

Administration of Intrauterine Oxytetracycline during Early Pregnancy in Repeat Breeding Cattle: A Case Study

Hafiz Aftab Ahmed¹ and Amir Shahzad²

1. Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad-38000, Pakistan
2. Faculty of Veterinary and Animal Sciences, The Islamia University of Bahawalpur-63100, Pakistan

*Corresponding Author: draftab381@gmail.com

ABSTRACT

To treat uterine infection, it is common practice to use intrauterine antibiotics, and oxytetracycline is the most widely used antibiotic worldwide for this purpose. However, there exist concerns about its safety if used during early pregnancy due to its nature that it can cross the placental barrier and cause developmental defects. This study describes the records of four cases of cattle presented during different periods with the complaint of repeat breeding. All animals had a history of multiple inseminations. Each animal was treated with 1.5 grams of intrauterine oxytetracycline after 17±10 days of their last insemination. Post-treatment, none of the cattle exhibited estrus, and rectal palpation revealed that all were pregnant with viable fetuses. Pregnancy was confirmed 15±15 days post-treatment and reconfirmed at 90 days of gestation. All cattle successfully deliver healthy calves.

Keywords: Intrauterine oxytetracycline, Repeat breeding, Early pregnancy, Uterine infection, Pregnancy progression, Fetal development

To cite this article: Ahmed HA & A Shahzad. Administration of Intrauterine Oxytetracycline during Early Pregnancy in Repeat Breeding Cattle: A Case Study. *Biological Times*. 2025 January 4(1): 6-7.

Introduction

Repeat breeding (RB) is a major concern in cattle that leads to economic loss due to its contribution towards repeated insemination costs, long calving intervals, and high culling ratios [8]. Repeat breeding is defined as the failure of the animal to get pregnant after more than three regular interval breeding services without any detectable abnormality [7]. Oxytetracycline, a broad-spectrum antibiotic, is commonly used for uterine infections. Oxytetracycline has the property to cross the placenta and accumulate in fetal tissues, especially the bones and teeth; thus, it may lead to developmental issues and embryotoxicity or teratogenic effects [3]. When oxytetracycline is administered intrauterine, it can cause local irritation and inflammation in the uterine lining that will lead to disruptions in placental function, which in turn affect the fetal nutrient and oxygen supply [2].

The literature cited that almost 40% of pregnancies are lost in the first 3 weeks after insemination [1]. It was estimated that 3 to 6 percent of pregnant cows, especially in the first trimester of pregnancy, exhibit the signs of estrus [4]. The first trimester is especially sensitive because during this period organ development (organogenesis) will occur. When the pregnancy is confirmed in cattle, a uterine plug or cervical mucus plug is formed under the influence of progesterone, and its main function is to protect the uterus from the external environment. Its breakage or disruption due to any reason poses the uterus at the risk of infection, and it may lead to placentitis, uterine infection and abortion [6]. This paper explains the cases of cattle that were treated with intrauterine oxytetracycline due to their owner's complaint of repeat breeding, but later on, they were found to be pregnant.

Materials and methods

This study is based on the data of case reports at the Aftab Veterinary Clinic Hasilpur. Case study records from 2017 to 2023 were studied and found a series of similar interesting cases. Four cases of cattle, of which 2 were primiparous cows and 2 were heifers, presented during different periods at the Aftab Veterinary Clinic Hasilpur with the complaint of repeat breeding. All cases belong to different herds with different locations and different housing and feeding practices. All the cattle were crossbreeds. The history of all cases reveals that they were artificially inseminated multiple times in a row but did not conceive by showing again the symptoms of estrus at the next estrus period. The reproductive tract of the cattle was examined manually by rectal palpation, and it was decided to administer oxytetracycline intrauterine blindly in case there might be a subclinical infection. The solution used for intrauterine treatment consisted of 30 ml 5% oxytetracycline (Rasomycin-5®, manufactured by Star Laboratories (PVT) LTD.) mixed with 30 ml normal saline 0.9% solution. So, the total dose of the oxytetracycline drug administered was 1.5 grams. The animals were restrained in a comfortable position; their perineal region was washed with tap water to remove all the dirt and fecal material, and then the area was dried with a clean piece of cloth. A disposable plastic pipette was guided through the cervix by means of rectal palpation. Intrauterine oxytetracycline was administered for 2 alternate days in cows and once in

