

STUDIES ON THE ANTEPARTUM PROLAPSE OF VAGINA
IN BUFFALOES

By

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B.V.Sc & A.H.

Thesis submitted to the Haryana Agricultural
University in partial fulfilment of the
requirements for the degree of

MASTER OF VETERINARY SCIENCE

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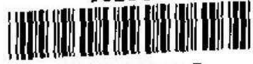
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This is to certify that this thesis entitled, "Studies on the antepartum prolapse of vagina in buffaloes" submitted for the degree of M.V.Sc., in the subject Veterinary Gynaecology and Obstetrics of the Haryana Agricultural University, is a bonafide research work carried out by Mohd. Zaffarullah Khan under my supervision and that no part of this thesis has been submitted for any other degree.

The assistance and help received during the course of investigation have been fully acknowledged.

SK Verma
Major Advisor

CERTIFICATE II

This is to certify that the thesis entitled,
"Studies on the antepartum prolapse of vagina in buffaloes"
submitted by Mohd. Zaffarullah Khan to the Haryana
Agricultural University in partial fulfilment of the
requirements for the degree of M.V.Sc., in the subject of
Veterinary Gynaecology and Obstetrics has been approved by
the Student's Advisory Committee after an oral examination
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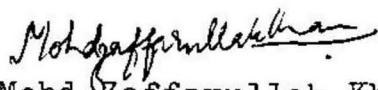
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Mohd. Zaffarullah Khan

DEDICATED
TO
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CHAPTER I

INTRODUCTION

INTRODUCTION

Buffaloes are the premier milk producing animals in the countries of South East Asia in general and India in particular. It has been observed that about 95 percent of the total milk handled by the milk plants, in this country, comes from the buffaloes (Mahadevan, 1978). In spite of the great economic importance of this species, both as meat and milk producing animals, very little has been done till lately to solve the various gynaecological and obstetrical problems from which these animals suffer. Among the various obstetrical disorders, in this species of animals, vaginal prolapse particularly antepartum, occupies a significant position. Mishandling of these cases often leads to serious and significant economic losses to the farmers not only in the form of low milk production but also due to the subsequent infertility.

The problem of vaginal prolapse has been the subject of considerable attention in the cows (Holland and Knox, 1967; Bierschwal and de Bois, 1971 and Seitaridis and Papadopoulos, 1978), but the buffaloes have not received similar attention. Only isolated studies have been reported so far in this species (Sheth, 1970; Misra, 1976 and Chaudhry et al. 1978). Although the clinical features of the vaginal prolapse and the different treatments have been occasionally reported, the possible aetiological factors for the occurrence of this condition in buffaloes have not been investigated so far. An ideal treatment for this condition is still far from perfect.

Keeping in view the contribution of the buffaloes to the economy of the farmers, and the scanty efforts made so far in finding the possible aetiological factors and the effective line of treatment; the present study was undertaken with the following objectives:-

1). To study the incidence of antepartum prolapse of vagina in the buffaloes in the Veterinary Clinic of the Haryana Agricultural University, Hissar and in the Progeny Testing Farm, Hissar.

2). To study the role of Calcium, Inorganic phosphorus and Magnesium levels in the blood of these animals, in order to find out if they have any role in the occurrence of the condition.

3). To study the efficacy of different types of anaesthesia in preventing tenesmus in these animals.

4). To study the efficacy of various treatments in the antepartum vaginal prolapse in the buffaloes.

CHAPTER II

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Vaginal prolapse has been observed in all the domestic animals, but with higher frequency in the cows, buffaloes and the ewes.

Woodward and Quesenberry (1956) reported ninety three cases of vaginal and uterine prolapse among 7859 births in Hereford cows. Elecko et al. (1962) reported 313 cases of vaginal prolapse in cows during 10 years of clinical practice, 38.3 percent postpartum vaginal prolapse and 7.6 percent prolapse of vagina unassociated with pregnancy. The proportion observed was 77.3 and 22.6 percent in cows and heifers respectively.

Sheth (1970) recorded an 11.7 percent incidence of vaginal prolapse in 60,000 buffaloes of the Surti breed. The highest incidence of sixty percent was observed during the months of August to November and the lowest incidence of 1.2 percent during the month of March. Singh and Johari (1973) observed five cases of the vaginal prolapse among 192 calvings and thus recorded a 2 - 2.5 percent incidence of the vaginal prolapse. In their opinion the incidence of this condition was higher in buffaloes than in the cows.

The survey conducted by Cockril (1974) on 20,000 animals in the Indian Veterinary Research Institute (U.P), revealed an incidence of 0.2 percent of the vaginal prolapse. Misra (1976) reported antepartum vaginal prolapse in 18 out of 22 buffaloes suffering from vaginal prolapse.

Kaikini et al. (1976) reported 3.48 and 1.20 percent

incidence of vaginal prolapse in Sahiwal heifers and cows respectively with an average of 1.70 percent. They also recorded a 1.51 percent incidence of vaginal prolapse in 359 Nagpuri buffaloes. Raman and Bawa (1977) observed 32.9 percent incidence of antepartum prolapse of vagina in 170 buffaloes having prepartum disorders during a two year study at the Veterinary Clinic, at Punjab Agricultural University, Ludhiana. The highest incidence of vaginal prolapse in buffaloes was recorded during the months of June to October by Chaudhry et al. (1978). In their studies vaginal prolapse occupied the fourth place with 9.16 percent incidence with a total of 7,966 animals treated for various reproductive disorders.

Pandit (1978) reported 12.1 and 3.61 percent incidence of genital prolapse in buffaloes and cows respectively, indicating more incidence in buffaloes than in the cows. Out of 279 buffaloes with vaginal prolapse, 157 had antepartum vaginal prolapse thus contributing 56.3 percent of the total cases. Bansal et al. (1978) observed 8.32 percent incidence of vaginal prolapse in buffaloes at the Veterinary Clinic, Punjab Agricultural University; Ludhiana. They also reported 1.23, 2.99 and 1.53 percent incidence of this malady in well organised military dairy farms at Ferozpur, Ambala and Jullundur respectively.

Bindamadhav and Krishnamurthy (1979) recorded a 2.42 percent incidence of vaginal prolapse in cattle and Verma et al. (1979) observed 13.37 percent incidence in the buffaloes during a study of one and ten years respectively. The latter authors also recorded a 9.38 and 3.99 percent

incidence of antepartum and postpartum vaginal prolapse in these animals respectively; which amounts to 70 and 30 percent of the total vaginal prolapse cases.

Rao et al. (1980) recorded 52 cases of vaginal prolapse out of 1206 buffaloes treated for reproductive disorders and observed an incidence of 4.31 percent. In their study, the highest incidence of 76.9 percent was observed in calved buffaloes and 30 percent of these animals had the history of prolapse of the genitalia in their previous calvings also.

Aetiology of the Vaginal Prolapse

The exact cause of antepartum vaginal prolapse in the domestic animals has yet to be ascertained; but several factors are considered as responsible as aetiological factors.

Vaginal prolapse was observed to occur more in pluriparous cattle (Craig, 1952; Roberts, 1971 and Arthur, 1975). Woodward and Quesenberry (1956) and Holland and Knox (1967) reported the occurrence of the vaginal prolapse in the young cattle also. Misra (1976) observed prolapse of vagina usually in second or third calvers. The proportion of the occurrence of vaginal prolapse in primiparous and pluriparous animals was 23 and 77 percent respectively (Rao et al. 1980)

Elecko et al. (1962) observed 75 percent of the vaginal prolapse in cows during first two quarters of the year, i.e. from January to June; but Seth (1970) recorded the highest incidence of 60 percent during the months of August to November and the lowest incidence of 1.2 percent during the month of March, whereas October with 22.4 percent incidence was the highest for any one month.

Pandit (1978) recorded 82.4 percent genital prolapse

from May to October, with the highest incidence in August. Verma et al. (1979) were of the opinion that the highest incidence of the vaginal prolapse occurs during July to October.

The vaginal prolapse in cattle is also reported to be of hereditary origin. (Woodward and Quesenberry, 1956; Holland and Knox, 1967 and Novazzi, 1971).

Excessive relaxation of the pelvic ligaments, due to debility, repeated pregnancies, old age and congenital weakness of the ligaments, high level of the oestrogens secreted by the placenta in advance pregnancy or by consuming mouldy feed rich in oestrogens may result in prolapse of the vagina (Craig, 1952; Roberts, 1971 and Arthur, 1975). An excessive deposition of fat in the perivaginal connective tissue with ligamentous relaxation may increase the mobility of the vagina (Arthur, 1975). A wide pelvis is also said to favour the genital prolapse in cattle (Craig, 1952 and Roberts, 1971).

Milne (1954) observed that Hereford cattle are susceptible particularly during the last two months of gestation. Typically the prolapse of vagina occurs in late gestation, more often at the end of seventh or eighth month of gestation in cows and buffaloes (Craig, 1952; Arthur, 1975 and Misra, 1976). It has also been reported to occur as early as the fifth month (Craig, 1952) and the sixth month (Misra, 1976) of gestation in the cows and buffaloes respectively.

Williams (1948) attributed the occurrence of the vaginal prolapse to excessive intra abdominal pressure and the sloping floor. Consumption of bulky roughages and distension of the rumen (Tympany) during advanced pregnancy may increase the

intra abdominal pressure and subsequently results into genital prolapse (Craig,1952; Roberts,1971; Siegmund,1973 and Misra, 1976).

Craig (1952) and Roberts (1971) hypothesized that the infection of the vaginal mucus membrane may lead to irritation, straining and subsequently to vaginal prolapse. Sharma et al. (1977) reported the occurrence of antepartum vaginal prolapse in buffaloes for the first time with urinary tract infection with Shigella organism. Pandit (1978) isolated from the vaginal discharge of buffaloes with antepartum vaginal prolapse the following microorganisms (Escherchia coli, 40.9%; Proteus, 18.18%; Klebsiella, 13.6%; Bacillus, 9.09%; Pseudomonas, 9.09%; Streptococcus, 4.55%; and Staphylococci, 4.55%) in descending order.

Mouldy corn, barley, clover and maize contaminated with Fusarium gramineae may lead to vaginal prolapse in cattle (Roberts,1971) and in sheep (Arthur,1975). Substandard nutrition was thought to be a factor responsible for the occurrence of genital prolapse in cattle (Woodward and Quesenberry,1956; Holland and Knox,1967 and Roberts,1971). However, Misra (1976) observed vaginal prolapse in well developed healthy buffaloes on adequate ration.

Some hormones have been considered responsible for vaginal prolapse by various workers. Koch and Haisch (1943) observed vaginal and rectal prolapse in heifers by oral feeding of synthetic oestrogens. The use of diethylstilbesterol implants for fattening ewes also resulted in prolapse of vagina and the rectum (Clegg et al. 1955 and Arehart et al. 1969). Certain feeds rich in oestrogens can also induce

genital prolapse in cattle (Roberts, 1971) and Sheep (Arthur, 1975). Burch (1953) hypothesized that the preparturient vaginal prolapse in cows and ewes may be due to excessive oestrogen stimulation, which apparently occurs by using diethylstilbesterol implants.

Gibbons (1962) reported that the imbalance between the progesterone and oestrogen or the reduction of progesterone and high oestrogen levels may predispose to vaginal prolapse. Excessive secretions of oestrogens in advanced pregnancy (Rossat, 1960) and in cystic ovarian degeneration (Roberts, 1971) are said to be responsible for the prolapse of vagina. Hormonal malfunction or disturbance was thought to be the main cause of vaginal prolapse in cattle (Novazzi, 1971).

Seitaridis and Papadopoulos (1978) recorded a reduced serum calcium level in cases of prepartum vaginal prolapse in cows and they attributed this fall to the increased levels of oestrogens in these animals.

