

**Gynaecopathological disorders of female
reproductive systems of cows suspected for
their culling at Birgonj of Dinajpur district**

A THESIS

BY

MD. ABDUR RAHIM

SEMISTER: SEPTEMBER-FEBRUARY, 2012

REGISTRATION NO.:1005110

SESSION: 2011-2012

MASTER OF SCIENCE (M.S.)

IN

PATHOLOGY



**DEPARTMENT OF PATHOLOGY AND PARASITOLOGY
HAJEE MOHAMMAD DANESH SCIENCE AND
TECHNOLOGY UNIVERSITY, DINAJPUR**

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**Submitted to the
Department of Pathology and Parasitology
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DEPARTMENT OF PATHOLOGY AND PARASITOLOGY
HAJEE MOHAMMAD DANESH SCIENCE AND
TECHNOLOGY UNIVERSITY, DINAJPUR

FEBRUARY, 2012

DEDICATED
TO MY
MOTHER, WIFE AND SONS

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*The author
February, 2012*

ABSTRACT

This is the first study describing the infertility problem in Birgonj Upazila and is aimed to identify the causes of infertility problem and improve fertility to solve the deficiency of animal protein requirement as per capital needed. During the period of January to December/2011, a total of two hundred fifty eight (258) female genital tracts were collected from the slaughtered animal of different bazer under Birgonj Upazila and from the slaughter house of Birgonj municipality. Gynaecopathological disorder is a common problem of heifers and cows in Bangladesh. The most common gynaecopathological disorders are endometritis, pyometra, mucometra, cervicitis, gravid uterus, haemorrhage in uterine horn, vaginitis, vulvitis, cystic ovary, par ovarian cyst, ovaro-bursal adhesion, haemorrhage in the ovary, atrophied ovary, hyperplasia of the ovary, hydrosalpinx mummified foetus and salpingitis. During postmortem examination 166 (65.11%) genital tracts pathologically disordered. The most common pathological lesions were atrophy of the ovary (21.31%), followed by cystic ovary (12.01%), hyperplasia of ovary (2.32%), par ovarian cyst (1.16%), ovaro bursal adhesion (1.16%), haemorrhage in ovary (1.55%), endometritis (6.97%), pyometra (5.03%), mucometra (1.16%), cervicitis (6.58%), gravid uterus (4.26%) and haemorrhagic lesion in uterine horn (1.55%). Histopathological examination was carried out and found destruction of endometrium which is characterized by huge infiltration of reactive cells, destruction of some uterine gland. In case of pyometra presence of neutrophils, presence of proteinacious mass in edematous uterus. The cystic ovary characterized by the cystic wall appeared to be flattened that might have resulted from pressure exerted by the cysts. Cattle are one of the important domesticated animals and easily reared. The local breed (*Bos indicus*) can easily survive in our environment but the foreign breed (*Bos taurus*) rearing needed so much carefully. Now a day the people of Birgonj Upazila reared crossbreed cattle which are rearing for both meat and milk purposes. The infertility problems of crossbreed animal was high so the farmer culling the animal from their herd which were slaughtered in the slaughter house in Birgonj municipality and different hat and bazer of Upazila.

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ABBREVIATION AND SYMBOLS

%	: Percentage
°C	: Degree Celsius
<i>et al</i>	: And his associates
etc.	: Etcetera
Fig	: Figure
gm	: Gram
hr	: Hour
H & E	: Hematoxylin and Eosin
HSTU	: Hajee Mohammad Danesh Science and Technology University
lbs	: Pounds
min	: Minute
ml	: Milliliter
mm	: Millimeter
MS	: Master of Science
No.	: Number
Sec	: Second
UK	: United Kingdom
USA	: United States of America
WHO	: World Health Organization



CHAPTER I
INTRODUCTION

CHAPTER I

INTRODUCTION

Bangladesh is an agricultural based country. Most of the people in this country depend on agriculture. Livestock is an integral part of agriculture and cattle help to provide important source of animal protein. In our country there are two types of cattle reared; *Bos indicus* and *Bos taurus*. Now a day we found that some people reared crossbred cows which are used for milk and meat purposes. The 100% foreign breed animal cannot survive in our environment easily. The local breed can easily survive in our environment but production performances not as high as in foreign breed. So recent trend is to choose the crossbred cattle rearing. Sometimes it was reported that the cross breed, local breed and foreign breed are infertile due to defective breeding programmed, inadequate knowledge of rearing system and their ration formulation. Inadequate nutrition was the major cause of the ovarian atrophy and subsequent estrus (Kumi-Diaka, 1981) and some bacterial infection. Gynaeco-pathological disorder is most common which was characterized by the incidence of smooth ovaries among crossbred cows and appeared lower in local cows (Hussain *et al.*, 1987; Farooq *et al.*, 2000).

