

Observations on the Current Incidence and Predisposing Factors for Ovarian Inactivity in Local Bred Cows at Upper Egypt

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Abstract: Ovarian inactivity is one of the most important causes of low fertility in farm animals in most of developing countries including Egypt with high economic losses due to low calf production and milk yield. The present study was carried out to investigate the present status of ovarian inactivity in cows at Upper Egypt. The incidence of ovarian inactivity was traced in records of 11361 cows admitted to veterinary clinics at different cities at Benisuef governorate during 2015. Moreover, a total number of 260 crossbred cows at Benisuef city was assigned for the current study. These animals were examined for ovarian activity by rectal palpation aided by ultrasonography. Cows were categorized into a group having ovarian structure and a group showing bilateral smooth inactive ovary. Results of case records analysis revealed that the incidence of ovarian inactivity at Benisuef governorate during 2015 average 17.13% from animals suffered from reproductive disorders. Alwasta city showed the highest incidence while Beba city showed the lowest incidence. For examined animals at Benisuef city, the incidence average 52.31% from anestrus animals and it was high in winter and in animals with poor body condition score (BCS). It was concluded that ovarian inactivity is predisposing for low fertility in local cows at Upper Egypt.

Key words: Ovarian inactivity • Cows • Benisuef Governorate

INTRODUCTION

Reproductive disorders generally and inactive ovaries, especially are the main cause of low reproductive efficiency in farm animals in most of developing countries, especially Egypt [1]. Ovarian inactivity is mainly manifested as late maturity or long postpartum anestrus and is directly or indirectly attributed to managerial, pathological and other external influences with consequent high economic losses [2, 3]. This condition induces high economic losses due to decreased milk production, cost of treatment and decreased number of calves output during the animal life span, besides it predispose for infection of the genital system [1].

Ovarian inactivity represented nearly one quarter (23.6%) of the total reproductive disorders in the examined dairy cows at Iraq [2-4]. Moreover, 11.8% of cows slaughtered at the Maiduguri abattoir in northeastern

Nigeria and neighboring parts of Niger, Chad and Cameroon Republics that showed no visible follicles or corpora lutea on any of their ovaries [5]. In Poland, the incidence was recorded as 15.9% from the total number of examined animals and represented 45.9% from the total number of anestrus Polish black and white dairy cows [6]. In Kashmir, India, it was reported that after frequent consecutive per rectum and clinical examinations, out of total examined anestrus crossbred cows, 76.19% showed ovarian inactivity and had not display oestrus for at least 2-4 months [7].

In Egypt, the incidence varied between 41.0% [8] and 78.9% [9] from the total examined anestrus animals. The last available record of GEOVS indicated that 23.56% of the total examined cows showing ovarian inactivity with high incidence (23.86%) in cows suffering from genital disorders and it is higher in Upper (24.28%) than Lower (23.66) Egypt [10].

Many factors have been reported to affect the incidence of ovarian inactivity including geographical environment, species, breed, season, level of nutrition, parity and managemental conditions [11].

The present investigation aimed to throw light on the present status of ovarian inactivity in local breed cows reared at Benisuef governorate as a model of Upper Egypt with references to predisposing factors.

MATERIALS AND METHODS

The present work was carried out on local breed cows at Benisuef governorate during January to December 2015. These animals came to veterinary clinic with owners complain of low fertility.

Data in this study were obtained from both records of veterinary clinics at different cities of Benisuef governorate (115 km south of Cairo, Egypt) and examination of cows admitted veterinary clinic at Benisuef city during 2015.

Animals:

- Case history records of a total number of 11361 mature cows from veterinary clinics at different cities of Benisuef governorate were analyzed to monitor the incidence of ovarian inactivity during the year 2015.
- A total number of 260 mature cows admitted veterinary clinic at Benisuef city all the year round was used due to this is the largest clinic with high number of cows in the governorate. Animals were examined for general health condition, body condition scoring (BCS) was conducted according to the method described by Braun *et al.* [12] using a scale of 1 to 5. Whereas:
 - BCS < 2 means poor condition.
 - 2-3 means favorable condition.
 - > 3 means over conditioned.

