1. PURPOSE

Transrectal ultrasonography is a non-invasive technique to monitor pelvic organs (e.g. ovary, uterus, prostate, etc.). This technique can be used in large animal models such as cattle, sheep, goats, horses and llamas. Transvaginal ovarian follicular aspiration is a minimally invasive technique to synchronize follicular wave emergence or to collect antral fluid and cells from follicles. This technique enables repeated collection of ovarian follicular samples without surgical excision of the ovary.

2. RESPONSIBILITY

Principal Investigator (PI) and their research staff, farm staff, veterinary staff and all qualified personnel who perform or assist with Transrectal Ultrasonography and Follicular Aspiration in Cattle.

3. MATERIALS

3.1 Personnel Protective Equipment (coverall, latex/ nitrile gloves, long-sleeve plastic gloves, CSA-approved steel-toe boots, etc.)
3.2 Halter
3.3 Ultrasound equipment (e.g. Aloka-900)
3.4 Lubricant (e.g. Acquasonic gel)
3.5 Transvaginal ultrasound-probe holder with needle guide
3.6 Follicular aspiration needles
3.7 Lidocaine HCl 2%
3.8 Warm water and antiseptic soap (e.g. Endure 400)
3.9 Paper towels
3.10 Sprayer with iodine solution
3.11 21G (4 cm) needles
3.12 Vacuum pump
3.13 Syringes (3 ml, 10 ml and 20 ml)
3.14 Collection tubes (15 ml and 50 ml)
3.15 Prostaglandin (500 µg) (e.g. ProstaMate®)
3.16 Controlled Internal Drug Release (CIDR) silicone device (one per cow)
3.17 Folligon (100 mg total dose (two 30mg and two 20mg doses administered every 12h))

4. GENERAL

4.1 Frequency of Ultrasonography Intervention:
   4.1.1 It is very common to perform this technique daily in a research set up
   4.1.2 Transrectal ultrasonography can be repeated to a maximum of 4 scanning sessions per day.

4.2 Frequency of Follicular Aspiration Intervention:
   4.2.1 Usually performed once during a follicular wave (a period of 7-10 days). However, it has been experimentally demonstrated that daily follicular fluid sampling for up to four days does not affect either follicular growth or cow’s health.
4.3 Research Utility
   4.3.1 Size, position and number of various structures within pelvic organs (e.g. Ovarian follicles).
   4.3.2 Collection of antral follicular samples including oocytes, granulosa cells and follicular fluid.

4.4 Duration:
   4.4.1 Ultrasonography: Must not exceed 10 minutes per scanning session.
   4.4.2 Follicular aspiration: 5-15 minutes per aspiration session.

5. PRECAUTIONS

5.1 Monitor for any bleeding in the rectum. Remove the probe in such case.

5.2 Animals will resist insertion of the ultrasound probe (or hand). Do not force the probe but firmly hold it in place for a few seconds. Continue insertion/scanning once the rectal muscles to relax.

5.3 Scanning must not exceed 10 sessions minutes to avoid inflammation of rectal wall.

5.4 Monitor the animal for signs of pain (e.g. hunching back, twitching of abdominal muscle, kicking, etc). Slow down or stop depending on the intensity of animal’s reaction.

6. PROCEDURE

6.1 Transrectal ultrasonography:
   6.1.1 Restrain the animal in a chute in such a way that it cannot back up.
   6.1.2 Carefully empty the rectum with lubricated and gloved hand
   6.1.3 Lubricate the ultrasound probe
   6.1.4 Carefully insert the probe into the rectum with the “face plate” facing downward
   6.1.5 Using the bladder as the landmark, proceed forwards and sideways to locate ovaries.
   6.1.6 DO NOT scan for more than 15 minutes, to avoid inflammation of rectal wall.

6.2 Follicular Aspiration:
   6.2.1 Restrain the animal in a chute.
   6.2.2 Induce caudal epidural anesthesia with 5–10ml lidocaine, to effect Refer to SOP DC 701 Substance Administration in dairy cattle.
   6.2.3 Ensure the rigidity of the tail base is reduced to confirm induction of anesthesia.
   6.2.4 Tie the cow’s tail to expose the perineum.
   6.2.5 Carefully empty the rectum using lubricated and gloved hand.
   6.2.6 Gently wash the perineum with warm water and Endure, then wipe with paper towels.
   6.2.7 Spray the perineum with iodine solution and wipe with paper towels.
   6.2.8 Don new set of clean gloves.
   6.2.9 Lubricate the ultrasound probe abundantly and carefully insert into the rectum to visualize the ovary of interest.
   6.2.10 Visualization of manipulation is done via the monitor.
   6.2.11 Manipulate the ovary so that it is apposed against the vaginal probe.
   6.2.12 Make sure the non-sharp end of the needle is connected to the vacuum pump.
   6.2.13 Advance the needle so that the tip enters the antrum and aspirate the antral follicle.
   6.2.14 Transfer the aspirant into the collection tube.
6.2.15 Remove the needle and the probe.
6.2.16 Wait 5-10 minutes before removing the animals from the restraint and return to the stall with assistance.
6.3 Clean the chute.

7. REFERENCES

7.1 Pierson et al., Theriogenology 1988, 29:3-20
7.3 Rajamahendran et al., Can Vet J 1994; 35: 563-572
7.8 Arashiro et al. Reprod Biol Endocrinol 2013, 11:73

Document Status and Revision History

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<tr>
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