

## **A case of pyometra and granulosa cell tumour in a sheep**

Ovarian tumours have been previously described in sheep, namely granulosa cell tumour [2], [4], [14], [5], [9], [8], [15], thecoma [4], adenocarcinoma [12], cystadenoma, hemangiosarcoma [12] and teratoma [3], [13]. One case of malignant granulosa cell tumour in a ewe with progressive weight loss and metastases in the lung, spleen, mediastinal, iliac lymph nodes has been described [15]. Associated lesions may be severe ascites due to the rupture of an ovarian tumour, or udder development and lactation, most likely secondary to oestrogen and progesterone production [5]; these effects are rare and in the case described the tumour had not ruptured.

A 7 year old female pet sheep was presented with abdominal enlargement, a white vulval discharge, udder development and lactation, all of several weeks duration. She was not kept as part of a flock but as a pet therefore her owners had ample opportunity to observe that there was a change in her behaviour, the ewe becoming more subdued than usual and failing to eat as heartily. Initial treatment before referral had comprised abdominocentesis to relieve the distension and antibiotics using amoxicillin. Clinical examination on arrival revealed that there was a chronic lameness of the left foreleg and some crepitation of the hips was detectable. All other clinical parameters were normal. Abdominal ultrasound (BCF Easiscan, 7.5MHz) revealed pockets of peritoneal fluid, peristaltic movements of normal gastrointestinal tract and soft tissue density areas tentatively identified as uterus. Ultrasound per rectum (using the scanner probe taped into a narrow progesterone implant applicator; CIDR applicator, Ceva) confirmed fluid distension of the uterus and elicited a copious white discharge from the vulva. Cytological examination of the discharge detected squamous cells and degenerate neutrophils. Cytology of aspirated peritoneal fluid showed it to be of low cellularity and low protein concentration, suggesting the fluid to be a transudate; bacteriological culture of either fluid was not carried out as the previous and ongoing antibiotics was presumed to interfere with culture results. Blood biochemistry revealed hypoalbuminaemia (all haematological and other biochemical parameters were within normal ranges according to values quoted in "Large Animal Internal Medicine"; Radostits).

On the basis of a diagnosis of pyometra antibiotics using amoxicillin (4ml Duphamox; 150 mg/ml amoxicillin; Zoetis Ltd) was continued and a course of cloprostenol commenced; 250µg administered intramuscularly at weekly intervals for 3 weeks (Estrumate; MSD Animal Health., 250µg/ml cloprostenol). Repeated ultrasonography during the cloprostenol treatment showed a reduction in size of the distended uterus and a reduction in the volume of peritoneal fluid. Grossly, the abdominal enlargement had reduced and the ewe was behaving as a normal sheep, eating and drinking normally and not demonstrating any signs of pain.

The primary aim of treatment was to induce oestrus and achieve resolution of the pyometra rather than to rely on antibiotics to deal with the uterine infection; efficacy of this approach was reliant upon the presence of a corpus luteum. Ultrasonography had insufficiently detailed resolution to identify the ovaries or their structures. An alternative means of confirming the presence of a corpus luteum would have been to measure serum progesterone levels; in this case the response to treatment was taken as being the marker of success.

Given the high risk of recurrence of pyometra in species in which it is commonly diagnosed, it was decided, after discussion with the owners, to perform ovario-hysterectomy. In the 24 hours between the decision being taken and the surgery being performed, the abdomen became grossly enlarged again and the ewe developed signs of discomfort including bruxism and inappetence; suggesting an

acute recurrence of abdominal pathology and supporting the decision that exploratory laparotomy was an appropriate step.

Anaesthesia was provided using diazepam (0.3mg/kg intravenously) with methadone (0.2mg/kg) premedication, induction with ketamine (3mg/kg intravenously) and maintained using isoflurane and oxygen. Additional pre-operative analgesia was achieved using meloxicam 0.25 mg/kg (Metacam solution 20mg/ml; Boehringer Ingelheim) and antibiotics continued using amoxicillin. During the midline celiotomy several litres of peritoneal fluid were removed by suction. The uterus appeared to be normal in size, as did the right ovary (compared with specimens previously observed at post mortem or slaughter). The left ovary was a large (approximately 10cm x 10cm x 15cm) cystic mass which was completely removed as part of the ovariohysterectomy. There were no visible metastases in the abdomen. Grossly the ovarian mass was polycystic and its image on ultrasound had merged into the pockets of peritoneal fluid, thereby not being discernible as a separate structure. Histopathology identified the mass as a granulosa cell tumour with a high proportion of mitotic figures and a higher than average risk of metastasis than is usual for a granulosa cell tumour. Granulosa cell tumours are associated in other species with abdominal fluid accumulation, including homo sapiens, and the gross appearance of granulosa cell tumours is highly variable: the surface may be smooth or irregular and when sectioned may be solid or cystic. These tumours tend not to exfoliate cells, hence the absence of neoplastic cells in the sample of peritoneal fluid which was examined cytologically. The abdomen was lavaged with 0.18% saline before closure.

