

NONCONVENTIONAL APPROACH IN COMBATING REPEAT BREEDING MENACE IN COWS IS THE NEED OF THE HOUR

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INTRODUCTION

Cows form an important part of livestock resources of tropical countries and contribute in milk production substantially. Cross breeding of indigenous dairy cows with high yielding exotic germ plasm has been undertaken to fulfill the dream of high milk production and “white revolution” in India. This aspiration has, however met with limited success due to very high incidence of repeat breeding in crossbred cows. Diseases of reproductive system have adverse effect on reproduction and ultimately lower the calf crop and milk production. In field conditions the incidence of uterine infection is more common which is more prevalent due to lowered immune status and unhygienic conditions in which the cattle are reared.

REPEAT BREEDING AND ITS CAUSES

Repeat breeding problem is a major concern which affects the farming community by causing conception failure in cows even after repeated inseminations. The repeat breeder animal is defined as sub fertile animal which failed to conceive after three or more services in absence of any obvious pathological disorders of the genital tract and cyclicity. The predisposing causes may be due to genetic, hormonal imbalance, bad management, infectious and non infectious factors etc. Traditionally various hormones has been advocated to contain repeat breeders provided nutrition and management are adequate. In Indian scenario subclinical endometritis might be a major etiology of repeat breeding and routine use of antibiotics are usually recommended either parentally or as intra uterine medications. Invariably, indiscriminate use of antibiotics might develop insensitivity against certain microbes leading to treatment failure. The need for an alternative form of treatment is imperative to ameliorate repeat breeding instead of conventional antibiotic treatment.

The key for an optimal fertility in dairy herds is a healthy uterine environment. A healthy uterus is the basis for high submission and conception rates. A normal uterus and particularly a normal endometrium is one of the important components of fertility. Endometritis, mainly of bacterial origin constitutes a major cause of repeat breeding and infertility especially in crossbred cattle. Recently, endometritis has been sub-divided into clinical and subclinical categories. Clinical endometritis is defined as purulent or mucopurulent uterine discharge present after 21 or 26 days postpartum [1]. In the absence of clinical signs of endometritis, alterations in the uterine lumen or endothelium can be defined as subclinical endometritis. Subclinical endometritis is defined as the presence of >18% polymorphonuclear (PMN) cells in uterine cytology samples collected 21–33 days postpartum, or >10% PMNs in samples collected at days 34–47 [2]. Cows with subclinical endometritis do not have uterine discharge; however, the severity of the disease is still considered sufficient to impair reproductive performance. Studies on subclinical endometritis (SCE) found prevalences in the range between 12 and 94 % compared to 18–37 % for clinical endometritis [3]. The prevalence of clinical and subclinical endometritis depends on the occurrence of puerperal uterine diseases. Diagnosis of subclinical endometritis can be performed by endometrial biopsy or ultrasonography or cytological examination of the uterus. The cytological examination is based on

uterine lavage or the cytobrush-method. The former methods are difficult to perform in field conditions for which white side test can also be used for the diagnosis of the subclinical endometritis cows.

Sub-clinical endometritis has been implicated as the most common cause of failure of conception of bovines in India. Uterine contents culture of cows demonstrated that subclinical endometritis is one of the most common cause of repeat breeding validating the reports of nearly cent percent bacterial recovery from the infertile and subfertile cows. Currently, subclinical endometritis is being discussed as an important cause of reduced conception rates in dairy cows. Inflammation of the endometrium alters the uterine environment and disrupts conception or embryo survival. Occurrence of endometritis has been associated with weak uterine defense mechanism (UDM) in females [4]. In tropical countries like India, the husbandry and sanitation practices commonly employed in the management of dairy cows are inadequate and the genital organs are more exposed to microbial invasion either at parturition or during estrus. These organisms are likely to multiply and invade the mucosal surface causing unhealthy uterine environment as a result of compromised uterine defense mechanism.