Gynecological examinations aided by Ultrasonography (PiaMedical Flacse Saote, Netherland) with an endorectal array of 8.6 M Hertz were carried out twice for two successive weeks at least to register the reproductive status and/or disorder. Animals which did not show estrous signs and have small nonfunctioning ovaries were considered to suffer from ovarian inactivity. A full case history, owner complaint and data of clinical examination of each animal were recorded.

According to gynecological examinations, animals were categorized into two groups:

- A group having ovarian structures such as retained corpus luteum and cysts.

- A group showing bilateral smooth inactive ovaries.

The incidence of ovarian inactivity was estimated in relation to the total number of examined anestrous animals. Also, the effects of month of the year, season, body condition score and parity were recorded.

Statistical Analysis: Results were computed using SPSS program (ver.16.0). Data were statistically analyzed using Chi- Square for percentages. Statistical analyses were carried out according to Snedecor and Cochran [13].

RESULTS

Incidence of Ovarian Inactivity

From Data Records of Veterinary Clinics at Benisuef Governorate: Chi-square analysis showed the total incidence of ovarian inactivity in cows admitted to different veterinary clinics at Benisuef governorate as 16.83 and 17.13%.from total number of examined animals and from animals having genital disorders, respectively. The incidence at different cities of Benisuef governorate showed that Alwasta city recorded the highest incidence (22.72%) while Beba city showed the lowest incidence (9.24%) of ovarian inactivity (Table1).

From Data of Animal Examined at Benisuef City: Incidence of ovarian inactivity for cows examined at Benisuef city is shown in Tables 2 - 5. The total incidence of ovarian inactivity average 52.31% from the total number of anestrous animals.

Factors Affecting Ovarian Inactivity

Months of the Year: Incidence of ovarian inactivity during different months of the year is shown in Table 2. Statistical analysis showed that February had the highest incidence of ovarian inactivity (75.00%) followed by January (74.29%) and April (65.00%) while the lowest incidence was in July (22.22%).

Season of the Year: Analysis of seasonal data for ovarian inactivity at Benisuef governorate showed that the highest incidence was during winter (71.08%) while the lowest incidence was during summer (28.81%) as shown in (Table 3).

Body Condition Score (BCS): Estimation of the relationship between the animal's body score condition that reflect its general health condition and nutritional status showed that most of animals having inactive ovary were malnourished and their BCS was less than or equal to 2 (on scale 1-5) as shown in Table 4.

Table 1: Incidence of ovarian inactivity in cows at different cities of Benisuef Governorate during 2015.

City	Total number of examined animals	Total number of animals suffered from reproductive disorders	Number of animals having ovarian inactivity	Incidence of ovarian inactivity (%)	
				From total number of examined animals	From number of animals suffered from reproductive disorders
Alwasta	1461	1455	332	22.72*	22.82*
Naser	760	746	158	20.79	21.18
Benisuef	2582	2582	339	13.13	13.13
Ehnasya	1465	1378	255	17.41	18.51
Beba	1765	1720	163	9.24	9.48
Somosta	994	973	170	17.10	17.47
Elfashin	2334	2309	495	21.21	21.44
Total	11361	11163	1912	16.83	17.13

*P<0.05 among column

Table 2: Monthly variations in incidence of ovarian inactivity in examined anestrous cows (%).

Month	Total number of examined anestrous cows	Number of cows having ovarian structure#	Number of cows having ovarian inactivity	Incidence of ovarian inactivity from total number of examined anestrous cows (%)
January	35	9	26	74.29
February	32	8	24	75.00**
March	19	8	11	57.89
April	20	7	13	65.00
May	16	6	10	62.50
June	16	11	5	31.25
July	18	14	4	22.22
August	16	12	4	25.00
September	17	10	7	41.18
October	26	17	9	34.62
November	26	15	11	42.31
December	19	7	12	63.16
Total	260	124	136	52.31

**P<0.01 among column

#includes retained corpus luteum and cyst.