Habel (1957) believed that vitamin B₁ deficiency may result in the displacement of the vagina in the cattle. Keshvamurthy (1964) reported higher serum alkaline phosphatase levels in pre and post partum genital prolapse in buffaloes, with remarkably higher values in the uterine prolapse than in the prepartum vaginal prolapse. Although mean serum calcium and phosphorus values remained normal, the level of serum alkaline phosphatase increased significantly in cows and buffaloes with genital prolapse.

The role of calcium, phosphorus and magnesium as an aetiological agent in the vaginal and uterine prolapse in cows, buffaloes and ewes has been studied by various workers.

Chavance (1944) reported that the prolapse of vagina may be the manifestation of rachitic tendencies in cows and ewes with calcium deficiency. Craig (1952) claimed that the vaginal prolapse may occur in good milkers due to the excessive drainage of calcium in milk. Pollet (1962) observed that the imbalance in the calcium to phosphorus ratio in blood may lead to vaginal prolapse. Stubbings (1971) observed that ewes with vaginal prolapse had a lowered serum calcium level, whereas the serum phosphorus and magnesium levels in these animals remained unaltered. Seitaridis and Papadopoulos (1978) estimated the serum calcium, inorganic phosphorus and magnesium levels in sixty two pregnant cows with vaginal prolapse and found that calcium levels alone were significantly different from the values obtained from normal animals. Pandit (1978) observed significantly low levels of serum calcium and phosphorus in vaginal prolapse in cows and buffaloes. He was of the opinion that the deficiency of these two minerals even at the subclinical levels may be a factor responsible for the vaginal prolapse. In contrast to the calcium and phosphorus levels, the magnesium content showed an increase in all the animals.

Keshvamurthy (1964), however, reported normal values for serum calcium and phosphorus in cows and buffaloes suffering from the prolapse of vagina. Misra (1976) was of the opinion that there was no alteration of the calcium, phosphorus ratio in the blood of the animals with vaginal prolapse, although they do respond to the calcium therapy. Hence, he considered that hypocalcemia even at the subclinical levels could be harmful to the physiologically stressed animals in pregnancy or parturition.

Methods of preventing Tenesmus

To prevent the more serious sequellae of the antepartum vaginal prolapse, the control of tenesmus is of prime importance.

Watts (1954) proposed that severing of the pudic nerves might give permanent relief from tenesmus in cases of vaginal prolapse with excessive straining.

Esperson (1962) and Svendsen (1967) were of the opinion that the straining in cattle and sheep due to the traumatic lesions of vulva, vagina, uterus or rectum or of unknown cause can be controlled by pneumoperitoneum produced by the injection of filtered air, but this is not always effective in cases of prolapse. Occasionally only tracheotomy will prevent severe tenesmus, but it is only rarely indicated. The pneumoperitoneum for the prevention of straining has also been cited by Roberts (1971), Pearson (1975) and Arthur (1975) with debatable success.

Roberts (1971) was of the view that the use of tranquilizers results in preventing the slight straining in cases of vaginal prolapse, whereas Pearson (1975) believed that moderate straining during vaginal prolapse could be controlled by the administration of analgesics such as pethidine or chloral hydrate, but is not always effective alone, as the straining may persist in severe cases inspite of heavy sedation.

Epidural anaesthesia:

For the prevention of straining and subsequent reduction and replacement of the prolapsed vaginal mass in cows and buffaloes many workers have employed the epidural anaesthesia

(Habel,1957; Hogg,1960; Magda and Shaldnga,1960; Hentschl,1961; Winkler,1966; Roberts,1971; Bierschwal and de Bois,1971; Novazzi,1971; Singh and Johari,1973; Arthur,1975; Baker,1975; Narasimhan et al.1975 and Misra,1976).

Pearson (1975) reported that epidural anaesthesia was immediately effective, having transient effect. It completely abolished the straining reflex and was sometimes exclusively used for curative purposes (Misra,1976). However, it facilitates the measures of reduction of the vaginal prolapse for a considerable time. Roberts (1971) reported that if constant straining after replacement is a problem, low epidural anaesthesia at one or two hour intervals may be helpful.

Prolonged epidural anaesthesia was advocated and used by various workers in cattle suffering from the prolapse of vagina. Milne (1954) controlled tenesmus for nearly 43 days by injecting 20 ml. of Effocaine (1 percent procaine hydrochloride). Senze (1963) used 12 - 14 ml. of 45 percent alcohol with 83.3 percent response in advanced pregnancy. In partial vaginal prolapse he used 10 - 12 ml. of 20 percent alcohol with good success. Johansen (1968) preferred 2.5 ml. of Isopropyl alcohol which checked the straining for six months. However, Milne (1954) earlier observed that the alcohol causes its prolonged anaesthetic effect by neurodegeneration. So, alcohol according to his opinion for a caudal nerve block is not much dependable and the results tend to be erratic and detrimental.

Internal pudic nerve block:

Larson (1953) described a new technique of blocking the internal pudendal nerve in bulls for relaxation of the penis and desensitization of the perineum. He further suggested that this technique can also be used in the females for the treatment of prolapse of the uterus and to prevent tenesmus in inflamed conditions of the vaginal mucosa.

Watts (1954) applied the above mentioned technique in a cow and observed that it had certain advantages over epidural anaesthesia as regards the desensitization of the vulva and the perineum and the limb coordination. Roberts (1971) also suggested that blocking of internal pudendal nerve in cows anaesthetized the vulva, vagina and the vestibular structures without affecting any motor nerves.

Deshmukh and Deshpande (1980) employed Larson's technique with 2 percent xylocaine plus adrenaline on seven normal healthy Gir cows and on one with postpartum vaginal prolapse, with success. This technique resulted into desensitization of the skin over the anus, perineum, postero-medial aspect of the thigh, the vulva, clitoris, vestibule, vagina, external urethral opening and the caudal part of the udder; and the technique was considered by them as a substitute for epidural anaesthesia because it did not affect any motor nerves and as such there was no danger of locomotor impairment.

Elmore (1980) observed that internal pudendal nerve block may be used in females to relieve straining in the posterior part of the genital tract, such as occurs after the

relief of the uterine prolapse or with chronic vaginal prolapse.

Treatment:

Various types of retention procedures have been employed by different workers from time to time, ranging from the conservative methods to the more heroic techniques. The method of treatment chosen depends upon the severity of the condition, stage of gestation and the ability of the owner to care for the animal until after parturition.

Williams (1939) applied purse string suture technique for the retention of preparturient prolapse of vagina, where minimum straining was present. Payton (1951) preferred a simple aluminium truss in cows over all other rope harness and other metallic appliances, because of its' simplicity and less likeliness of loosing and shifting the position. Greater degree of safety and dependability was provided by this truss.

Benesch (1952) used metal skewer type appliances with large wooden buttons for retaining the vaginal prolapse with success. A modified hidden purse string suture technique for prolapse of vagina in cattle was described by Buhner (1958) in Germany, and later adopted by Pierson (1961) and Arthur (1966) and by Roberts (1971) and Novazzi (1971) successfully.

Bierschwal and de Bois (1971) also applied this technique for the control of chronic vaginal prolapse in cows successfully. They also employed a modification of this technique, by having two incisions below the ventral vulval commissure, instead of one in the original method. Pearson (1975) considered the Buhner's technique as the most effective and possibly the easiest method of treating the vaginal prolapse in cattle.

Pierson (1961) and Roberts (1971) modified the Caslick's operation for mares and advocated that it can be used for chronic prolapse of the vagina, two months or more before parturition or in post partum vaginal prolapse in cattle. Pierson (1961) described a quill sutures technique for retaining preparturient or postparturient vaginal prolapse in cows with excessive straining. Arthur (1975) advocated that the quill sutures tied over rubber tubing were the best. Modified quill sutures adopted by Walker and Vaughan (1980) afford the best durability and good strength in retaining the prolapsed mass of vagina in cattle.

Schaetz (1968) recommended the use of Flessa with or without splints for the closure of vulva. Pearson (1975) and Walker and Vaughan (1980) used the prolapse pins for vulvar closure. These pins have a round ball on each end, one of which is removable and that end of the pin has a sharp point. Insertion is done horizontally from one side to the other side of the vulva. The pins in their opinion are quite effective in retaining the prolapsed mass.

Minchev (1956) devised a new technique named "Through and through stay sutures", for retaining the prolapsed vagina. The method involves fastening of the cranial portion of the vaginal wall through the lesser sciatic foramen to the dorso-lateral walls of the sacrosciatic ligament, muscles and skin of the croup.

Bouckaert et al. (1956) slightly modified Minchev's

technique by placing the stay sutures cranial or anterior to the lesser sciatic foramen. They recorded no recurrence in 25 out of 40 cows thus treated. Various other workers have reported satisfactory recovery in cattle by using the modified Minchev technique (Habel, 1957; Hogg, 1960; Hentschl, 1961; Hattangadi and Deshpande, 1967).

Gibbons (1962) observed that stainless steel prolapse pins placed on each side from the roof of the vagina, through the sacrosciatic ligament and biceps femoris muscle to the skin are superior to tape sutures and are very easy to apply and cows have calved without trouble with these pins in place.

Winkler (1966) successfully retained the prolapsed vagina in 12 cows by fixing the cervix with the prepubic tendon, using noncapillary suture material.

Narassimhan et al. (1975) applied a purse string suture with vetafil at the hymenal ring, anterior to the urethral meatus, which proved to be an effective and simpler method of retention of the prolapsed vagina, besides being applicable in field conditions.

Laparotomy and caesarean section have been performed to treat vaginal prolapse in cattle by internal fixation of the vagina (Kerz, 1966 and Anders, 1971). Removal of the perivaginal fat has been said to be effective in treating vaginal prolapse in obese animals (Frank, 1964 and Roberts, 1971).

Scheel (1956) injected prolapsan, an alkali iodophenol

sulphonate, with inorganic halogen compounds, beneath the vaginal mucosa after the organ was repositioned; which resulted in preventing the recurrence of the incomplete vaginal prolapse.

Bomer (1959) gave perivaginal injections of "Dondren" a preparation of mineral oil in soft paraffin treating 12 out of 16 cows successfully. Bierschwal and Ebert (1961) used Dondren for correction and supportive therapy in cases of chronic prolapse of vagina in cattle. The procedure induces a mild inflammation of short duration, followed by a chronic inflammation thus resulting into the formation of new connective tissue. The new connective tissue tends to thicken and strengthen the supportive structures.

Magda and Shaldnga (1960) injected 120 to 180 ml. of 1 percent procaine hydrochloride in 70 percent alcohol through the wall of the vagina into the perivaginal tissue. The principle behind this procedure was that it caused a thickening of the perivaginal tissues which held the vagina in its normal position. The treatment was successful in 20 out of 41 animals thus treated.

Chavance (1944) treated the vaginal prolapse by calcium phosphorus and vitamin D therapy effectively and thus recommended this treatment before and after parturition.

Rydell (1954) was of the opinion that even tenesmus could be reduced by the intravenous administration of commercial calcium and phosphorus therapy, and according to him this therapeutic approach had more satisfactory

results than any other method previously used.

Payne (1964) was of the belief that the calcium therapy to the hypocalcemic animals can increase the absorption of calcium from the intestine thus breaking the vicious circle. Moddie (1965) recommended the calcium therapy in milk fever cases and suggested that it may act via sensitizing the tissues to the action of various hormones.

Simkiss (1968) recommended the calcium therapy to maintain the proper tone of the smooth muscles of the genitalia in cases of prolapse of vagina. Mannari (1971) reported the use of colloidal calcium (Calciostalin) preparation for treating vaginal prolapse with encouraging results. He further reported that this preparation acts as a general tonic in neuromuscular debility and neuroaesthesia.

Misra (1976) treated the antepartum prolapse of vagina in cows and buffaloes by administering calcium borogluconate parentally with success. Pandit (1978) used simultaneous injections of calcium, phosphorus, progesterone and antihistaminic preparations in treating the prepartum vaginal prolapse in cattle and buffaloes; and he was of the opinion that calcium and phosphorus therapy could be an effective supportive treatment for the cases of vaginal prolapse in these animals.