heifers. The intrauterine treatment to all animals was given after 17 ± 10 days of their last artificial insemination (A.I.). After the treatment, all the cattle owners reported that the animal didn't come in heat at the expected date of their next estrus period. Upon request, all the cattle were examined manually by rectal palpation to examine the reproductive tract of the animal. It was found that all the cattle were pregnant with a viable fetus and also had all other signs of pregnancy. This rectal palpation was performed 15 ± 15 days after the intrauterine oxytetracycline treatment. Further, the reconfirmation of pregnancy was done at about 90 days of gestation, and all the animals were found to be pregnant with healthy and alive fetuses. Later, after the completion of gestational length, all the cattle gave birth to normal and healthy calves.

Discussion

At first palpation, all the animals were actually carrying a fetus, but due to their initial pregnancy, the pregnant uterus was not judged on rectal palpation. The animals were assumed to be having any subclinical uterine infection due to their history of repeat breeding and treated with intrauterine oxytetracycline. But after some days, on the owner's complaints that animals did not come into heat again, the animals were re-examined by rectal palpation and found to be pregnant. It was all accidental or incidental. A major risk related to intrauterine treatment is the disruption of the cervical plug. The disturbance to this protective barrier can lead to abortion. However, there is a possibility that careful administration of the drug using a pipette guided by rectal palpation can minimize the risk of cervical plug disruption.

All the cases had completed full gestational length despite being treated with intrauterine oxytetracycline in their first trimester. No animal had aborted or given birth to a physically deformed or compromised calf.

This study challenges concerns raised by some researchers regarding the teratogenic potential of oxytetracycline when administered intrauterinely during pregnancy. The findings also emphasize the importance of timing and dosage in preventing adverse effects, suggesting that oxytetracycline can be used safely in specific cases of repeat breeding in cases when administered after early pregnancy has not been confirmed.

Further research with larger populations is needed to confirm the safety and efficacy of intrauterine oxytetracycline in treating subclinical uterine infections in pregnant cattle. Future studies should also consider monitoring long-term fetal development to rule out any delayed effects of antibiotic exposure during early pregnancy. This study contributes to the growing body of knowledge regarding reproductive management in cattle and offers a potential treatment option for managing repeat breeding without compromising pregnancy.

Conclusion

Following analysis, it could be concluded that a dose of 1.5g intrauterine oxytetracycline for a single time or even for two alternate days has no adverse effect on pregnancy progression and fetal development during early pregnancy in cattle.

Table 1: Illustration of material and method and results in tabular form

17 ± 10 days last insemination according to history	1st Rectal Palpation Result			
	Primiparous cow 1	Primiparous cow 2	Heifer 1	Heifer 2
	Negative	Negative	Negative	Negative
17 ± 10 days of last insemination according to history	Treated with 30 ml 5% oxytetracycline mixed with 30 ml normal saline 0.9% solution by intrauterine			
	Primiparous cow 1	Primiparous cow 2	Heifer 1	Heifer 2
	Yes	Yes	Yes	Yes
18 ± 10 days of last insemination according to history	Treated with 30 ml 5% oxytetracycline mixed with 30 ml normal saline 0.9% solution by intrauterine			
	Primiparous cow 1	Primiparous cow 2	Heifer 1	Heifer 2
	No	No	No	No
19 ± 10 days of last insemination according to history	Treated with 30 ml 5% oxytetracycline mixed with 30 ml normal saline 0.9% solution by intrauterine			
	Primiparous cow 1	Primiparous cow 2	Heifer 1	Heifer 2
	Yes	Yes	No	No
15 ± 15 days after the 1 st intrauterine oxytetracycline treatment	2nd Rectal Palpation Result			
	Primiparous cow 1	Primiparous cow 2	Heifer 1	Heifer 2
	Positive	Positive	Positive	Positive
90 ± 10 days of last insemination according to history	3rd Rectal Palpation Result			
	Primiparous cow 1	Primiparous cow 2	Heifer 1	Heifer 2
	Positive	Positive	Positive	Positive

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