In Bangladesh expected number of cattle estimated by the Ministry of Fisheries and Livestock are 22.87 million (2006-2007), 22.90 million (2007-2008) and 22.97 million (2008-2009) respectively. Per head per day we require 120 gm meat but availability 21 gm per head per day. We require 250 ml per head per day but availability is 45 ml per head per day (BBS 2007-2008). The economic importance of cattle can not be over emphasized. In each country of the world, the cattle product and by-products utilized for the welfare of human being. Almost whole economy of Bangladesh is based on agriculture and hitherto the cattle population constitutes a major source of draft power. The present cattle populations are not fulfill the diet of majority people of Bangladesh is a well established fact (Talukder, 1982).

Infertility disorder in cows of Bangladesh is commonly seen because of poor nourishment and low quality of semen supply (Rahman *et al.*, 1993), carried out

a study on the incidence of reproductive disorders in 2280 cows and heifers in six AI pocket areas namely Hazirhat (Rangpur), Puthia (Rajshahi), Avoyagar (Jessore), Comilla, Manikganj and Moshurikhola (savar) during the period from July 1990 to June 1991 and some environmental causes.

Therefore improvement of cattle fertility is a prime target, increase cattle population can contribute considerably in solving the human health problems by providing increase animal protein. It appeared that low reproductive performance in cattle is one of the major problems for the enhancement of cattle production. In this country majority numbers of heifers and cows are sold for slaughter due to their reproductive failure or reduced production efficiency. Thus different reproductive disorders seriously tax the fertility and productive performance of the animal that result in significant economic losses. Reproductive pathology may be of hereditary (Farooq *et al.*, 2000) anatomical disorders of female genitalia (Rao *et al.*, 1993; Kubar, 2002; Patel, 2007; Srinivas –Manda *et al.*, 2007) and various diseases of the female genital tract (Anttilia and Roine, 1972; Berked Leschorn, 1984; Nanda *et al.*, 1989).

Some earlier reports were available on reproductive problems in cattle of Bangladesh (Alam and Rahman, 1979; Samad, 1986; Dewan and Rahman, 1987; Samsuddin *et al.*, 1989; Ahmed *et al.*, 1989; .Mollah *et al.*, 1989; Rahman, 1993) however majority of these works pointed out the incidence of reproductive disorders.

Gynaeco-pathological disorder in cattle caused by *Escherichia coli* (Frazie *et al.*, 2001; Twardon *et al.*, 2001; Kotowski, 2001; McDougall, 2005; Azawi, 2009) played important role of causing metritis, pyometra and other pathological disorder. *Salmonella spp* also causes in uterine infection and leads to abortion .pyometra and endometritis (Saroj *et al.*, 2008; Pullinger, 2010). *Salmonella spp* also identified in genital tract (Esaki *et al.*, 2004; Zhao *et al.*, 2007) and may lead to infertility.

The present study was therefore, designed in order to determine the disorder in fertility axis with the fulfillment of following objectives.

Objectives in view

- ↓ To study the gross pathological disorders in female reproductive system of cows and heifers from abattoirs.
- ↓ To study the histopathology of the ovaries and uterus of cows and heifers.



CHAPTER II
REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

Gynaecopathological disorder is a common problem of heifers and cows in Bangladesh. It causes infertility in heifers and cows. In this study, available and relevant literatures are reviewed with special emphasis on the gross and histopathological changes of collected ovary and uterus. A number of studies have been conducted on different ovarian and uterine diseases. The most common Gynaecopathological disorders are cystic ovary, hypoplasia of the ovary, hyperplasia of the ovary, ovaro-bursal adhesion, salpingitis, hydrosalpinx, endometritis, pyometra, mucometra, cervicitis and vaginitis and vulvitis. Varying degree of Gynaecopathological abnormalities of reproductive tract and ovaries has been highlighted in this chapter under the following subheadings.

2.1 Prevalence of the reproductive tract disorder

2.1.1. Congenital defects in the reproductive tract

Rao *et al.*, (1975) studied the pathology of repeat breeding in cows. Different pathological conditions were found in 44 repeat breeder cows. Such disorders included segmental aplasia of fallopian tube, infantile genitalia, kink cervix, hydrosalpinx, hydrometra, tuberculous endometritis, follicular cysts, bursal adhesions and cervicitis. The significant changes in the uterus were periglandular fibrosis, cystic dilation of glands, lymphoid aggregates in the endometrium alone in various combinations indicating a low grade infection. The most common condition was granular vulvo- vaginitis among repeat breeder cows.

Kadu *et al.*, (1976) conducted a study on reproductive disorders in 849 farm (435 Sahiwal cows and 414 buffaloes) and 1138 field animals (575 cattle and 563 buffaloes). The incidence of anatomical abnormalities was 25.98% in cattle and 24.22% in buffaloes in the field. The authors found fewer (29.8%) functional disorders in cows in the farm than in the field (71.3%) though the incidence among buffaloes was almost similar (67.46 and 68.75% respectively) in farm and field. Parturient disorders were 29 and 24.6% in farm cattle and buffaloes respectively against 0.59 and 2.34% in field animals.

