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# Ultrasound and endocrine evaluation of the ovarian response to a single dose of 500 IU of eCG following a 12-day treatment with progestogen-releasing intravaginal sponges in the breeding and nonbreeding seasons in ewes

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## Abstract

A standard dose of 500 IU of eCG is commonly given to progestogen pre-treated anestrus ewes for induction of estrus. Twelve seasonally anestrus and 12 cyclic Western White Face ewes were treated for 12 days with intravaginal sponges impregnated with medroxyprogesterone acetate (MAP). In trials in both the breeding and nonbreeding seasons, six randomly selected ewes were given 500 IU of eCG at sponge removal to determine the effects of low dose of eCG on ovarian antral follicular dynamics and ovulation. Ultrasound scanning and blood sampling were done daily. Treatment with eCG did not have marked effects on antral follicular growth. All ewes ovulated, except for five of six control anestrus ewes. Luteal structures and progesterone secretion were confirmed in all but the control anestrus ewes. In the breeding season, peak progesterone concentrations were greater ( $P < 0.05$ ) in eCG-treated compared to control ewes. Daily serum estradiol concentrations were greater in the periovulatory period in eCG-treated compared to control ewes (treatment-by-day interaction;  $P < 0.05$ ), particularly in anestrus. Progestogen-treated ewes ovulated follicles from several follicular waves, in contrast to ovulations of follicles from the final wave of the cycle in untreated, cyclic ewes. Anestrus ewes exhibited more frequent follicular waves and FSH peaks compared to cyclic ewes after a progestogen/eCG treatment. In conclusion, 500 IU of eCG given after 12 days of progestogen treatment had limited effects on the dynamics of ovarian follicular waves. However, eCG treatment increased serum concentrations of estradiol during the periovulatory period, particularly in anestrus ewes; this probably resulted in the synchronous estrus and ovulation in anestrus ewes.

**Author Keywords:** Ultrasound; Progestogen sponge; eCG; Antral follicles; Ewes

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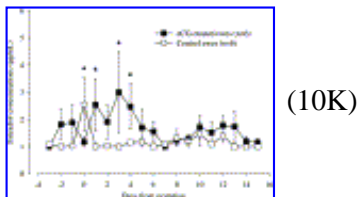
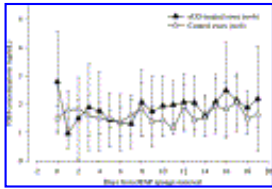
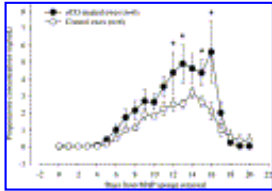


Fig. 1. Mean ( $\pm$ S.E.M.) daily serum estradiol concentrations after progestogen sponge removal in seasonally anestrous Western White Face ewes treated with MAP sponges for 12 days, with or without 500 IU eCG at sponge removal. Data were normalized to the day of ovulation in eCG-treated ewes and one ovulating control ewe (Day 0); for the five anovulatory controls, data were aligned to the mean day of ovulation (3 days after sponge removal) detected in the ewes that ovulated. There was an interaction between treatment group and day ( $P < 0.05$ ). Asterisk (\*) indicates differences between groups ( $P < 0.05$ ).



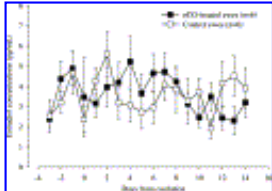
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Fig. 2. Mean ( $\pm$ S.E.M.) daily serum FSH concentrations for a 19-day interval after sponge removal in seasonally anestrous Western White Face ewes treated with progestogen (MAP) sponges for 12 days, with or without 500 IU eCG at sponge removal (Day 0).



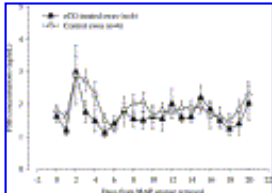
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Fig. 3. Mean ( $\pm$ S.E.M.) daily serum progesterone concentrations for 20 days after progestogen sponge removal in cyclic Western White Face ewes treated with MAP sponges for 12 days, with or without 500 IU eCG at sponge removal (Day 0). There was a main effect of day ( $P<0.001$ ) and an interaction between treatment group and day ( $P<0.001$ ). Asterisk (\*) indicates differences between groups ( $P<0.001$ ).



(13K)

Fig. 4. Mean ( $\pm$ S.E.M.) daily serum estradiol concentrations after progestogen sponge removal in cyclic Western White Face ewes treated with MAP sponges for 12 days, with or without 500 IU eCG at sponge removal. Data were normalized to the day of ovulation (Day 0). There was a treatment group-by-day interaction ( $P<0.05$ ).



(11K)

Fig. 5. Mean ( $\pm$ S.E.M.) daily serum FSH concentrations for a 20-day interval after progestogen sponge removal in cyclic Western White Face ewes treated with MAP sponges for 12 days, with or without 500 IU eCG at sponge removal (Day 0).

Table 1. Characteristics of all follicles  $\geq 4$  mm in diameter at sponge removal and of such follicles that ovulated in seasonally anestrous Western White Face ewes treated with progestogen (MAP) sponges for 12 days, with or without 500 IU eCG at sponge removal [View Table](#) (<1K)

Data are presented as mean $\pm$ S.E.M. Superscripts indicate significant differences within rows. <sup>a,b</sup> $P<0.001$ ; <sup>c,d</sup> $P<0.05$ .

Table 2. Characteristics of follicular waves emerging within 10 days after sponge removal in seasonally anestrous Western White Face ewes with progestogen (MAP) sponges for 12 days, with or without 500 IU eCG at sponge removal [View Table](#) (<1K)

There were no differences ( $P>0.05$ ) between the eCG-treated and control ewes (data were combined for both groups). Data are presented as mean $\pm$ S.E.M. Number of emerging waves per ewe was  $2.7\pm 0.2$ .

Superscripts indicate significant differences within rows. <sup>a,b</sup> $P < 0.005$ . ND: not determined.

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Table 3. Characteristics of all follicles  $\geq 4$  mm in diameter at sponge removal and of such follicles that ovulated in cyclic Western White Face ewes treated with progestogen (MAP) sponges for 12 days, with or without 500 IU eCG at sponge removal [View Table](#) (<1K)

There were no differences ( $P > 0.05$ ) between eCG-treated and control ewes. Data are presented as mean  $\pm$  S.E.M.

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Table 4. Characteristics of follicular waves emerging within 10 days after sponge removal in cyclic Western White Face ewes treated with progestogen (MAP) sponges for 12 days, with or without 500 IU eCG at sponge removal [View Table](#) (<1K)

There were no differences ( $P > 0.05$ ) between the eCG-treated and control ewes (data were combined for both groups). Data are presented as mean  $\pm$  S.E.M. Number of emerging waves per ewe was  $1.6 \pm 0.1$ .

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