Closure of the celiotomy was by simple interrupted sutures to appose the peritoneum and linea alba, a subcuticular layer (all polygalactin; Polysorb 3m) and cutaneous staples. Recovery from anaesthesia was uneventful with the ewe able to stand within 6 hours of surgery.

One week postoperatively the ewe had developed an incisional hernia, identified by gradually increasing swelling of the surgical site, palpation of an incisional ring and ultrasound scan which identified peristaltic movement within the swelling. Possibly the hypoalbuminaemia and the chronic stretching of the abdominal muscles had impaired healing. A second surgery was performed to insert a polypropylene mesh [6] into the defect and again the recovery from anaesthesia was uneventful with the ewe being mobile and eating on the day of surgery. Ultrasonography scan one week post operatively revealed the mesh to be in place and healing proceeding routinely.

Unfortunately the forelimb lameness had worsened acutely after the second surgery. Radiography revealed multiple osteophytes in the elbows of both forelimbs and a fracture of the right proximal ulna. Granulosa cell tumours are not documented as being notable for paraneoplastic changes and there was no hypercalcaemia to suggest a paraneoplastic syndrome. No known trauma occurred during recovery from anaesthesia.

The ulna in a sheep is a substantial bone and unlikely to heal without external support or internal fixation. Casting of the fracture was not an option due to its proximal position and the impossibility of extending a cast above the right elbow (in order to satisfy the need for a cast to extend one joint proximal and one joint distal to a fracture). Surgery to repair the fracture was deemed to be compromising to the ewe's welfare, given that the contralateral limb would have to fully bear weight during a 4-8 week healing period. Unfortunately, therefore, the decision to perform humane euthanasia had to be taken.

The case demonstrates the possibility of ovarian and / or uterine pathology being the underlying reason for abdominal distension in the ewe and as a differential in the diagnosis of unexpected

lactation. The ewe's recovery from laparotomy and correction of the incisional hernia demonstrates the success of general anaesthesia and surgical procedures in the ewe.

Plate VII  
Švara T. et al.: Malignant ... pp. 281-285



Figure 1: image of granulosa cell tumour, from **Malignant Ovarian Granulosa Cell Tumour in a Ewe**  
Tanja Švara, Mitja Gombač, Polona Juntos, Milan Pogačnik

## REFERENCES

- 1) Adams N.R. A pathological and bacteriological abattoir survey of the reproductive tracts of merino ewes in Western Australia; *Aust Vet J*, 51 (7) (1975), pp. 351–354
- 2) Benchaib F., Niar A. Comparative and pathological studies on the reproductive tract of Algerian ewes and goats *Assiut Vet Med J*, 51 (107) (2005), pp. 295–311
- 3) Brandly P.J., Migaki G. Types of tumours found by federal meat inspectors in an eight-year survey *Ann N Y Acad Sci*, 108 (1963), pp. 872–879
- 4) Cassali G.D., Nascimento E.F., Silva M.I.F. Morphologic alterations in the ovaries and uterus of sheep (*Ovis aries*) *Arq Bras Med Vet Zootec*, 48 (6) (1996), pp. 677–687
- 5) Cordes D.O., Shortridge E.H. Neoplasms of sheep A survey of 256 cases recorded at Ruakura health laboratory *New Zeal Vet J*, 19 (1971), pp. 55–64
- 6) Edwards G.B., Umbilical hernias and infections in calves *In Practice* 1992;14:4 163-170
- 7) Emady M., Noakes D.E., Arthur G.H. Analysis of reproductive function of the ewe based on post mortem examination *Vet Rec*, 96 (12) (1975), pp. 261–266
- 8) Gardner R.B., Alcaraz A., Porter B.F., Divers T.J. Udder development, lactation and ascites in a ewe with an ovarian granulose cell tumor *Aust Vet J*, 83 (2005), pp. 486–488
- 9) Head K.W. Tumours in sheep *In Pract*, 12 (1990), pp. 68–80

- 10) Long S.E. , Some pathological conditions of the reproductive tract of the ewe  
Vet Rec, 106 (8) (1980), pp. 175–177
- 11) Palmieri, C. Congenital and acquired pathology of ovary and tubular  
genital organs in ewes: A review; *Theriogenology* Volume: 75 Issue: 3  
(2011-01-01) p. 393-410. ISSN: 0093- 691X
- 12) Pirino S, Pau S, Biolatti B, Zedda M.T., Carluccio A, Leoni A (2000).  
Neoplasie dell'apparato genitale dell'ovino. In Proc Mediter Fed Health  
Production Ruminants, 8<sup>th</sup> International Congress, 331–5.
- 13) Rawal C.S.W., Parihar R.S., Luktuke S.N. Pathology of certain ovarian  
abnormalities in native sheep Indian J Anim Sci, 59 (1989), pp. 1110–1111
- 14) Smith K.C., Parkinson T.J., Long S.E. Abattoir survey of acquired  
reproductive abnormalities in ewes Vet Rec, 144 (1999), pp. 491–496
- 15) Svara T., Gombac M., Juntos P., Pogacnik M. Malignant ovarian granulosa  
cell tumour in a ewe Acta Vet Brno, 78 (2009), pp. 281–285