Ahmed (1984) conducted an abattoir survey on 980 cows and heifers to investigate various pathological disorders of the reproductive system in Sweden. The pathological disorders recorded in this study included cystic ovary (20%), ovarian adhesion (4.2%), metritis (5%), salpingitis (2%), double cervix (0.3%), mummified fetus (0.1%), uterine aplasia (0.1%), freemartin (0.1%), testicular feminization (0.1%), ovarian hypoplasia (1.1%), twin fetus (0.2%) and uterus unicorns (0.1 %).

Hussain and Moniraju (1984) examined 889 cattle and 1155 buffaloes between January and June 1982 in Karnataka to determine the incidence of female reproductive disorders. The authors recorded anoestrus in 42% and various other reproductive disorders in 36% cases. Hypoplasia of the genital system was observed in 9.7% cows and 15.7% of buffaloes, ovarian cysts in 6.4% and 8.0% and pathological conditions (endometritis, pyometra and vaginitis) in 29 and 9% respectively.

2.1.2. Pathological disorder in the reproductive tract

Afanasievs (1971) conducted an experiment on endometrial biopsy and pathological changes in the endometrium in infertile cows. The author examined endometrial biopsy specimens from 427 cows; the examined 56% cows had cystic hyperplastic endometritis, noncystic endometrial, hyperplasia, endometritis or diffuse inflammatory cells with desquamation of the endometrial epithelium and vascular changes. He found 73% of cows with various forms of endometritis due to nonspecific infection.

Seitarisis and Metaxopoulos (1971) performed a study on the affections of oviduct and ovaries in cows slaughtered in Athens slaughter house. They examined a total of 1097 cows among which 226 were found to be pregnant. They recorded certain reproductive disorders among the remaining 371 no pregnant cows. Such reproductive disorders included tuberculous salpingitis (34), hydrosalpinx (8), adhesion or the ovarian bursa (9), atrophied ovaries (91), ovarian cysts (24) and cysts of the corpus luteum (91).

Onet (1972) examined microscopically and histologically the uterovaginal tract of 665 non pregnant cows after slaughter. He found pathological lesion in 96 (14.4%) animals. Ten cows (1.5%) showed anomalies such as genesis of one of

the uterine horns or persistent hymen. In 54 cows (8%) there was a (4.5%) showed various inflammatory processes affecting the uterus, vagina and vestibule. Two cows had malignant neoplasia in the uterine wall.

Aranjo *et al.*, (1973) examined a total of 25000 cows in 20 herds to determine the causes of postpartum anoestrus. The authors found 1065 cows did not exhibit the signs of estrus for more than five months after calving in which 70 had smooth inactive ovaries and 3.3% had uterine infection persistent corpus luteum.

Vogler (1973) examined 1086 cattle and observed various disorders in these cattle such as ovarian cysts (89%), infertile heifers (13%) endometritis associated with ovarian disease (8%) and persistent corpus luteum (6%).

Francos (1974) examined 4811 Friesian cows and observed endometritis (11%) and ovarian cysts (2%).

Rao *et al.*, (1975) studied the pathology of repeat breeding in cows. Different pathological conditions were found in 44 repeat breeder cows. Such disorders included segmental aplasia of fallopian tube, infantile genitalia, kink cervix, hydrosalpinx, hydrometra, tuberculous endometritis, follicular cysts, bursal adhesions and cervicitis. The significant changes in the uterus were periglandular fibrosis, cystic dilation of glands, lymphoid aggregates in the endometrium alone in various combinations indicating a low grade infection. The most common condition was granular vulvo- vaginitis among repeat breeder cows.

Selunskaya (1975) culled 120 cows during his eight years study of 1100 Simmental and Black pied cows. He examined the cows after slaughter and found the following abnormalities: persistent corpus luteum (44), atrophied ovaries (42), ovarian cysts or degeneration (19), mucopurulent endometritis (13) and oviduct lesions (4).

Kadu *et al.*, (1976) conducted a study on reproductive disorders in 849 farm (435 sahiwal cows and 414 buffaloes) and 1138 field animals (575 cattle and 563 buffaloes). The incidence of anatomical abnormalities was 25.98% in cattle and 24.22% in buffaloes in the field. The authors found fewer (29.8%) functional disorders in cows in the farm than in the field (71.3%) though the incidence among buffaloes was almost similar (67.46 and 68.75% respectively) in farm and

field. Parturient disorders were 29 and 24.6% in farm cattle and buffaloes respectively against 0.59 and 2.34% in field animals.

Coster (1977) examined histologically of 36 bovine uteruses having non specific infectious endometritis. The most common lesions were cellular infiltration with only little degenerative changes of the luminal epithelia. Severe endometritis resulted in epithelial necrosis and stromal fibrosis.