Rao et al. (1980) tried a homeopathic preparation "Kosto" in cases of prolapse of vagina in buffaloes with

varying success. The affected animals were administered 18 ml. of kosto liquid diluted in 250 ml. of water as a drench. In addition to this the animals with severe prolapse were also treated by retention sutures and supportive therapy. The results in their opinion were encouraging and consistent.

Koch and Haisch (1943) treated vaginal prolapse in pregnant and non pregnant cows by administering Chorionic gonadotrophin (Prolan) in oil subcutaneously in doses of 250 to 1,000 rat units. Burch (1953) in a clinical study involving 90 heifers and cows with prepartum vaginal prolapse found that progesterone therapy was very effective. The dose suggested was 1 mg. per 5 pound body weight in mild cases and 1 mg. per 2 pound body weight in severe cases.

Gibbons (1962) recommended the use of Repositol progesterone at the rate of 150 mg. every two weeks during the last two months of pregnancy, as a treatment and preventive measure for vaginal prolapse in cattle.

Roberts (1971) advocated the use of 50 to 100 mg. of progesterone intramuscularly daily or 500 mg. once every 10 days as a treatment for vaginal prolapse in cattle. He further stated that the rationale for such therapy was doubtful, as progesterone has no value in preventing straining or neutralizing the effect of oestrogens. Such treatment if continued beyond 280 days of gestation may delay the parturition. Pandit (1978) used progesterone to treat vaginal prolapse in cattle and buffaloes. He stated

that the therapy is quite effective as it counteracts the excessively secreted oestrogens on the tubular genitalia.

Tseng and Gurpide (1975) stated that the progesterone may reduce the levels of oestradiol 17 beta, by stimulating the enzyme oestradiol dehydrogenase which converts oestradiol 17 beta into estrone which is metabolically less active and diffuses out of the cell more easily than oestradiol 17 beta. Henrick and Haris (1978) were of the opinion that high levels of progesterone may influence the oestrogen receptor levels and make the tissue less responsive to ovarian oestrogens at the luteal phase of the oestrous cycle and during pregnancy in bovines.

Roberts (1971) emphasised the need of cleaning the prolapsed mass with antiseptic solution, to free it from dirt and debris so as to check irritation and straining. Sharma et al. (1977) treated a case of vaginal prolapse due to urinary tract infection by injecting oxytetracycline intramuscularly. Pandit (1978) used Furacin cream locally after cleaning the vagina with antiseptic lotion.

Nanda (1979) suggested that antiseptic vaginal douching in cases of prepartum vaginal prolapse was an effective supportive treatment, if used alongwith specific treatment.

Rao et al. (1980) opined that in complicated cases antibiotics, tranquilizers and retention sutures should be used as adjuncts.

CHAPTER III

MATERIALS AND METHODS

MATERIALS AND METHODS

The present study was conducted on the animals which were brought to the Veterinary Clinic, of Haryana Agricultural University; Hissar, over a period of two years from 1979 to 1980. A total of 43 buffaloes suffering from antepartum prolapse of vagina were included in the study and formed the group A.

Group B comprised of 49 normal pregnant buffaloes from the Progeny Testing Farm, Hissar. These animals were at the corresponding stages of gestation of the group A animals.

The animals in both the groups were further subdivided into subgroups on the basis of their stages of gestation as follows:

S.No.	Stage of gestation.	Group A.	Group B.
1.	Below 7 months	6	15
2.	7 to 8 months	2	7
3.	8 to 9 months	10	13
4.	9 months to term	25	14

The study was conducted on the following aspects:-

- a). Incidence of antepartum prolapse of vagina.
- b). Biochemical studies, which included the estimation of the blood plasma levels of calcium,

inorganic phosphorus and magnesium in both the groups of animals.

- c). Clinical studies, which included the study of the efficacy of the different types of anaesthesia employed and the efficacy of the different treatments adopted. These studies were conducted on the animals in group A.

a). Incidence:

The clinical records concerning the cases of the reproductive disorders in buffaloes, maintained at the Veterinary Clinic, HAU; Hissar and the Progeny Testing Farm, Hissar; from July, 1976 to October, 1980 and July, 1971 to October, 1979 respectively were utilized for working out the monthly incidence, the relation between the stage of gestation and the occurrence of the vaginal prolapse, the effect of calving number of the dam and the effect of the season on the antepartum prolapse of vagina in these animals.

b). Biochemical studies:

i). Collection of blood plasma:

Blood was collected from 35 buffaloes in the group A and from all the 49 animals in group B. Blood was collected by jugular venipuncture in sterilized, heparinized centrifuge tubes, immediately after the animals were reported for treatment in the clinic. The blood samples collected were allowed to stand for about 15 minutes and then centrifuged at 3,000 rpm for 3 to 5 minutes. Plasma

was separated and stored in collection tubes at -20 C, till they were analyzed for the calcium, inorganic phosphorus and magnesium levels.

ii). Methods of estimation:

Calcium was estimated by the Clark Collip modification of the method of Kramer and Tisdall (1925), for inorganic phosphorus the method of Fiske and Subbarow (1925) was followed and for the estimation of the blood magnesium levels the method of Spare (1962) was followed.

The data was subjected to statistical analysis using standard techniques as described by Snedecor and Cochran (1967).

c). Clinical studies:

i). Anaesthesia:

Two types of anaesthesia were employed for preventing the tenesmus.

a). Epidural anaesthesia.

b). Pudendal (pudic) nerve block.

a). Epidural anaesthesia was employed in 28 animals, by using an average quantity of 5.6 ml. of Novocaine⁺ (2 percent procaine hydrochloride). The anaesthetic solution was injected in standing animals restrained in a crate. The sacro-coccygeal space was identified by alternately elevating and lowering the tail with one hand and with the other hand determining the intervertebral space by palpating

+ : Hoechst Pharmaceuticals Ltd. Bombay.

the depression and movement between the vertebrae. The location at which the tail movement ceased, was the sacro-coccygeal articulation. The site was prepared and with an 18 gauge needle a small quantity of the anaesthetic solution was injected into the skin. The needle was subsequently pressed downwards into the sacro-coccygeal space at an angle of 45 degrees, usually to a depth of 2 to 3 cm. and the required quantity of the anaesthetic solution deposited.

b). Pudendal nerve block was employed in 15 animals by injecting on an average 76.3 ml. of Novocaine solution. The injection was made at the deepest portion of the ischio-rectal fossae. The fossae are two triangular depressions bounded ventrally by the ischial tuberosity, medially by the rectum and the tail and laterally by the posterior border of of the sacro-sciatic ligaments. The deepest portion of each fossa was located as the site for the penetration of the hypodermic needle. A subcutaneous wheal was formed by injecting 2 ml. of Novocaine solution on both the sides with the help of a 20 gauge hypodermic needle. Then with the help of a 15 gauge needle a cutaneous puncture was performed, which served as the entrance point for the 18 gauge needle of six inches length. The left hand was introduced into the rectum with the fingers directed outwards and downwards, so as to locate the lesser sciatic foramen by the soft and depressible circumscribed area of the sacro-sciatic ligament. At the antero-dorsal border of this foramen, the pulsation of the internal pudic artery was palpated, the

internal pudendal nerve was located lying a finger's breadth above the internal pudic artery. After locating the right nerve a six inches long hypodermic needle was passed through the right skin hole and brought in close vicinity of the right internal pudic nerve (Fig.3). Then 25 to 30 ml. of the anaesthetic solution was deposited around the nerve. The needle was then withdrawn to a distance of two to three cms. and another 15 to 20 ml. of the solution was deposited caudo-dorsal to the previous site so as to block the middle haemorrhoidal nerve. The needle was then completely withdrawn. The procedure was repeated similarly to block the nerve on the other side. After completing the second injection, the nerve sites were mildly massaged through the rectal wall; in order to facilitate the quick dispersal of the anaesthetic solution.

ii). Treatment:

In all the animals the prolapsed vaginal mass was cleaned, reduced and replaced as described by Roberts (1971).

Buhner's retention technique (9 animals), Flessa sutures (8 animals) and AG-TEK Pro fix button technique (6 animals) were used for the retention of the prolapsed vaginal mass. In another two groups of animals, no retention sutures were employed and they were either treated with a combination of Mifex⁺ and Progesterone⁺⁺ (6 animals) or with

+: May & Baker (India) Ltd. Bombay.

++: "Uniprogestin" Unichem Laboratories Ltd. Bombay.

Mifex alone (16 animals).

Two animals which did not respond to treatment with Mifex and Progesterone were later treated with other methods of retention sutures and included in those groups. Mifex was also given to all the animals in the other groups as a supportive therapy.

Progesterone treatment was given as 250 mg. Uniprogestin repeated at 5 day intervals till approximately ten days before parturition. Mifex was given, one hundred and fifty ml. intravenously on the first day followed by 100 ml. subcutaneously. Subsequently 150 ml. was repeated on alternate days for 15 days. Thereafter 150 ml. was given at three day intervals subcutaneously.

Technique of Retention procedures

1). Buhner's Technique:

The perineum was thoroughly cleaned and epidural anaesthesia or pudendal nerve block was employed. Two small skin incisions were then made, one midway between the anus and the dorsal vulval commissure and the other just below the ventral vulvar commissure (Fig.4). With the hand inside the vulvar orifice, the Buhner's needle was inserted through the ventral incision and guided along the wall of the vulva, in the depth of the perivulvar tissue on one side until the point emerged from the upper incision. The eye of the needle was threaded (Fig.5) with tubular woven flattened type of synthetic tape (Already chemically sterilized) and the needle was withdrawn back through the lower incision along

with the tape. The procedure was then repeated on the other side (Fig.6). With the palm of the hand placed vertically in the vulvar orifice, the two ends of the tape were tightened and tied in a fashion of bow knot (Fig.7), leaving the vulvar opening only four fingers open. The upper incision was sutured with one mattress suture. The knot was undone before parturition.

ii). Flessa Technique:

This technique involves the closure of the vulva by using two stainless steel brackets or splints placed vertically on external sides of both the vulvar lips as far anteriorly as possible. The stainless steel pin was unfastened from one side from the wooden head and fixed on a sharp Flessa needle. This needle was passed through the hole in the bracket on one side and pierced through the skin of the vulvar lip past the mucosa and then passed through the other vulvar lip from inside out. The needle was unscrewed and the pin passed through the hole in the other bracket. The wooden head was then fixed to the stainless steel pin and screwed tightly to fit into the groove of the bracket. Three stainless steel pins were fixed in this manner and left in situ till the time of parturition, when they along with the brackets were withdrawn.(Fig.8)

iii). AG-TEK Profix Technique:

The technique of the AG-TEK Profix buttons is illustrated in Fig.9.

After the animals were either given epidural anaesthesia or the pudendal nerve block, the prolapsed vaginal mass was reduced and replaced as described earlier (Roberts, 1971). A six inch long plastic trocar, containing a sharp stainless steel needle was fixed on the bigger of the two plastic buttons and introduced into the vagina. The tip of the needle was inserted through the replaced vaginal wall, passed through the sacro-sciatic ligament, biceps femoris muscle and the skin; coming out at a point about six inches posterior to the tuber coxae and within three to four inches of the mid line (Fig.10). The needle was then removed and the small plastic button was fixed on the plastic trocar, so as to hold the vaginal wall firmly with the sacro-sciatic ligament. The hitch pin cotter was inserted through the hole in the plastic trocar closest to the small button. The plastic trocar was cut at a point one hole above the hitch pin cotter. The area of the skin under the small plastic button was sprayed with antiseptic cream (Cetavlex⁺). Seven days after calving, the buttons were removed and the area was dressed with antiseptic cream till the hole in the skin was repaired. All the parts of the AG-TEK Profix button were chemically sterilized with Cetavlex cream before use.

Three animals with prolapse of vagina, which also had the prolapse of the rectum and five animals in which there was eversion of the urinary bladder along with the vaginal

+: The Alkali and Chemical corporation of India Ltd.
Madras.

prolapse were also treated for the same. In the prolapse of the rectum cases purse string sutures were applied with silk No. 4, around the anus. These animals were also kept on a laxative diet throughout the treatment.

