

CYSTIC OVARIES IN DAIRY COWS

H. Allen Garverick
Department of Animal Sciences
University of Missouri, Columbia

INTRODUCTION

Cystic ovaries, ovarian follicular cysts, ovarian cysts and cystic ovary degeneration are all terms used synonymously to describe an anovulatory condition whereby a follicular structure grows to and surpasses ovulatory size, but fails to ovulate. In this paper, the condition will be referred to as cysts. The condition has been described in a number of mammalian species, but discussion in this paper will be limited to cattle. Cysts are an economic problem for dairy producers since cows are infertile as long as the condition persists. Cows that develop cysts have extended calving intervals of approximately 50 days over unaffected cows. Cysts occur in 10 to 13% of the US dairy herd population annually. Several reviews have been written covering occurrence, causes, costs and treatment therapy (Kesler and Garverick, 1982; Ax et al., 1984; Nanda et al., 1989; Youngquist, 1994; Garverick, 1997). Where possible, reviews will be cited for the various sections rather than the original published papers.

Cysts have also been classified as either follicular or luteal. The term, follicular cyst has been used to describe an enlarged follicular structure that is thin walled and secretes little progesterone. Luteal cysts are thicker walled and usually secrete progesterone. Follicular cysts are more common than luteal cysts. It is estimated that 30% of cysts are luteal. Luteal cysts are likely follicular cysts in later stages of development; whereby the theca or granulosa cells spontaneously luteinize. However, many follicular cysts never spontaneously luteinize and remain follicular cysts throughout their lifespan. Another condition (cystic corpora lutea) is often confused with the anovulatory cyst condition. Cystic corpora lutea (CL) occur following ovulation and are characterized by a central, fluid filled cavity of varying size within an otherwise normal CL.

Usually cysts have been defined in dairy cows as anovulatory follicular structures of 2.5 cm in diameter or larger that persist in the absence of a CL for 10 days. It was assumed that most cysts were static structures that persisted for extended periods of time. Original observations and study of cysts were usually based upon examination of the ovaries by rectal palpation at monthly, biweekly or occasionally weekly intervals. More recent observations have led to a re-evaluation of this concept.

OVARIAN FOLLICULAR DYNAMICS

Determination of the dynamics of ovarian follicular growth was unclear based upon observations of gross and histological examination of ovaries and examination of the reproductive tract by rectal palpation. More recently, several investigators have used real-time ultrasonography to reliably follow the growth and demise of antral follicles during the bovine estrous cycle (for reviews, see Fortune, 1994; Ginther et al., 1996). The estrous cycle in cattle is characterized usually by 2 or 3 waves of follicular growth. The initiation of each wave of follicular growth is characterized by the initiation of growth (recruitment) of a cohort of follicles (usually 3 to 6) to grow beyond 5 mm in diameter. From the cohort of recruited follicles, growth of the follicles continues until follicles reach approximately 8 to 9 mm in diameter; whereby one is selected to continue to grow to ovulatory size and become dominant over the others. The fate of the others is atresia. If the cow is in the luteal phase of the estrous cycle when the dominant follicle reaches its maximum size, the dominant follicle retains its maximum size for 3 to 6 days, but another wave of follicular growth is initiated. If luteal regression occurs during the growing phase of the dominant follicle, the dominant follicle will ovulate; otherwise the fate of the dominant follicle is atresia. The first wave of follicular growth normally emerges about day 2 following estrus in cows with 2 or 3 waves of follicular growth.