Transvaginal Ultrasound-Guided Biopsy Of The Bovine Ovary: A New Tool For The Study Of Preantral Follicles

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Materials and Methods

- Ovaries visualized with a mechanical multiple angle 5 MHz ultrasound transducer (Pie Medical, the Netherlands), fitted next to a needle guidance system in an OPU handle.
- Specially designed needle carrier with a 14-gauge disposable needle acting as a trocar (Figure 1), inserted through the vaginal wall.
- 60 cm long disposable biopsy needle (Cook, Denmark) (Figure 2A) passed through the disposable needle into the ovarian stroma, under ultrasound control.
- Prior to insertion, the plunger of the biopsy needle is pulled back, with the needle spring locked in ready position.
- Biopsy needlepoint positioned closely under the surface of the ovary with the stylet retracted and specimen notch covered by cutting cannula.
- With the needle in position, the stylet is advanced to expose the specimen notch within the ovarian stroma.
- Cutting cannula fired and tissue sample captured (Figure 2B).

Results

- Repeated biopsies taken in four cows over a two-week period, without echographically detectable detrimental effects to reproductive tract.
- Biopsies taken from both ovarian stroma and corpus luteum (CL).
- 25 tissue specimens recovered in 30 attempts.
- Biopsy fixation
  - 4% paraformaldehyde for 2 hours at room temperature.
  - Overnight incubation in 15% sucrose solution for cryoprotection.
  - 17-µm cryostat sections stained with hematoxylin.
- Histological examination
  - Small populations of primordial follicles, clearly distinguishable from surrounding ovarian stroma (Figure 3)
  - Groups of luteinized cells in CL biopsies.

Conclusions

- Adapted OPU-instrument can be used for repeated prelevation of ovarian biopsies from living donor cows.
- On-going study will evaluate effect of repeated biopsy taking on fertility.
- Further studies needed to standardize procedure.