Fig.1. Severe degree of prolapse of vagina and the cervix in a buffalo.

Fig.2. Moderate degree of prolapse of vagina in a buffalo.

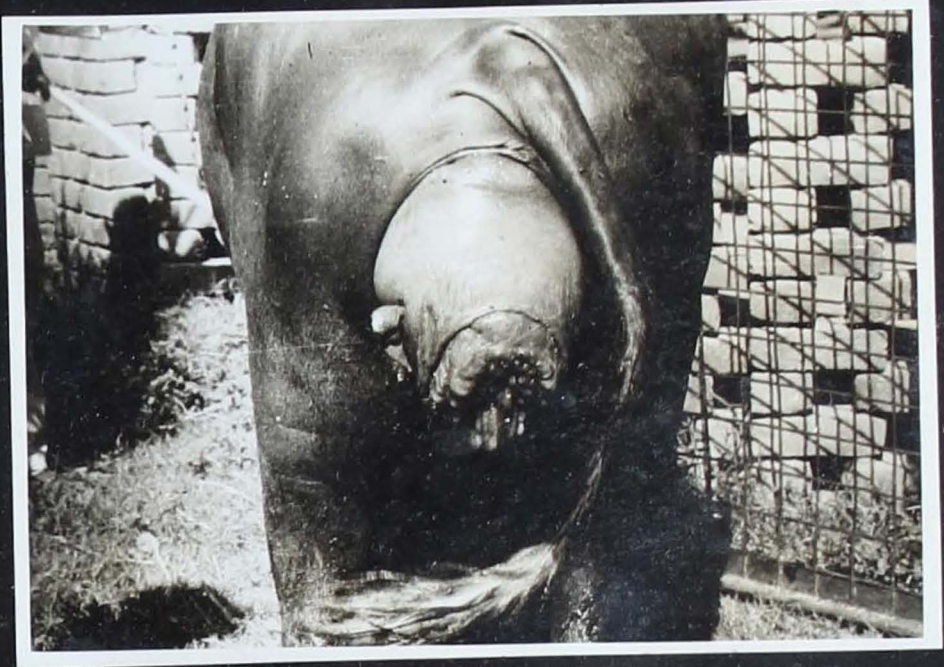


Fig.3. Line diagram of the lateral view of the pelvis with the needle pointing above the pudic nerve.

Fig.4. Line diagram of the Buhner's Technique.

- A. Site of skin incisions
 - 1).Midway between the anus and the dorsal vulvar commissure.
 - 2).Below the ventral vulvar commissure.
- B. Insertion of Buhner's needle through the lower incision.
- C. Threading of the needle with the synthetic tape.

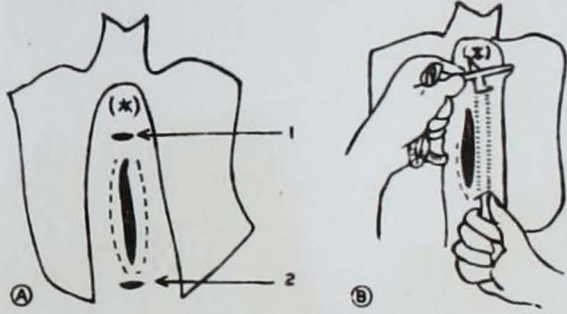
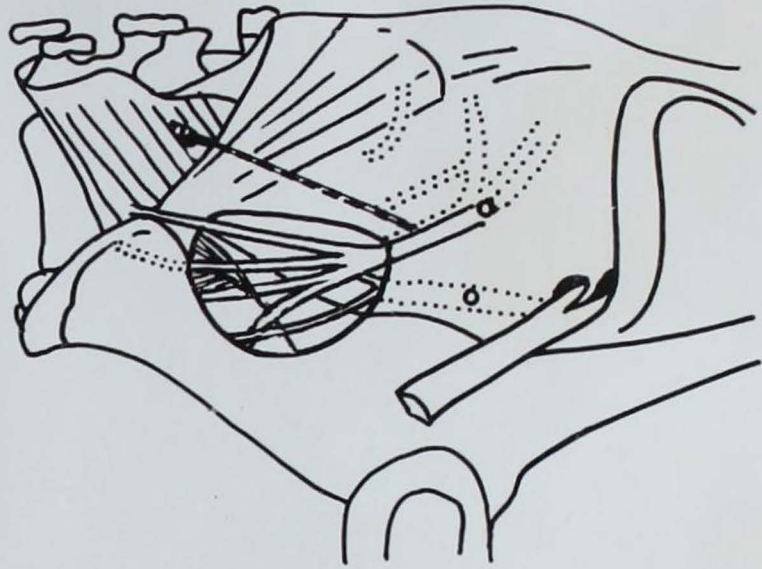


Fig.5. Photograph showing the insertion of the Buhner's needle through the ventral incision on the right side in a buffalo.

Fig.6. Photograph showing the insertion of the needle through the ventral incision on the left side in a buffalo.

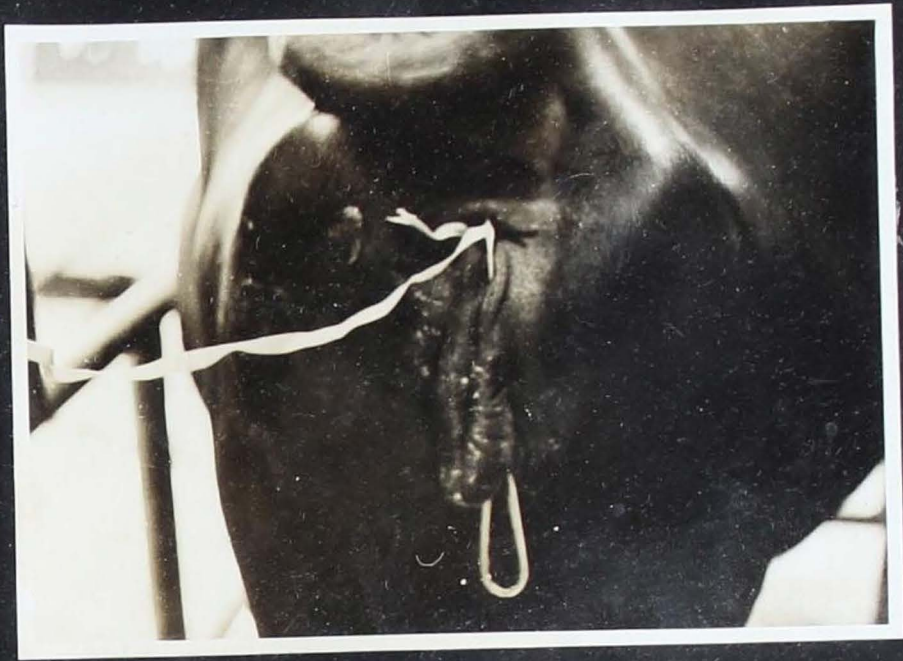


Fig.7. Photograph showing a bow knot applied below the ventral vulvar commissure in a buffalo.

Fig.8. Flessa sutures in situ in a buffalo.

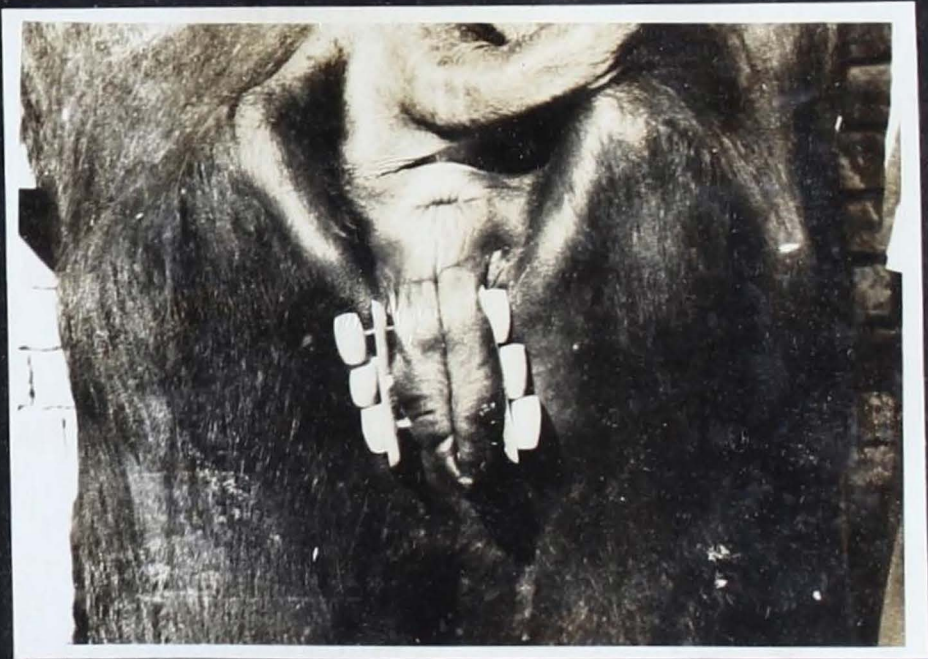
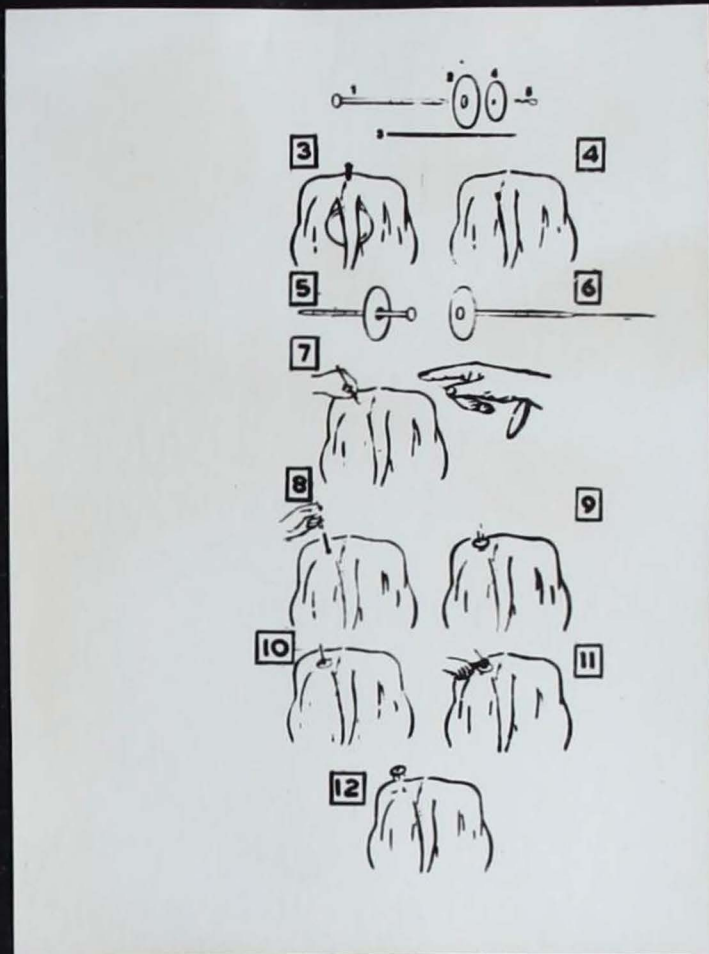


Fig.9. Line diagram showing the technique of AG-TEK profix buttons.

Fig.10. Photograph showing the AG-TEK profix buttons in situ in a buffalo.

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CHAPTER IV

RESULTS

RESULTS

Incidence:

The results of the incidence of the antepartum prolapse of vagina are presented in Figs. 11-14 and tables I-III.