Kruif (1977) examined 2720 cows in different herds and 20 farms which had recently calved. Of which 438 (16%) failed to reach estrus within 50-60 days after parturition. The failure was attributed to the following causes: ovary not contained within the uterus (sub estrus) 76%, ovary small and herd (genuine anestrus) 9%, pyometra 6%, ovarian cysts 7%, and gestation 1%, ovarian cysts and pyometra were diagnosed mostly in older cows.

Roine (1977) examined genitalia of 2010 Finish cows collected from abattoir quarterly over three years period for reproductive abnormalities. The abnormalities diagnosed were ovarian cysts (8.6%), bursal adhesions (2.7%), hydrosalpinx (0.40%), par ovarian cysts (2.3%), uterus unicornis (0.2%), uterus didelphys (0.1%), complete double cervix (0.10%) incomplete double cervix (1.6%), pyometra and endometritis (1.2%), vaginal cysts (1.0%). Of all the organs examined 18.2% showed these abnormalities. The location of the 172 ovarian cysts was as follows: left (27.9%) right (50%) and in both ovaries (22.7%). The location of 1039 corpora lutea was in left (42.8%), right (56.8%) and in both ovaries (0.4%).

Roine and Saloniemi (1978) studied the infertility problem including anoestrus, sub estrus, delayed ovulation, cystic ovaries, repeat breeder cows and endometritis accounted for 20% of all the diseases encountered in 283 herds. Most cases of infertility occurred between December and April but did not correspond with seasonal variation in calving.

Alam and Rahman (1979) examined genital system of indigenous cows in Dhaka slaughter house of Bangladesh. They recorded one more abnormalities in the genital system of 276 (92%) animals. The commonest abnormalities recorded by the authors were ovarian cysts (129 cows). Other common conditions were granular vulvo vaginitis, small contracted cervix, pyometra,

cystic corpus luteum and ovarian hypoplasia.

Theus *et al.*, (1979) studied the clinical, pathological and histological aspects of endometritis in cattle. They examined the endometrium of 30 cows of which some animals showed endometritis, some showed asymptomatic infertility and some normal. The gross pathological changes included marked endometrial hyperplasia which was not always consistent with the clinical findings. Ultra structurally, granulosa-cell tumor cells of folliculoid type contained well developed rough-surfaced endoplasmic reticulum's and Golgi- complex remarkably. Concentric lamellar bodies, fat droplets and fine filaments were also noticeable.

Chatterjee *et al.*, (1982) examined 194 cows in 13 organized dairy herds and 795 cows in individual holding in west Bengal. The recorded abnormalities were abnormal termination of pregnancy, cervicitis, endometritis, repeat breeding or anoestrus for brucellosis, camphylobacteriosis, leptospirosis and trichomoniasis.

Kaikini *et al.*, (1983) investigated reproductive disorders in Holstein Frisian X Gir F1 crossbred cows. The overall incidence of reproductive disorders was 36.50%. Such disorders were lowest during 3rd lactations (29.17%) and highest during 5th lactations (60.53%). The most frequent disorder was metritis 8.76%) followed by placental retention (7.06%), cystic ovaries (6.81%) and dystocia (5.35%).

Sinha *et al.*, (1983) performed histological studies of endometrial glands and revealed marked differences between fertile and repeat breeder cows and buffaloes. Fertile animal both species exhibited smaller glands and shorter epithelium than those of repeat breeders. In addition, the fertile cows had 76 % glands surrounded by less than two layers of fibroblast, whereas the repeat breeder cows had fewer such glands and higher percentage of their glands was surrounded by more than two layers of fibroblast. In repeat breeder cows more of the glands contained inspissated mass of secretion without cells in the lumen. In buffaloes there was no specific correlation of fertility with either the number of layers of fibroblast around the glands or the contents of the glandular lumen.

Berlel and Leschhorn (1984) studied the prevalence of genital diseases in cows and heifers. The authors collected records by health service for cattle for 8059 inseminations carried out during 1981 in 453 herds. They recorded vaginitis

and/or endometritis in 248 cows being mild in 59% of cases. Ovarian cysts were found in 172 cows occurring in the left ovary in 27%, right ovary in 36% and both ovaries in 17% cases.

Ahmed (1984) conducted an abattoir survey on 980 cows and heifers to investigate various pathological disorders of the reproductive system in Sweden. The pathological disorders recorded in this study included cystic ovary (20%), ovarian adhesion (4.2%), metritis (5%), salpingitis (2%), double cervix (0.3%), mummified fetus (0.1%), uterine aplasia (0.1%), freemartin (0.1%), testicular feminization (0.1%), ovarian hypoplasia (1.1%), twin fetus (0.2%) and uterus unicorns (0.1 %).

Frie *et al.*, (1984) investigated the seasonal distribution of ovarian cysts in German Red pied cattle during the period of January to December 1984. They diagnosed 684 (1.86%) ovarian cysts in 36707 cases of first insemination in 377 farms. The prevalence of ovarian cysts varied months to months, being significantly higher than average in April and May and significantly lower average in the month of February. Occurrence of ovarian cysts was associated with nymphomania in 69 of cases, relaxed pelvic ligaments in 60% and anoestrus and endometritis in 18% and 7% respectively.