Table 3: Seasonal variations in incidence of ovarian inactivity in examined anestrous cows (%).

Season	Total number of examined anestrous cows	Number of cows having ovarian structure	Number of cows having ovarian inactivity	Incidence of ovarian inactivity from total number of examined anestrous cows (%)
Winter	83	24	59	71.08**
Spring	50	18	32	64.00
Summer	59	42	17	28.81
Autumn	68	40	28	41.18
Total	260	124	136	52.31

**P<0.01 among column

Table 4: Incidence of ovarian inactivity in relation to BCS in examined anestrous cows (%).

BCS	Total number of examined anestrous cows	Number of cows having ovarian inactivity	Number of cows having ovarian structure	Incidence of Ovarian inactivity from total number of examined anestrous cows (%)
< 2	5	5	0	100.00**
2	47	42	5	89.36
3	125	68	57	54.40
> 3	83	21	62	25.30
Total	260	136	124	52.31

**P<0.01 among the column

Table 5: Incidence of ovarian inactivity in relation to parity in examined anestrous cows (%).

Parity	Total number of examined anestrous cows	Number of cows having ovarian structure	Number of cows having ovarian inactivity	Incidence of ovarian Inactivity from total number of examined anestrous cows (%)
First	83	39	44	53.01
Second	66	27	39	59.09**
Third	51	27	24	47.06
More than three parities	60	31	29	48.33
Total	260	124	136	52.31

**P<0.01 among column

Parity: The incidence of ovarian inactivity in relation to number of birth is shown in Table 5. The highest incidence of ovarian inactivity was recorded in cows calved twice followed by primipara and the lowest incidence was recorded in cows calved more than twice.

DISCUSSION

Reproductive efficiency is a high priority in all breeding systems, as the opportunity for cow to calve and become pregnant is time limited. In the same time, reproductive potential of the Egyptian cow is alarmingly somewhat low in comparison to standard breeds, with consequent great economic losses [14] whereas, it was recorded that a higher incidence of ovarian inactivity, especially abnormal postpartum resumption leads to reduced life time reproductive performance in cows [15, 16].

The current study revealed that the incidence of ovarian inactivity at Benisuef governorate during 2015 was 16.83 and 17.13% from total number of examined cows and from cows having genital disorders, respectively. These results were in agreement with those previously reported by some authors with a range 14.0 – 24.8% from the total number of animals suffered from reproductive disorders [4, 6,10,17]. On the contrary, lower Figures (4.6 – 9.3%) from the total number of examined animals were recorded [18 -20].

In the current study, the incidence for the same disorder in cows examined at Benisuef city was 52.31% from the total number of anestrous animals. These results were in coincidence with some authors [8, 21, 22] who reported that the incidence of ovarian inactivity ranged from 41 – 51% from the total number of anestrous cows and disagreed with others [7, 9, 23] who found higher incidence ranged from 76.0 – 78.9% from total number of anestrous cows. Such variations in the incidence of ovarian inactivity among different studies may be related to breed, parity, season of the year, level of nutrition, individual cow status, managerial conditions and geographic environment [4, 11].

In these results, the incidence of ovarian inactivity showed obvious cities variation ranged from 9.24 – 22.72%. These findings were in line with the view of Ali *et al.* [9] who mentioned that location in which the animal bred, affected its reproductive performance through availability of minerals, vitamins and trace elements in animal feed which is necessary for proper ovarian activity. Also, this difference among cities may be attributed to alteration in managerial and nutritional status of animals referred to the economic and educational state of breeders in each city [24]. Moreover, it was reported that improper housing conditions contribute to decrease achievement of high fertility [25]. In this respect, Ali *et al.*[9] recorded improvement in animal fertility in Assiut, Elmenea and Sohag governorates after national and international projects worked to improve the knowledge of small holders for better management of animals and providing animals with well mixed and balanced ration.