From the table I, it is seen that in the veterinary Clinic, Haryana Agricultural University; a total of 3003 cases of reproductive disorders in buffaloes were recorded during the period from July, 1976 to October, 1980. Out of these, 216 animals (7.19%) were with the prolapse of vagina, which includes 152 animals (5.06%) with antepartum prolapse of vagina. The maximum number/^{of} antepartum prolapse of vagina cases, 29 and 23 were recorded in the months of July and August respectively (Appendix I).

The incidence of antepartum prolapse of vagina in buffaloes was observed to be the highest during the months of July to October, with 55.25 percent of the total cases recorded during this period; whereas the lowest incidence of 12.5 percent was recorded during the months of November to February. During the months of March to June the incidence was 32.5 percent. The seasonal trend in the occurrence of antepartum prolapse of vagina in these animals as recorded in the Veterinary Clinic, HAU; is shown in Fig. 13.

The incidence in relation to the stage of gestation was also recorded in 45 cases treated during 1979 and 1980, in the Veterinary Clinic, HAU, Hissar. It was observed

that 35 (77.8%) of these animals were in advanced stages of pregnancy ranging from nine months to term. Out of the remaining ten animals, two animals (4.4%), three animals (6.75%), three animals (6.75%) and two animals (4.4%) were pregnant for eight, seven, six and five months respectively (Table III).

The incidence in pluripara and primipara was 71.1 and 28.9 percent respectively (Table III). Among the pluriparous animals there were eight animals (17.8%), eleven animals (14.5%), nine animals (20%), two animals (4.4%) and two animals (4.4%) in the second, third, fourth, fifth and sixth calving respectively.

The proportion of antepartum prolapse of vagina cases to those with postpartum vaginal prolapse and the prolapse of vagina unassociated with pregnancy was 70.36, 26.8 and 2.84 percent respectively.

From table I it is further observed that in the Progeny Testing Farm, Hissar; out of a total of 703 cases of reproductive disorders in buffaloes, 60 (8.56%) were suffering from vaginal prolapse. Out of these 40 animals (5.69%) had antepartum vaginal prolapse, whereas the remaining 20 animals either had postpartum vaginal prolapse or the prolapse of vagina unassociated with pregnancy. The highest number of animals with antepartum vaginal prolapse were observed in the month of July (Appendix II).

The incidence was found to be the highest during July to October, which was fifty percent of the total cases

whereas the lowest incidence of 22.5 percent was recorded from March to June. During the months of November to February, the incidence was 27.5 percent. The seasonal trend in the incidence of the prolapse of vagina in these animals is shown in Fig. 14.

Out of the forty animals with antepartum vaginal prolapse, thirty three animals (82.5%) were in advanced stages of gestation, ranging from nine months to term and the remaining seven animals ranged between four to eight months of gestation (Table II).

The incidence in pluriparous and primiparous animals was sixty and forty percent respectively (Table III). Among the pluriparous animals there were five animals (12.5%) in second calving, four animals (10%) in third calving, ten animals (25%) in fourth calving, two animals (5%) in the fifth calving and three animals (7.5%) in the sixth calving respectively.

The proportion of the antepartum prolapse of vagina to those of postpartum vaginal prolapse and the prolapse of vagina unassociated with pregnancy were to the extent of 66.67, 26.67 and 6.66 percent respectively.

Biochemical studies:

The results of the biochemical studies in relation to the blood plasma calcium, inorganic phosphorus and magnesium levels are presented in Figs. 15-19. and tables IV-VI.

Calcium:

The blood plasma calcium levels (Table IV) in normal pregnant buffaloes at the various stages of gestation were 10.62, 11.4, 10.08 and 10.86 mg. percent for animals below seven months, seven to eight months, eight to nine months and from nine months to term respectively. In comparison to these values, the levels of blood calcium obtained in the buffaloes with antepartum prolapse of vagina at the corresponding stages of gestation were 9.87, 9.20, 8.60 and 8.75 mg. percent respectively (Fig. 15). All these values were significantly lower ($p < 0.01$), than the values obtained in the normal animals at all the stages of gestation.

Inorganic phosphorus:

The blood plasma inorganic phosphorus levels in normal pregnant buffaloes (Table IV), at various stages of gestation were 5.64, 5.15, 5.43 and 5.02 mg. percent at below seven months of gestation, between seven to eight months, between eight to nine months and from nine months to term respectively. In comparison to these values, the levels of inorganic phosphorus obtained in the animals with antepartum vaginal prolapse were 4.42, 4.69, 5.07 and 5.27 mg. percent respectively at the corresponding stages of gestation (Fig. 16). These values did not differ significantly from those obtained from the normal animals at any stage of gestation.

Magnesium:

The blood plasma magnesium values in normal pregnant

animals at various stages of gestation were 3.56, 3.23, 4.18 and 3.82 mg. percent respectively for animals below seven months of gestation, between seven to eight months of gestation, between eight to nine months of gestation and from nine months to term (Table IV). In comparison to the values obtained in the normal pregnant animals the values of the blood plasma magnesium in animals with antepartum prolapse of the vagina were 3.43, 3.16, 4.42 and 4.01 mg. percent respectively at the corresponding stages of gestation (Fig.17). These values also did not differ significantly from those of the normal animals.

Calcium, phosphorus and magnesium ratio:

The blood plasma calcium, phosphorus ratio was consistently low in the animals with antepartum prolapse of vagina as compared to the animals in the other group (Normal pregnant animals) at all the stages of gestation, except in the animals below seven months gestation in which the ratio was increased in the animals with vaginal prolapse (Table V).

The ratio between blood calcium, phosphorus and magnesium when examined together showed a decrease in all the stages of gestation in the animals with antepartum prolapse of vagina as compared to the normal pregnant animals at the corresponding stages of gestation. (Table VI).

Clinical studies:

Efficacy of Anaesthesia:

The comparative efficacy of the posterior epidural anaesthesia and pudendal nerve block are presented in table VII.

It is observed from the above mentioned table that for the pudendal nerve block an average of 11.6 minutes were required for the cutaneous desensitization, with a range of 8 to 15 minutes. Although, the effect of the anaesthesia was complete only in eleven of the fifteen animals, yet it was observed that the anaesthesia resulted in complete desensitization of the skin over the anus, perineum, vulva, vagina and the postero-medial aspect of the thighs. The average time for which the anaesthesia remained effective was 149.5 minutes with a range of 105 and 185 minutes.

In the animals in which epidural anaesthesia was employed, it was observed that the time required for cutaneous desensitization was considerably less, 4.6 minutes, as compared to the pudendal nerve block. The duration of anaesthesia was also lower in these animals, with an average of 68.3 minutes, ranging from 45 to 85 minutes. The anaesthesia, however, was complete in all the animals.

Efficacy of the different treatments:

The comparative efficacy of the different treatments employed is presented in tables VIII and IX.

Buhner's technique:

The maximum and the minimum duration for which these sutures remained in situ was sixty and two days respectively. Out of the nine animals treated by this method, the prolapsed mass was retained successfully in eight animals, but in one animal the sutures gave way and the animal simultaneously developed infection of the suture line. The sutures were removed in all the animals before parturition and the parturition in seven animals was normal, whereas in the remaining two animals the delivery of the calf had to be assisted because of the lateral deviation of the head and the neck resulting into dystocia.

Flessa technique:

The sutures remained in situ for a minimum of one day and a maximum of 14 days. The prolapsed mass was effectively retained in seven animals (87.5%). In one animal, in which the sutures were not effective, there was tearing of the vulva and a mucopurulent discharge from the vagina. The foetal delivery was normal in seven animals, whereas in the other animal a dead foetus was removed by caesarean section.

AG-TEK profix button technique:

The buttons remained in situ for a minimum of eight and a maximum of thirty days. The effective retention was achieved in four animals and in the remaining two animals the vaginal mass could be observed at the gaping vulvar orifice, as and when the animals strained. In two animals

which had excessive straining during the period of study, fistulous tracts were formed by the plastic trocar, which turned septic with purulent discharge and foul odour. The foetal delivery, however, was normal in all the cases. In one animal the plastic trocar, at the time of removal, was found to be broken.

Progesterone and Mifex therapy:

The treatment with progesterone and Mifex was successful only in three of the six animals in which it was tried (Table IX). In the other three animals which did not respond, to this treatment, retention sutures were applied subsequently. The minimum and the maximum number of days for which the treatment was continued was twelve and forty days respectively.

Mifex therapy:

Out of the sixteen animals in this group the treatment was effective in thirteen animals (81.25%). The remaining three animals, which did not respond to this treatment, subsequently developed prolapse of more serious nature. These animals were treated with other methods of retention sutures. This treatment was continued in the affected animals for a minimum of one and a maximum of thirty days.

Table I. Incidence of Antepartum Vaginal prolapse in the Veterinary Clinic, HAU and Progeny Testing Farm

S.No.	Observations.	Vety.Clinic HAU.	Progeny Testing Farm.
1.	Total number of cases with reproductive disorders.	3,003	703
2.	Total vaginal prolapse cases.	216 (7.19)	60 (8.56)
3.	Antepartum vaginal prolapse cases.	152 (5.06)	40 (5.69)
4.	Postpartum vaginal prolapse cases.	58 (1.93)	16 (2.27)
5.	Vaginal prolapse unassociated with pregnancy.	6 (0.20)	4 (0.60)

Figures in parenthesis indicate percentages.

Table II. Incidence of Antepartum Vaginal prolapse in buffaloes in relation to the stage of gestation.

Source.	No. of Anim.	Stage of gestation (Months)						
		10	9	8	7	6	5	4
Vety. Clinic, HAU.	45	25 (55.6)	10 (22.2)	2 (4.4)	3 (6.7)	3 (6.7)	2 (4.4)	-
Progeny Testing Farm.	40	31 (77.5)	2 (5.0)	2 (5.0)	2 (5.0)	1 (2.5)	1 (2.5)	1 (2.5)

Figures in parenthesis indicate percentages.

Table III. Incidence of Antepartum prolapse of vagina in relation to calving No. in buffaloes.

Source.	Calving Number.					
	1	2	3	4	5	6
Vety.Clinic HAU.	13 (28.9)	8 (17.8)	11 (24.5)	9 (20.0)	2 (4.4)	2 (4.4)
Progeny Testing Farm.	16 (40.0)	5 (12.5)	4 (10.0)	10 (25.0)	2 (5.0)	3 (7.5)

Figures in parenthesis indicate percentages.

Table III. Incidence of Antepartum prolapse of vagina in relation to calving No. in buffaloes.

Source.	Calving Number.					
	1	2	3	4	5	6
Vety. Clinic HAU.	13 (28.9)	8 (17.8)	11 (24.5)	9 (20.0)	2 (4.4)	2 (4.4)
Progeny Testing Farm.	16 (40.0)	5 (12.5)	4 (10.0)	10 (25.0)	2 (5.0)	3 (7.5)

Figures in parenthesis indicate percentages.

Table IV. Mean blood plasma Calcium, Inorganic phosphorus and Magnesium levels in normal (pregnant) and Antepartum prolapse of vagina in buffaloes (mg%)

Stage of gestation.	Calcium		Phosphorus		Magnesium	
	N	P	N	P	N	P
Below 7 months.	10.62 ± 0.36 (15)	9.87 ⁺⁺ ± 0.61 (4)	5.64 ± 0.30 (15)	4.42 ± 0.52 (4)	3.56 ± 0.32 (15)	3.43 ± 0.23 (4)
7 to 8 months.	11.40 ± 0.30 (7)	9.20 ⁺⁺ ± 0.40 (2)	5.15 ± 0.30 (7)	4.69 ± 2.06 (2)	3.23 ± 0.25 (7)	3.16 ± 0.10 (2)
8 to 9 months.	10.08 ± 0.44 (13)	8.60 ⁺⁺ ± 0.40 (7)	5.43 ± 0.27 (13)	5.07 ± 0.45 (7)	4.18 ± 0.36 (13)	4.42 ± 0.49 (7)
9 months to term.	10.86 ± 0.34 (14)	8.75 ⁺⁺ ± 0.27 (22)	5.02 ± 0.27 (14)	5.27 ± 0.32 (22)	3.82 ± 0.38 (14)	4.01 ± 0.32 (22)

N:-Normal: P:-Animals with vaginal prolapse:

Figures in parenthesis indicate number of animals.