Hussain and Moniraju (1984) examined 889 cattle and 1155 buffaloes between January and June 1982 in Karnataka to determine the incidence of female reproductive disorders. The authors recorded anoestrus in 42% and various other reproductive disorders in 36% cases. Hypoplasia of the genital system was observed in 9.7% cows and 15.7% of buffaloes, ovarian cysts in 6.4% and 8.0% and pathological conditions (endometritis, pyometra and vaginitis) in 29 and 9% respectively.

Izquierdo and Angelow (1984) examined 118 oviducts from 59 infertile Cuban zebu cows. This study revealed acute salpingitis (6), sub-acute salpingitis (15) and chronic salpingitis (61). The disorders were unilateral in 29 and collateral in 24 animals.

Kucharski and Zduncayk (1984) analyzed the records that kept for 996 calving of cows which showed that the placenta was retained in 52% of calving and it occurred more than once in 34 of the cows. Other disorders were retarded

uterine involution (26%), endometritis (41%), ovarian cysts (11%) and ovarian dysfunctions (11%). These disorders occurred more often in spring and summer than in autumn and winter calving.

Kumar *et al.*, (1986) performed a survey on reproductive disorders in none descript cattle. In this survey of 810 indigenous cattle 52% were normal and 48% had reproductive disorders. Anoestrus was found in 19%, ovarian hypoplasia in 1.7%, atrophy/hypoplasia of uterus in 7% underdeveloped/ infantile genitalia 9.5%, cervicitis in 5% and endometritis in 1.2% of the cases. The frequency of various other disorders was each less than 1%.

Rahmathulla *et al.*, (1986) examined 331 cows and 181 female buffaloes to determine the main causes of infertility. The recorded causes were failures to conceive (74.7% of cows and 56% of buffaloes), anoestrus (5.4% of cows and 29.3% of buffaloes), and endometritis (8.5% of cows and 8.8% of buffaloes). Minor cases of infertility were found to be associated with ovarian cysts, cervicitis, vaginitis and persistent corpus luteum.

Chaffux *et al.*, (1986) examined endometrial biopsy of cows with puerperal disorders. About 25-30% of the examined cows developed endometritis. The study revealed the occurrence of dilated or cystic glands, periglandular fibrosis, infiltration of mononuclear or polynuclear cells and lymphoid nodules in biopsied materials.

Rose (1987) investigated cases of endometritis occurred on 65 farms in Brittany between October 1985 and April 1986 by testing blood samples and vaginal swabs.

Shamsuddin *et al.*, (1988) examined crossbred cows to detect various reproductive disorders. The study was undertaken to find out the relative incidence of reproductive disorders after birth in cows of savar dairy farm. The relative percentage of retained placenta, metritis, pyometra, endometritis, cervicitis, persistent corpora lutea, cystic ovaries and non functional ovaries were 42.26%, 10.38%, 8.15%, 27.39%, 1.52%, 1.17%, 3.13% and 5.98% respectively. They concluded that the persistent corpora lutea and cystic were in right ovaries, whereas higher number of non functional ovaries were found in both the ovaries.

Ahmed *et al.*, (1989) performed a study on the incidence of surgical and

reproductive disorders in cattle of Bangladesh. The investigation was conducted at size different places viz. Bangladesh Agricultural University Hospital, Central Veterinary Hospital (Dhaka), Jamalpur Veterinary Hospital, Rajshahi Veterinary Hospital, Khulna Veterinary Hospital and Jess ore Veterinary Hospital. The authors recorded 12.60% overall incidence of affections of the uro-genital system which included rupture of the urinary bladder due to calculi, phimosis, paraphimosis, posthitis, vaginitis, prolapse of uterus and vagina and dystocia.

Dtsch. Tierarztl. Wochenschr (1991) collected genital organs, ureter, urinary bladder, and blood from a 12 year old watusi cow which never exhibited estrous behavior. Post-mortem findings and hormone assays, however, indicated the incidence of recent estrous cycles. The animal showed a chronic pyometritis, retained fetal membranes or fetal residues, an infected mucometra with cystic glandular hyperplasia, and a leiomyoma. Tubular genitalia, ureter, and urinary bladder exhibited sub-acute inflammation.

Rahman *et al.*, (1993) carried out a study on the incidence of reproductive disorders in 2280 cows and heifers in six AI pocket areas namely Hazirhat (Rangpur), Puthia (Rajshahi), Avoy Nagar (Jessore), Comilla Manikganj and Moshurikhola (savar) during the period from July 1990 to June 1991. The reproductive problems recorded were anestrus (29.69%), metritis (5.66%), pyometra (6.80%), cervicitis (1.58%), uterine prolapse (1.6%), abortion (4.87%), dystocia (1.6%), vaginitis (2.01%), cystic ovaries (2.45%) and developmental anomalies (1.18%).