In the present study, the incidence of ovarian inactivity in cows bred at Benisuef city showed a significant seasonal trend with the highest incidence during winter, especially January and February and the lowest incidence during summer, especially July. Similar seasonal results were reported by Delgado *et al.* [26] at Mexico, Crivei *et al.* [20] and Boni *et al.* [27] at Europe. However, dissimilar seasonal results were reported by Yaniz *et al.* [18] and Lopez-Gatius[28] at Europe; Menale *et al.* [29] at Ethiopia and Ali *et al.* [9]and Soliman *et al.* [30] at Egypt, who found high incidence during summer than other seasons of the year. Season could affect the reproductive activity of farm animals through the changes in the available animal feed in different seasons whereas in winter; most farmers fed Berseem in sufficient amount in addition to a variable amount of concentrates. Berseem is rich in Ca and contain high amount of vitamins A and E but very poor in phosphorus. Deficiency of phosphorus has been reported to impair the fertility in cattle [31, 32]. At the same time, winter is considered as calving and lactation season, in the same time, environmental stress (extreme cold or heat) was reported to affect the development of ovarian follicles and manifestation of

estrus in cattle and buffalo [33]. It was found that unfavorable weather condition during winter can reduce fertility while during summer season can disrupt both the physiology and reproductive performance of cows [34]. Also, season may affect incidence of ovarian activity through fluctuations in availability and quality of feed and this condition is clear in case of delay puberty and increases the duration of postpartum ovarian inactivity [35].

The present work demonstrated that cows having inactive ovary were malnourished and their BCS was less than or equal to 2 (on scale 1-5). Similar results were found by other authors [9, 36-38] who demonstrated that cows had low BCS suffering from ovarian inactivity. BCS is the principal factor that influencing the reproductive function, especially during the postpartum period [39]. Moreover, BCS affects ovarian functions of cows through increased development of follicles, ovulation and formation of corpus luteum [36] and it can be used to measures of nutritional status of animals [40]. Lower BCS is an indicative of poor nutritional management such as severe negative energy balance (NEB) or insufficient dry matter intake [41, 42]. NEB is strongly associated with the length of the postpartum anovulatory period through attenuation of LH pulse frequency and low levels of blood glucose, insulin and IGF-I that limit estrogen production by dominant follicles. Pryce *et al.* [43] concluded that extremes of BCS (very low and very high) at pre-calving, calving and early postpartum period delay onset of cyclicity.

This study demonstrated that the highest incidence of ovarian inactivity was recorded in cows calved twice followed by primipara and the lowest incidence was recorded in cows calved more than twice. This result was in coincidence with those reported by other authors [29, 44, 45] who reported high delayed cyclicity in primiparous cows than cows calved more than two parities. On the other side, Kawashima *et al.* [46] reported that primiparous cows have shorter anestrus than multiparous cows and Cavestany *et al.* [47] found that parity had no effect on the incidence of ovarian cyclicity. In this respect, Ambrose *et al.* [48] found that younger cows still growing till the third lactation and need more energy for growth beside maintenance of milk production and physiological changes for reproduction. Also, Petersson *et al.* [49] found that cows in first parity had a higher incidence of atypical progesterone profiles and subsequently a longer interval from calving to conception than cows of higher parity. This may be due to the metabolic profiles which differ between young cows and

older ones as young cows are still growing. Both pleuriparous and primiparous cows lost their body weight throughout lactation but pluriparous tended to maintain better body condition than primiparous cows which need to recover their body condition after their first-calving [50].

CONCLUSION

Ovarian inactivity is still the main cause of low fertility in local breed cows reared at Benisuef governorate as a model of Upper Egypt.

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