++ : $0.01 > p > 0.001$.

Table V. Blood plasma Calcium-Phosphorus ratio in Normal (pregnant) and Antepartum prolapse of vagina in buffaloes.

S.No.	Stage of gestation.	Normal pregnant.	Animals with prolapse.
1.	9 months to term.	2.16 : 1.0	1.66 : 1.0
2.	8 to 9 months.	1.86 : 1.0	1.70 : 1.0
3.	7 to 8 months.	2.22 : 1.0	1.96 : 1.0
4.	Below 7 months.	1.85 : 1.0	2.23 : 1.0

Table VI. Blood plasma Calcium, Inorganic Phosphorus and Magnesium ratio in Normal (pregnant) and Antepartum prolapse of vagina in buffaloes.

Stage of gestation.	Normal pregnant buffaloes.	Animals with vaginal prolapse.
9 months to term.	2.84 : 1.31 : 1.0	2.18 : 1.31 : 1.0
8 to 9 months.	2.41 : 1.30 : 1.0	1.94 : 1.14 : 1.0
7 to 8 months.	3.52 : 1.59 : 1.0	2.91 : 1.48 : 1.0
Below 7 months.	2.96 : 1.67 : 1.0	2.87 : 1.28 : 1.0

Table VII. Comparative efficacy of the Pudic nerve block and Epidural anaesthesia in Antepartum prolapse of vagina in buffaloes.

S.No.	Observation.	Pudic nerve block.	Epidural anaesthesia.
1.	Number of animals.	15	28
2.	Average quantity used (ml.).	76.3 (70-86)	5.6 (5-7)
3.	Average time required for cutaneous desensitization (min.).	11.6 (8-15)	4.6 (3-7)
4.	Effect of anaesthesia:-		
	a). Complete	11 animals	28 animals
	b). Partial	4 animals	-
5.	Average duration of anaesthesia (min.).	149.5 (105-185)	68.3 (45-85)

Figures in parenthesis indicate the range.

Table VIII. Relative efficacy of the different types of retention sutures employed in buffaloes with antepartum prolapse of vagina.

Observations.	BUHNERS	FLESSA	AG-TEK PROFIX BUTTON
Number of animals.	9	8	6
Duration for which remained in situ. (Days).			
a). Minimum.	2	1	8
b). Maximum.	60	14	30
Effective retention of the prolapsed mass. (% animals).	88.9	87.5	66.67
Infection. (% animals).	11.1	12.5	33.3
Foetal delivery.			
a). Normal.	77.8	87.5	100
b). Assisted.	22.2	12.5	-

Table IX. Comparative efficacy of Progesterone and Mifex therapy in antepartum prolapse of vagina in buffaloes.

S.NO.	Group.	No.of Animals.	Duration of treatment.		Efficacy	
			Min.	Max.	n.	%
			Days			
1.	Proges- terone + Mifex.	6	12	40	3	50.00
2.	Mifex.	16	1	30	13	81.25

Fig.11. Monthwise incidence of vaginal prolapse in buffaloes in Veterinary Clinic, Haryana Agricultural University, Hissar.

Fig.12. Monthwise incidence of vaginal prolapse in buffaloes in the Progeny Testing Farm, Hissar.

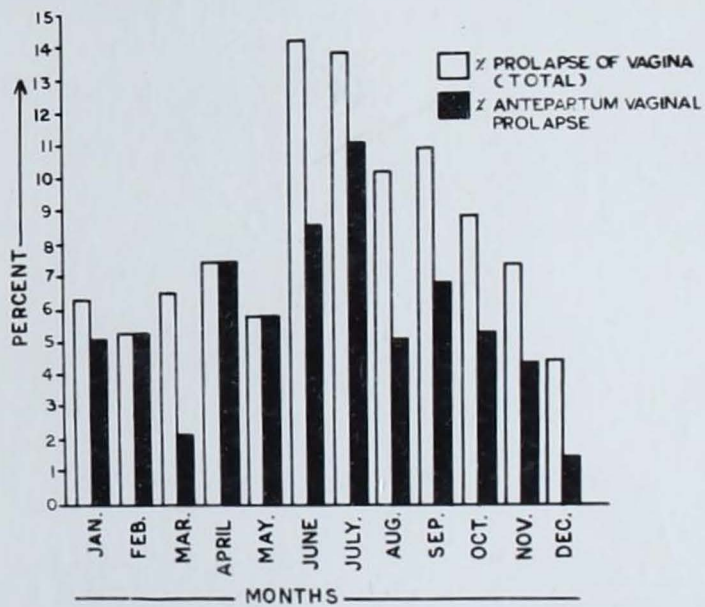
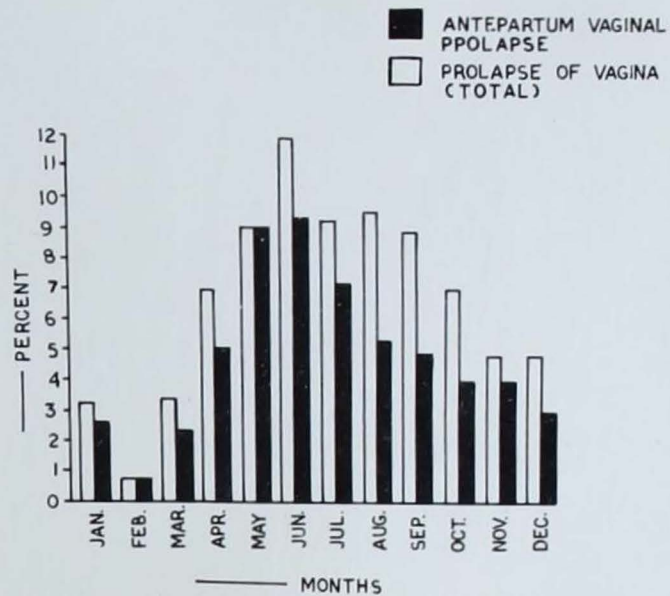


Fig.13. Seasonal trend of antepartum prolapse of vagina in buffaloes in Veterinary Clinic, HAU; Hissar.

Fig.14. Seasonal trend of antepartum prolapse of vagina in buffaloes in the Progeny Testing Farm, Hissar.

SEASONAL TREND OF ANTEPARTUM VAGINAL PROLAPSE IN MURRAH BUFFALOES IN VET. CLINIC FROM JULY 1976 TO OCTOBER 1980.

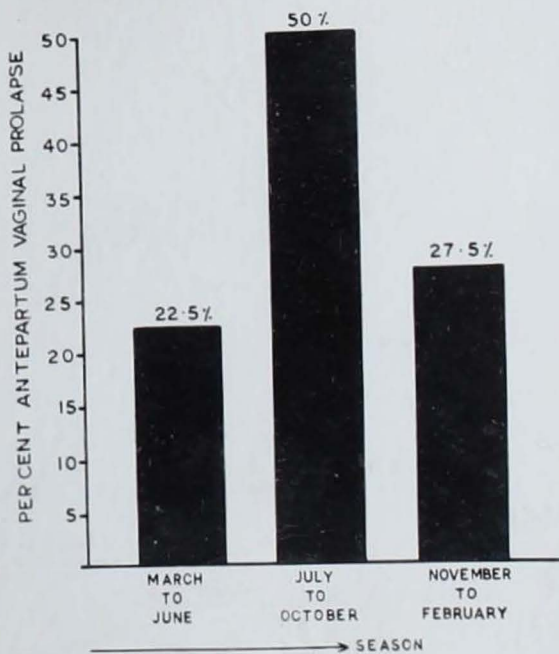
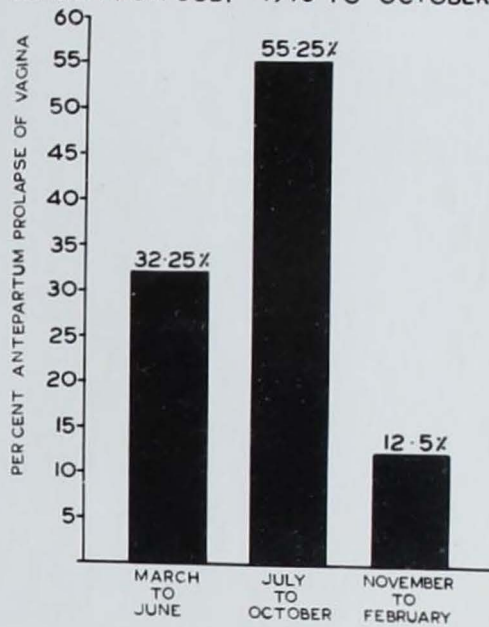


Fig.15. Mean blood plasma calcium values in normal (pregnant) animals and with antepartum prolapse of vagina in buffaloes.

Fig.16. Mean blood plasma inorganic phosphorus values in normal (pregnant) and with antepartum prolapse of vagina in buffaloes.

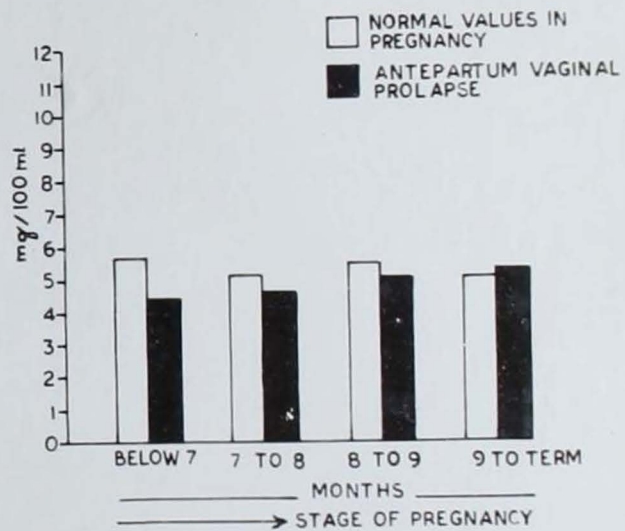
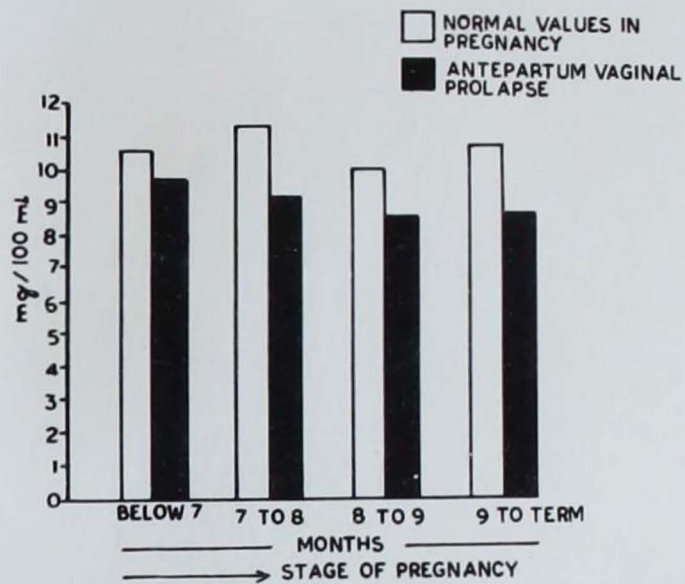


Fig.17. Mean values of blood plasma magnesium in normal (pregnant) and with antepartum prolapse of vagina in buffaloes.