Rao *et al.*, (1993) made a comparative study on the incidence of reproductive disorders among 1860 crossbred Hersy and Holstein cows and heifers that were classified as half bred, three quarter bred or higher (seven- eight). The overall incidence of anatomical functional and infectious (non specific) from of infertility were 3.0, 56.4 and 40.6 respectively. The highest incidence of specific conditions was for cystic ovaries 49.7% and endometritis 32.8%.

Chawdhury (2000) studied to assess the reproductive status, pregnancy wastage and incidence of gross genital abnormalities in cows slaughtered at Maiduguri abattoir, 7375 female genitalia were examined over a period of 36 months from July 1997 to June 2000. A total of 55.49% organs were cyclic while

44.51% were non-cyclic. The cyclic organs included 12.64% at pro estrus, 12.0% at estrus, 13.03% at met estrus and 17.82% at dioestrus stage of the estrous cycle. Out of 3283 non-cyclic organs, 1676 were gravid from which 1676 fetuses were recovered. The fetal crown-rump (CR) lengths ranged from 6 to 85 cm with corresponding age range of 60 to 265 days. Juvenile organs with smooth ovaries were 3.78%. The gross abnormalities of the genitalia recorded included cystic ovaries (3.35%), ovaro-bursal adhesion (2.9%), ovarian hypoplasia (2.2%) and endometrocervicitis (1.7%). Oviduct occlusion accounted for 0.75%, hydrosalpinx 0.54%, pyometra 0.48%, par ovarian cyst 0.26%, hypo plastic uterus 0.24% and uterine cyst 0.08% cases.

Fathalla (2000) conducted a survey in Northern Jordan to determine the incidence of gross reproductive tract abnormalities in cattle. A total of 200 specimens of bovine reproductive tracts were collected from cows slaughtered at a local abattoir in Irbid, Jordan between 1993 -1994. The results of the investigation showed that a large number of slaughtered cows (n=27; 13.5%) were pregnant. A total of 27 (13.5%) specimens had lesions. The predominant lesion of the ovaries was ovarian inactivity (21 cases; 10.5%), ovaro-bursal adhesions (16 cases; 8%) and cysts (14 cases; 7%). Other, interesting rare pathological lesions of the ovaries were bilateral ovarian haematoma and tuberculosis. Twenty specimens (10%) had uterine lesions, the most common of which were infections, presenting as metritis and pyometra. Seven specimens (3.5%) had oviduct lesions, which included hydrosalpinx, pyosalpinx and haemosalpinx.

Farooq (2000) recorded 3760 crossbred cows at various locations in Northwest Frontier Province (NWFP), Pakistan, revealed 379 (10.08%) cases of reproductive abnormalities. Cervicitis had the highest incidence at 45.12%, followed by abnormalities of uterus (38.26%), vagina (10.29%) and ovary (6.33%). The frequencies of endometritis and vaginitis were 28.69 and 4.76%, respectively. Ovarian cysts were found in 6.33% of the cases. The incidence of pyometra, vaginal tumors, pyometritis and metritis were 6.53, 1.83 5.56 and 1.58%, respectively. Genetic group, season and locality had significant effect ($P<0.01$) on incidence of various reproductive abnormalities. Cows possessing 75% Holstein Friesian (HF) inheritance were the most susceptible to

reproductive disorders. Summer was the peak (35.88%) season and spring the rough (15.57%) season of incidence. The highest incidence of reproductive disorders was found in Peshawar (34.31%), followed by cows in Bannu (26.13%), Mardan (13.18%), Risalpur (8.97%), Nowshera (6.58%), Kohat (6.33%) and Dera Ismail Khan (4.23%). It was concluded that reproductive disorders were more prevalent under stressful environment, within or around thickly populated areas, during hot summer months and among crossbred.

Nakao.Toshihiko (2000) examined the endometritis of cattle has been considered the main cause of non-conception from old days, many parts of it are still uncertain at present, and accurate and practical diagnosis has not been established. This paper summarizes the normal uterus recovering process in postpartum, and describes the cause and classification of endometritis which expresses disease symptom by a decrease in defense mechanism against bacteria of uterus for some causes. It shows the main symptom of metritis and endometritis, and explains the features and diagnostic method of puerperal metritis, postpartum endometritis, and chronic endometritis. It also introduces therapy carried out for each of these inflammations more at present, as well as new therapy that will be possible to practically use in the future. Since the disease state of inflammation of uterus is different by the time of postpartum, it is important to carry out appropriate diagnoses in response to each disease state and give rational treatment.