Non-conventional approaches in treatment of repeat breeding

Animals undergoing external or internal challenge to their state of health mount a vigorous response including activation of both the innate and acquired immune systems. The innate immune system which covers those aspects of the host defence mechanisms not dependent on specific response, such as production of antibody, not only stimulates leukocyte activity but also effects many aspects of the host's metabolic processes. The varied reactions of the host to infection, inflammation, or trauma are collectively known as the acute-phase response (APR) and encompass a wide range of pathophysiological responses such as pyrexia, leukocytosis, hormone alterations, and muscle protein depletion combining to minimize tissue damage while enhancing the repair process. Acute phase proteins like C-Reactive Proteins (CRP), Haptoglobins (Hp) and Serum Amyloid A (SAA) are used mainly as a marker of inflammation and infection. Measuring and charting APP values can prove useful in determining disease progress or the effectiveness of treatments [5]. Viral infections tend to give a lower APP level than bacterial infection. The immune response of the reproductive tract depends on the steroidogenic profile of the animal. Besides systemic immune globulin, all the secretory organs are armed with their own defense mechanism. The predominant immune globulin (Ig) of blood is IgG (75 to 80 %) followed by IgA and IgE. However, the tubular genitalia synthesize IgA and a small amount of IgG. There is sufficient evidence to show that the level of various types of immune globulin fluctuates during various stages of estrus cycle and uterine pathology.

Various substances, ranging from antibiotics to hormones have been tried earlier to counteract uterine infections. Inconsistent success, high cost of treatment, emergence of microbial resistance to antibacterial drugs, lack of laboratory facility for culture and sensitivity test (CST) and uterine biopsy under field conditions make their use uneconomical and unacceptable. Moreover, antibacterial drugs can also markedly inhibit or destroy the phagocytic activity of polymorphonuclear leucocytes (PMNLs), which are responsible for maintaining uterine defense. So the rationality of antibiotic treatment to effect wholesome remedy is inconsistent and put a question mark for treating endometritis. Antiseptics are generally irritating in nature and hamper natural defense mechanism of uterus. PGF₂α has been used for treating endometritis but it requires a corpus luteum to be present for its effect and uniformly successful results are not always obtained. The progressing awareness of treatment failure by conventional therapy has necessitated adopting an alternative therapy for clinical management of subclinical endometritis. Increasing recognition of the disappointing efficacy of intrauterine antimicrobial therapy in most instances has rightly focused attention on alternative therapies which stimulate the natural uterine defense mechanisms through immunomodulation.

The present focus on immunomodulation is considered as a novel way of therapy for overall augmentation of disease resistance ability which is the manipulation of the immune system augmenting or decreasing the magnitude of immune responsiveness. The immunomodulation of animals with drugs such as levamisole, PGF₂α, *E.coli* LPS, bacterial modulins, bacterial free filtrate, autologous plasma, autologous serum, hyper immune serum,

oyster glycogen, leukotriene B₄, granulocyte-macrophage colony stimulating factor, concanavalin A (Con A) and Colostrum etc have been used successfully for treatment of sub clinical and clinical endometritis, repeat breeding and other reproductive complications. Recently complexes of herbal preparations like Immolyte, Immuplus, Stenot and Zee-stress, Restobal etc. have been used for augmentation of body defense mechanism in livestock. These immunomodulators not only reinforce a potent body defense mechanism but also augment local defense mechanism evoking both cellular and humoral defense mechanism. Levamisole, besides its antinematodal effect behaves as thymo-mimetic drug which stimulates immune system of body. It modulates immune system by correcting immunological imbalance through modification of activity of T-lymphocytes and phagocytes. It improves cell mediated immune activity in response to antigens and mitogens. Evidence showed that levamisole known to improve reproductive performance of buffaloes and cows during late gestation period. Prostaglandins are routinely used for luteal regression and uterine pathology. The oxytocic and pharmacodynamic action of PGF₂ α is attributed for resolving uterine infection. Although its elicitation of local immunity of uterus has been established but its role as a systemic immunomodulator has not been set up.

CONCLUSION

It could be concluded that the mode of the treatment with non conventional drugs, might act as an alternative and effective choice in treating repeat breeders against traditional use of antibiotics and hormones, which have got their own limitations.

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