they should be free of stress from diseases, heat or cold.

As I mentioned initially embryo transfer can be a practice builder. It contributes economically and develops better professional relationships with your clients. The client develops an awareness of the reproductive problems that can develop in the cow.

One of the advantages of being in a diversified group practice is the variety of our work. However, embryo transfer can be a pleasant change from retained placentas, cattle processing, and prolapsed uteri. It gives one a satisfying feeling to view offspring that are a result of this procedure.