Kotowski (2001) determined the health condition of mammary glands and reproductive organs of cows selected for slaughter. The studies were carried out in Poland in 1999 on 84 black and white cows 3 to 16. It was found that most of the cows subjected to slaughter (31 %) were in the 6-8 age bracket and it was at this age that most of the inactive udder quarters were noticed. Mammary gland irritation was diagnosed in 41 cows, i.e. 48.80%. In the post-slaughter examination fetuses in the uterus were discovered in 6 cows (7.16%) whereas various pathological changes in the reproductive organs were recorded in 49 cows, i.e. 58.34%. The pathological changes more often affected the uterus (59.18%) than the ovaries (40.82%). The bacteriological examination of uterine swabs revealed the presence of potentially pathogenic bacterial flora in all cases. The predominant microorganisms were of the following types: *E. coli*

33.33%, *Staphylococcus epidermidis* 12.5%, *Pseudomonas aeruginosa* 12.5%, and *Enterococcus sp.* 20.83%. Practical conclusions include: advisable physical check-up of cows prior to slaughter and that chronic illness of the reproductive organs most often affects cows at their peak of performance.

Parmigiani (2001) examined 8900 dairy cows in 3 large areas of Milan, Cremona and Brescia Italy. The incidence of genital tract diseases at the post-partum period in the last 5 years was approximately 35% with follicular cysts representing about 30% of all cases. The culling rate due to reproductive disorders was 4%. It is suggested that close cooperation between farmers and veterinarians is fundamental for improving productive performance of animals and economic results.

Khurshid Shah (2002) observed that hydrometra or mucometra develops in untreated cases of cystic ovarian degeneration (Kaikini 1992). Hydrometric containing gallons of fluid associated with retained corpus luteum was reported in goats, sows and cows Roberts and Fox, (1968), Bearden and Fuquay, (1980), Robert, (1984). Kubar (2002) the reproductive organs of 20 Estonian Holstein Breed (EHF) cows and 3 heifers, culled because of infertility, were studied by palpation per rectum and ultrasonography. In addition, pathoanatomical and histopathological studies were carried out after slaughter. The histopathological study revealed that small cysts less than 2.5 cm in diameter, often (12 animals) existed in culled cows. These cysts were frequently accompanied by changes in secondary and Graafian follicles, rete ovaries, ovarian stroma, and the endometrium. Three cows had follicular cysts in the ovaries, which were 25-35 mm in diameter. Two cows revealed luteal cysts in the ovaries and one of them had vaginal prolapse. Four animals (one heifer and three cows) manifested tumors or tumor-like malformations: ovarian endosalpingiosis, germ and stromal cell tumor, oviductal myolipoma, and haemangiosarcoma in the uterine blood vessels. One heifer had been culled because of 2 abscesses in the -vaginal wall close to the cervix and another had chronic endometritis. The research findings indicated that the most common cause of infertility in the culled cows was cystic degeneration in ovaries (85%), accompanied by pathological changes elsewhere in the reproductive organs.

Rahman (2002) explore the characteristic tissue changes in the endometrium resulting from different levels of clinical endometritis, samples (n=75) of endometrial biopsy were collected from randomly selected cows (n=174) of the Savar Dairy Farm given scores both for physiological and clinical evidence of pathological genital discharges. Based on histopathological evaluation different changes in the endometritis were rated (Biopsy rating) and their frequency and strength of association were measured relative to genital discharge scores (GDS). Cows with physiological genital discharge (GDS-1) did not show any pathological changes (BR 1) in the endometrium. A characteristic change in the endometrium (BR 2) with variable degrees of infiltration of neutrophils, eosinophils (30 PMN) and mononuclear cells (20) including plasma cells and macrophages on hpf (high power field) around uterine glands, with occasional interstitial accumulation of lymphocytic follicles were observed in cows with cloudy to mucopurulent genital discharge (GDS-2). While peri glandular fibrosis or encapsulation, subsequent glandular degeneration and cystic dilatation of the lumen, ≥ 20 PMN and ≥ 40 mononuclear cells including epithelioid and plasma cell (BR-3) appeared on endometrial sections from cows with purulent genital discharge (GDS-3). The strength of association between genital discharge score and biopsy rating was regarded as "Good" according to Kappa Test ($K=0.616$). The results suggest that histopathological evaluation of uterine biopsies could be used as an important supportive diagnostic tool for categorizing different levels of endometritis in cows with clinical evidence of pathological genital discharge.

Kubar (2003) determined the pathological changes in the reproductive organs of cows and heifers culled from high-production herds because of infertility. 39 cows and 4 heifers culled because of infertility. After slaughter, the female reproductive organs were studied patho-anatomically. The organ samples were taken and placed in the Rossman fixator. Moreover, a sample from a uterine horn was taken in order to study the uterine secretion microbiologically. After fixing the material, paraffin slides were prepared and stained by the Periodic Acid-Shiff method (PAS). The histopathological study enabled to divide the cows into two groups. One cow and three heifers represented sporadic cases. Infertile cows, which revealed concurrent changes both in the uterus and the ovaries, formed the largest group comprising of 29 animals. The uterus often revealed