□ NORMAL VALUES IN PREGNANCY
■ ANTEPARTUM VAGINAL PROLAPSE

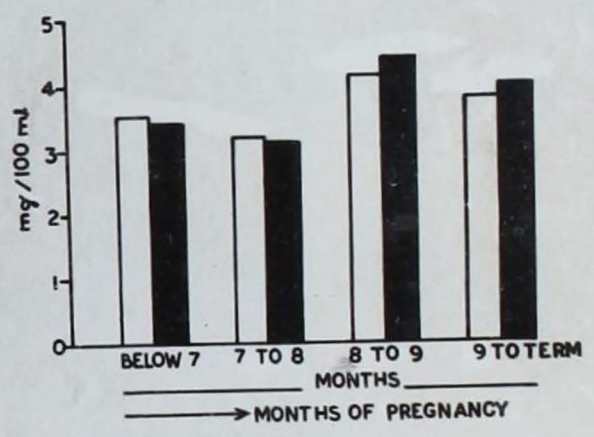
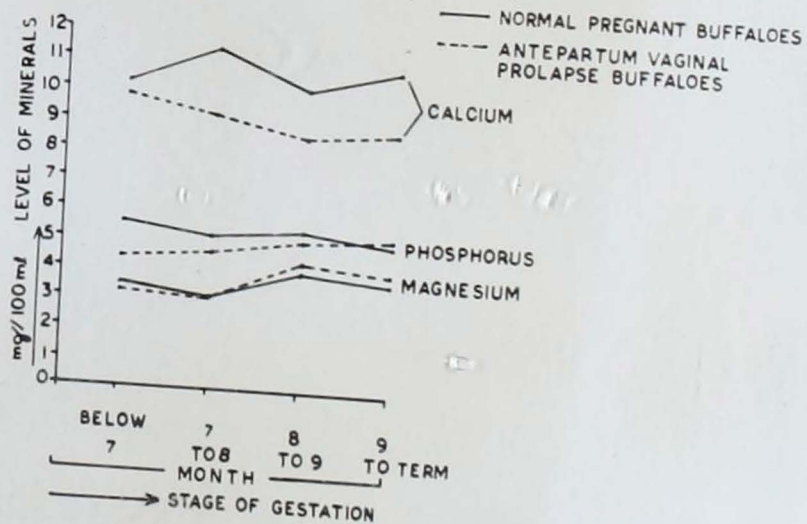
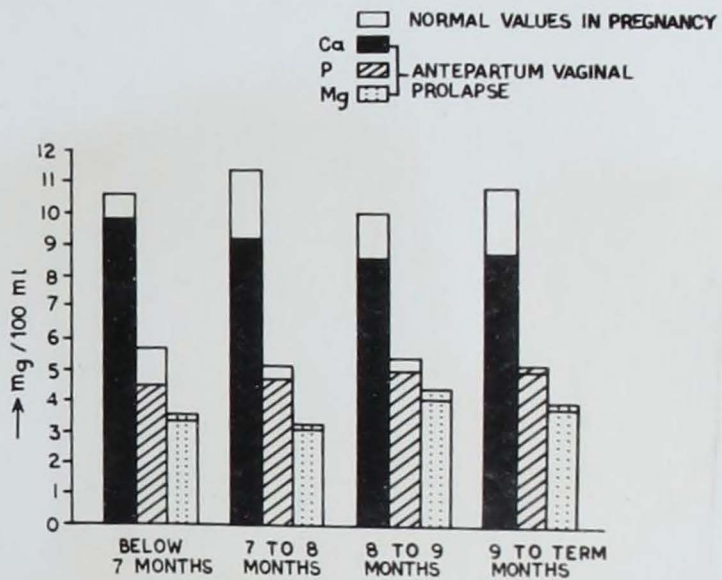


Fig.18. Mean values of blood plasma calcium, inorganic phosphorus and magnesium in normal (pregnant) and antepartum prolapse of vagina in buffaloes.

Fig.19. Graph showing the mean values of blood plasma calcium, inorganic phosphorus and magnesium in normal (pregnant) and antepartum prolapse of vagina in buffaloes.



CHAPTER V

DISCUSSION

DISCUSSION

Incidence:

The incidence of prolapse of vagina in the buffaloes recorded in the present study was 7.19 percent and 8.56 percent respectively in the Veterinary Clinic, HAU and the Progeny Testing Farm, Hissar. Out of this the incidence of the antepartum prolapse of vagina was 5.06 and 5.69 percent respectively. The incidence of vaginal prolapse in the present study was slightly lower than the incidence recorded earlier by Sheth (1970), Chaudhry et al. (1978), Pandit (1978) and Verma et al. (1979). However, Rao et al. (1980) recorded a lower incidence of 4.31 percent in the buffaloes. The variation observed in the incidence of vaginal prolapse by different workers may be due to the differences in the number of animals included in the respective studies, the geographical areas where the studies were conducted, the nutritional status of the animals involved, the breed of the buffaloes and even the educational status of the farmers in the area in which the studies were conducted.

The analysis of the data further revealed that in both the Veterinary Clinic and the Progeny Testing Farm, Hissar; there was a seasonal trend in the occurrence of this condition. The maximum number of cases with antepartum vaginal prolapse of 55.25 and 50.0 percent were recorded during the months of July to October in both the places. The highest number of cases for any single month at both the places was recorded in the month of July. Similar

observations were also made by Verma et al. (1979). However, Pandit (1978) observed the maximum number of cases from May to October, with the highest incidence in the month of August. Sheth (1970) observed the maximum number of cases during the months of August to November. Elecko et al. (1962) and Nanda (1979) observed the highest number of cases during the months of October and August, respectively. Since the vaginal prolapse in the buffaloes usually occurs during the later stages of gestation, so the high incidences during the months of July to October, as observed by various workers, is expected; because this period invariably coincides with the calving season in these animals (Cockril, 1974).

Stage of gestation:

From the present study it was also observed that the highest incidence of this condition was usually observed in the advanced stages of gestation, particularly from nine months to term and these animals constituted 77.8 and 82.5 percent of the total animals studied in the Veterinary Clinic and the Progeny Testing Farm, Hissar; respectively. Similar observations have also been made by Craig (1952), Milne (1954), Elecko et al. (1962) and Arthur (1975) in cows and by Misra (1976), Pandit (1978) and Nanda (1979) in buffaloes. Several factors have been thought to have been responsible for the occurrence of this disorder during the later stages of gestation, like excessive relaxation of the pelvic ligaments and the vaginal muscles probably due

to the higher levels of relaxin and oestrogens and the altered calcium, inorganic phosphorus ratio; which further reduces the tonicity of the vaginal muscles. Besides these, hereditary predisposition in certain families of these animals, varying systems of management, increased intra abdominal pressure and the heavy foetus may be the other contributing factors in the occurrence of the antepartum prolapse of vagina.

Calving number:

The present study also revealed that the incidence of the antepartum prolapse of vagina was higher in the pluriparous than in the primiparous animals. The ratio of pluriparous to primiparous animals suffering from the antepartum vaginal prolapse, in the present study, was 71.1 and 28.9 in the Veterinary Clinic, HAU and 60 and 40 in the Progeny Testing Farm, Hissar, respectively. Similar observations were also made by Craig (1952), Elecko et al. (1962), Roberts (1971) and Arthur (1975) in cows and by Misra (1976), Verma et al. (1979) and Rao et al. (1980) in buffaloes. Excessive stretching of the pelvic ligaments and the loosening of the vaginal muscles in the earlier calvings may be the probable reason attributed for the higher incidence of this malady in the pluriparous animals.

The higher incidence of antepartum vaginal prolapse observed in the present study both in the Veterinary Clinic, HAU and the Progeny Testing Farm, Hissar; in comparison to the postpartum vaginal prolapse or the prolapse of vagina

unassociated with pregnancy has also been reported earlier by various workers in cows and buffaloes (Elecko et al. 1962 and Pandit, 1978). This is more or less expected because the possible aetiological factors like heavy foetus, increased intra abdominal pressure and increased level of oestrogens disappear after parturition. However, Raman et al. (1977) recorded a lower incidence of antepartum vaginal prolapse as compared to postpartum prolapse of vagina in buffaloes.

Biochemical studies:

Blood calcium level

In the present study a significant decrease in the blood plasma calcium level was observed in the buffaloes with antepartum vaginal prolapse at all stages of gestation. Similar observations have been made by Chavance (1944), Craig (1952) and Seitaridis and Papadopoulos (1978) in cows and by Pandit (1978) and Nanda (1979) in the buffaloes. The lowered blood plasma calcium level in antepartum prolapse of vagina particularly during the later stages of gestation may be due to the high rise of oestrogens during this period, (Seitaridis and Papadopoulos, 1978). Payne (1964) also observed lowered serum calcium in goats following oestrogen administration in these animals.

Since calcium is required and is necessary for neuromuscular excitability, capillary and cell membrane permeability, muscle contractions and nerve impulse transmission (Simesen, 1970), so the deficiency of calcium can result in reduced vaginal muscle tone and ultimately the

prolapse may occur.

Inorganic phosphorus level

The average inorganic phosphorus values obtained in the animals with antepartum prolapse of vagina did not differ significantly from the values obtained in normal pregnant buffaloes at the corresponding stages of gestation. Similar observations have also been made by Stubbings (1971) in ewes and by Keshvamurthy (1964), Seitaridis and Papadopoulos (1978) in cows. However, Pandit (1978) and Nanda (1979) observed significant changes in these values in buffaloes with antepartum vaginal prolapse.

Magnesium level

In the present study it was observed that the blood plasma magnesium levels in the buffaloes with antepartum vaginal prolapse did not differ significantly from the normal values in pregnant animals at the corresponding stages of gestation. Stubbings (1971) did not find any significant variation in these values in ewes, whereas Pandit (1978) observed a high concentration of magnesium in buffaloes having antepartum vaginal prolapse.

In the intracellular fluid magnesium has an important role to play in the production and destruction of the acetyl choline which is necessary for the transmission of impulses at the neuromuscular junction. A low concentration of magnesium or more particularly a low magnesium, calcium ratio potentiates the release of acetyl choline, so it may be

possible that a low concentration of magnesium in the extra cellular fluid surrounding the muscle end plates may produce tetany through this mechanism.

Calcium, phosphorus and magnesium ratio

In the present study the calcium, phosphorus ratio was consistently low in all the animals with antepartum prolapse of vagina in comparison to the values obtained from the normal animals at corresponding stages of gestation. Similar observations have also been made by Pollet (1962) and Nanda (1979) in cows and buffaloes respectively. However, Keshvamurthy (1964) and Misra (1976) could not observe any significant change in the calcium and phosphorus ratio in these animals, although the animals in latter's study with vaginal prolapse responded well to the calcium therapy.

The ratio between the blood plasma levels of calcium, inorganic phosphorus and magnesium, when examined together showed a decrease at all the stages of gestation in the animals with antepartum prolapse of vagina as compared to the normal pregnant animals at the same stages of gestation. It is assumed that alteration in this ratio may play some role in the occurrence of the antepartum vaginal prolapse in these animals.

Clinical studies:

Anaesthesia

For the prevention of the more serious outcome of the antepartum vaginal prolapse, the control of straining is of

prime importance, so as to prevent such cases from further deterioration. Epidural anaesthesia and pudendal nerve block were employed in ~~all~~ the animals with antepartum vaginal prolapse for the prevention of straining and to prevent its subsequent recurrence.

In the present study it was observed that on an average 11.6 and 4.6 minutes were required for bringing about cutaneous desensitization by pudendal nerve block and epidural anaesthesia respectively. It was also observed that the use of epidural anaesthesia completely eliminated the straining in all the animals for a considerable period of time and the subsequent reduction and replacement of the prolapsed mass of the vagina was facilitated. Similar observations were also made by Habel (1957), Hogg (1960), Hentschl (1961), Roberts (1971), Bierschwal and de Bois (1971) and Novazzi (1973).in cattle and by Singh and Johari (1973) and Narasimhan et al.(1975) in buffaloes. The lesser time of induction of anaesthesia in the epidural technique, as compared to the pudendal nerve block, is advantageous as far as the immediate reduction and replacement of the prolapsed vagina is concerned. Similar observations have also been made by Pearson (1975), who reported that the epidural anaesthesia was immediately effective with transient effect, however, it completely abolished the straining reflex, thus facilitating the measures of reduction and replacement.

Complete desensitization was obtained only in eleven of the fifteen animals in which pudendal nerve block was

employed. The possible explanation for the partial anaesthetic effect in the four animals may be that the middle haemorrhoidal nerve which is also blocked at the time of pudendal nerve block may not have been adequately desensitized or might have been unanaesthetized. The technique of pudendal nerve block was employed by Deshmukh and Deshpande (1980) on a few cows and in one clinical case of postpartum prolapse of vagina. However, in their study the duration of the anaesthesia was longer, probably due to the combination of xylocaine with adrenaline.

A comparison of the two methods employed indicated that the epidural anaesthesia had an edge over the pudendal nerve block, because it is not only easy to administer, but there are less chances of error and needs less expertise. Moreover the onset of cutaneous desensitization is immediate, requires lesser quantity of the anaesthetic solution and can be repeated easily at desired intervals.

Treatment

The present investigation was an attempt to study the different types of surgical and non-surgical treatments in antepartum prolapse of vagina in buffaloes. The treatment was employed keeping in view the severity of the condition at the start of the therapy.

The Buhner's sutures employed in nine animals with antepartum prolapse of vagina, were effective in eight animals in retaining the prolapsed mass. In the ninth animal

the sutures gave way and the animal simultaneously developed infection of the suture line. The total period of time for which the sutures remained in situ depended upon the proximity of the occurrence of the vaginal prolapse to the act of parturition. Foetal delivery was normal in seven of the nine animals and in the remaining two animals although the delivery had to be assisted, it had nothing to do with the sutures, as the foetus was in an abnormal presentation and posture. In these animals delivery by traction after correction of the faulty posture was avoided in order to eliminate the chances of aggravating the prolapse of the vagina and thus caesarean section was resorted to.

The use of Buhner's retention technique has also been successfully employed by Pierson (1961), Arthur (1966), Baker (1967), Roberts (1971) and Novazzi (1971). Bierschwal and de Bois (1971) used the same technique with slight modification for the control of chronic vaginal prolapse in cows with success. Pearson (1975) was of the opinion that this technique was the most effective and possibly the easiest method of treating the vaginal prolapse in cattle.

The Flessa technique was effective in retaining the prolapsed mass in seven of the eight animals. In one animal, in which the technique was not effective, there was tearing of the vulva and a mucopurulent discharge. The foetal delivery was normal in seven of the eight animals, and in one a dead foetus was removed by laparo-hysterotomy. Schatez (1968) employed Flessa sutures, with or without

splints, successfully for the treatment of prepartum vaginal prolapse in the cow. On the same pattern Pearson (1975) and Walker and Vaughan (1980) used prolapse pins with good results for effecting the closure of the vulva.

Out of the two methods, it appears that the former technique advocates itself over the other by virtue of the fact that the method is easy and simple in application. Moreover it can remain in situ indefinitely without any untoward effects. It can also be used at any stage of pregnancy and can be easily inserted and released or retied at parturition.

The principle of the efficacy of the AG-TEK profix button technique is that it may cause adhesions of the vaginal wall with the overlying ligaments and muscles, and thus in turn help in the retention of the prolapsed mass. Out of the six animals in which this method was employed, effective retention of the prolapsed mass was obtained in only four animals; whereas in the remaining two animals the vaginal mass could be periodically observed at the gaping vulvar lips, as and when the animal was straining. In these two animals, with excessive straining during the period for which the buttons remained in situ, fistulous tracts were observed to have developed by the plastic trocar. These tracts turned septic with purulent discharge and foul odour. Perhaps the only advantage of this technique is that the parturition is not interfered with, and the foetus can successfully negotiate the birth canal without any obstruction, even when



the buttons are insitu. The buttons which remain in situ normally for about a week after parturition, also help in preventing the occurrence of the postparturient vaginal prolapse. This is a definite advantage over the other methods in which at the same time when parturition is likely to take place, the sutures have to be removed to allow the passage of the foetus, besides the necessity of replacing the sutures should there be any apprehension of a post parturient prolapse of either the vagina or the uterus.

However, the disadvantage could be the formation of the fistulous tracts, along the course of the plastic trocar; which if infected may lead to complications.

Earlier fastening of the cranial part of the vagina with the sacro-sciatic ligaments and associated muscles was performed by Minchev (1956) and later modified by Bouckart et al.(1956). Habel (1957), Hentschl (1961), Gibbons (1962) and Hattangadi and Deshpande (1976) also used this technique for the treatment of antepartum prolapse of vagina in cows with good results.

In this study an attempt was made to study the effect of progesterone and Mifex in cases of antepartum prolapse of the vagina in buffaloes. Out of the six animals treated, only three responded to the treatment successfully. The remaining three animals subsequently developed prolapse of more serious nature and had to be treated with one or the other methods of the retention procedures. Although Burch (1953)

and Gibbons (1962) were of the opinion that the progesterone could be used as a preventive or therapeutic agent in cases of antepartum vaginal prolapse in cattle, the findings in the present study, however, do not support their contention. Similar observations have also been made by Roberts (1971). In contrast, Pandit (1978) stated that the progesterone therapy was quite effective in these animals with antepartum vaginal prolapse. It is possible that only those cases of the prolapse of vagina usually respond to this therapy in which progesterone hormone is able to replace the oestrogen hormone at the receptor sites in sufficient levels. This aspect, however, needs intensive study and further clarification.

In the present investigation Mifex was used as a treatment in sixteen animals with antepartum prolapse of the vagina, out of which thirteen animals responded successfully. The remaining three animals developed prolapse of severe nature and were treated subsequently by other procedures. The treatment was obviously effective only in mild cases of the vaginal prolapse. Chavance (1944) treated the cases of vaginal prolapse by calcium, phosphorus and vitamin D therapy; whereas Rydell (1954) got better results by using the commercial preparation of calcium, phosphorus and magnesium. Mannari (1971) observed that the colloidal calcium preparation (Calciostalin) acts as a general tonic in cases with vaginal prolapse, where there is neuromuscular

debility and neuroaesthesia. Misra (1976) also treated prepartum vaginal prolapse cases due to subclinical hypocalcemia in cows and buffaloes by the parenteral administration of calcium borogluconate.

The successful treatment of antepartum prolapse of vagina in large number of animals by Mifex therapy is more or less expected, since it has been observed that blood plasma calcium levels in such cases are significantly low as compared to the normal pregnant animals at the corresponding stages of gestation. This parenteral administration of calcium, not only increases the absorption of calcium from the gut (Payne, 1964), but also increases the muscular tone of the smooth muscles of genitalia (Simkiss, 1968). It also acts, probably, by sensitizing the tissues to the action of various hormones (Moddie, 1965), thereby helping in the treatment of the prolapse of the vagina in the early stages.

However, from the observations made in the present study, it was apparent that although in cases of mild vaginal prolapse calcium therapy could be useful, yet in more severe cases both the retention sutures and the calcium therapy should be used simultaneously for optimum results.

CHAPTER VI

SUMMARY AND CONCLUSIONS

SUMMARY AND CONCLUSIONS

The present study was carried out to study the incidence, role of calcium, phosphorus and magnesium as an aetiological agent, efficacy of anaesthesia and the line of treatment in the antepartum prolapse of vagina in buffaloes. The incidence was studied in relation to the month of the year, effect of season, the stage of gestation and the calving number of the dam. The incidence of vaginal prolapse was 7.19 and 8.56 percent with 5.06 and 5.69 percent as the incidence of antepartum vaginal prolapse in the Veterinary Clinic, HAU; Hissar and the Progeny Testing Farm, Hissar respectively. The maximum number of antepartum prolapse of vagina cases was recorded during the month of July at both the places. The highest incidence was observed during the months of July to October with 55.25 and 50.0 percent cases in the Veterinary Clinic and Progeny Testing Farm, respectively. It was also observed that the incidence was very high in the animals in advanced stages of gestation, particularly from nine months to term. Pluriparous animals were found to be more prone to the vaginal prolapse and constituted 71.1 and 60 percent of the total cases observed at the two places respectively. The proportion of antepartum prolapse of vagina to the postpartum vaginal prolapse in both the places was very high.

In the present investigation 43 clinical 49 normal pregnant buffaloes formed the material of study for biochemical and clinical studies. Blood plasma calcium levels

were significantly low in the animals with antepartum prolapse of vagina at all the stages of gestation as compared to the normal pregnant animals at the corresponding stages of gestation. Blood plasma inorganic phosphorus and magnesium levels in the animals with vaginal prolapse did not vary significantly from those of the normal animals. The blood plasma calcium, phosphorus and magnesium ratio was observed to be low in clinical cases with antepartum prolapse of vagina, nearly at all stages of gestation; in comparison to the ratio of these minerals in normal pregnant animals.

For the prevention of straining in clinical cases, epidural anaesthesia was found to be more practical, easy and effective as compared to the pudic nerve block.

For the retention of the prolapsed mass, Buhner's technique, Flessa sutures and AG-TEK profix button technique were used. Among the three methods of retention sutures used, the Buhner's technique was found to be quite effective in retaining the prolapsed mass. Although the retention was also adequate in the animals with Flessa sutures, yet it was apparent that the method was not useful in the animals in which there was straining as seen in the animal which developed a tear of the vulva. The AG-TEK profix button technique was effective in only four of the six animals, and in the remaining animals not only was the prolapsed mass observed at the gaping vulva, periodically, but there was also the formation of fistulous tracts due to the plastic trocar which also became septic.

As far as the treatment of antepartum vaginal prolapse cases with drugs containing calcium and calcium with progesterone is concerned, it was observed that calcium and progesterone therapy was less useful compared to treatment with calcium alone. However, calcium therapy must be supplemented with either of the retention techniques in order to make the treatment effective in severe nature of vaginal prolapse. Calcium therapy is effective alone only in those cases where the prolapse of vagina is of a mild degree.

Following conclusions can be drawn from the present study:

- 1). The highest incidence of antepartum vaginal prolapse was observed to occur from July to October.
- 2). The pluriparous animals were more prone to the disease than the primiparous animals.
- 3). The incidence was high during the advanced stages of gestation.
- 4). The incidence of antepartum vaginal prolapse is high as compared to the postpartum vaginal prolapse.
- 5). Blood plasma calcium values were significantly low in animals with vaginal prolapse than in the normal animals at the corresponding stages of gestation.
- 6). The ratio of calcium, phosphorus and magnesium in these animals is consistently low as compared to the normal animals.
- 7). Epidural anaesthesia was observed to be the anaesthesia of choice in preventing the straining compared

to the pudendal nerve block.

8). Calcium therapy should be advocated in all the animals with vaginal prolapse in order to rectify the mineral imbalance in these animals.

9). The Buhner's technique was found to be quite effective and the easiest method with the least side effects.

10). In mild cases of vaginal prolapse, calcium therapy alone may be beneficial but in more severe cases the retention sutures together with calcium therapy was of better therapeutic value.

CHAPTER VII

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Appendix i

Monthly incidence of antepartum vaginal prolapse in buffaloes from July, 1976 to October, 1980; in the Veterinary Clinic, HAU; Hissar.

Month.	Total cases.	Antepartum.	Postpartum.	Unassociated with pregnancy.
January	5	4	1	-
February	1	1	-	-
March	7	5	1	1
April	11	8	2	1
May	18	18	-	-
June	23	18	4	1
July	36	29	7	-
August	41	23	18	-
September	36	20	14	2
October	18	12	6	-
November	11	9	2	-
December	9	5	3	1
Total	216	152	58	6

Appendix ii

Monthly incidence of antepartum vaginal prolapse in buffaloes from July, 1971 to October, 1979; in the Progeny Testing Farm, Hissar.

Month.	Total cases.	Antepartum.	Postpartum.	Unassociated with pregnancy.
January	5	4	1	-
February	3	3	-	-
March	3	1	2	-
April	3	3	-	-
May	2	2	-	-
June	5	3	2	-
July	10	8	2	-
August	8	4	3	1
September	8	5	3	-
October	5	3	-	2
November	5	3	2	-
December	3	1	1	1
Total	60	40	16	4