changes in the blood vessels of the endometrium and uterine glands. Chronic endometritis was uncommon. The latter was caused by microbes only in two cows. The same animals revealed some changes, mostly cysts, in the ovaries as well. Two cows of this group had tumors. One had vascular malformations of uterine blood vessels, and the other had an adenoma of the oviduct. The second group was comprised of 10 cows which revealed pathological changes only in the ovaries. Nine out of ten animals had ovarian cysts. Most ovarian cysts were follicular cysts, and only one-third of the animals also had luteal cysts or cysts that revealed at the same time signs of follicular and luteal cysts. Three cows and one heifer had tumors. The latter included the ovarian sex cord tumor, Leydig cell hyperplasia, endovascular angioendothelioma of the ovarian blood vessels, and granulosa cell tumor. In two animals, infertility was caused by vaginal pathology. One cow had vaginal prolapse, and one heifer had vaginal abscesses. Changes in both oviducts had caused infertility in one heifer. To the naked eye, these changes were typical of a papilloma, but the histological study indicated that it was a myolipoma. In one heifer, infertility was caused by pathology (chronic endometritis).

Asseyl (2004) examined the reproductive organs from mature Small East African Zebu (SEAZ) heifers and cows slaughtered at the Morogoro abattoir were collected twice a month and evaluated over a period of 12 months. Out of the 402 animals from which reproductive organs were taken, 54% were pregnant, 24% were actively cycling and 22% were non-cycling. Various gross abnormalities were observed in the reproductive organs of about 16% of the cattle, and the major reproductive abnormality in both total and the noncycling animals was various degrees of fibrous adhesion between the ovary and infundibulum and mesosalpinx. It is concluded that, contrary to common belief, a majority of the female SEAZ cattle that are slaughtered are fertile. Tumors of this group are subdivided into four categories according to their main morphological features: papillary adenoma, papillary adenocarcinoma, cyst adenoma and cystadenocarcinoma. Cyst adenomas, which appear to arise from the epoophoron and/or rete ovarii, are comparatively rare in domestic animals. This article discusses the occurrence, pathology, histopathology and diagnosis of serous papillary cyst adenoma in the ovary of a cow from Turkey

Abaltil (2006) studied the type and prevalence of abnormalities occurring in the female reproductive tracts of 201 Zebu cattle of Fogera type (161 cows and 40 heifers) slaughtered at Bahir-Dar town, north-west Ethiopia. Out of the 201 female genital tracts collected and examined, abnormalities were recorded in 74 (36.8%). The most common abnormalities encountered were ovaro-bursal adhesion (5.5%), endometritis (3.9%) and cystic ovaries (3.5%). Other abnormalities recorded were ovarian hypoplasia, vaginitis, cervicitis, tortuous cervical canal, mucometra, vaginal cyst, par ovarian cyst, hypo plastic cervical rings,

cervical cyst, freemartins, closed external cervical os, uterine and oviducts adhesion, cystic uterine tube, remnant of retained fetal membrane and cyst in the uterine wall. The prevalence of the abnormalities was significantly ($p < 0.05$) higher in parous than in nulliparous cows. Moreover, evidence of ovarian cyclicity was found in 51.6% and 30% of non-pregnant parous and nulliparous cows examined, respectively.

Ali *et al.*, (2006) collected the reproductive tracts of 110 non descriptive cows from Faisalabad abattoir, were studied for biometrical values and pathological changes during disease condition. The average length of right ovary was 2.40 ± 0.06 cm and that of left ovary was 2.31 ± 0.05 cm. The average width of right ovary was 1.15 ± 0.02 cm and that of left ovary 1.14 ± 0.03 cm. The average thickness of right ovary was 1.61 ± 0.04 cm and that of left ovary was 1.52 ± 0.03 cm. The average weight of right and left ovaries was 4.29 ± 0.29 and 3.97 ± 0.24 g, respectively. The average size of right and left horns was 0.69 ± 0.59 and 19.76 ± 0.58 cm, respectively. The average length of circumference and cervical rings were 6.0 ± 0.22 , 8.40 ± 0.21 and 4.62 ± 0.09 cm, The incidence of pathological conditions observed were ovaro-bursal adhesions, cysts ovary, cystic corpus luteum, par ovarian cysts, teratomas, pyometra, metritis, mummified fetus, mucometra, cervicitis, fibrosity of cervix, tortuosity of cervix and double cervices. No abnormalities of oviducts were found.

Moreira (2006) presented the data reported in the occurrence of adenomyosis in slaughtered cows from the North region of Rio de Janeiro State, Brazil. 27 samples of uterus from zebu cows were collected and individually recorded in the Section of Morphology and Pathological Anatomy/Isa/ccta/uenf. The samples

were submitted to histochemical technique and staining with haematoxylin and eosin and Van-Gieson. A score was idealized for adenomyotic lesions. Of the 27 samples, 18 (66.67%) presented adenomyosis and 9 (33.33%) were negative. 10 (55.56%) presented discreet superficial adenomyosis. 2 (11.12%) deep discreet, 1 (5.56%) of the type superficially moderated, 3 (16.67%) deep moderate and finally 2 (11.12%) of the type deep accentuated. The lack of each acceptable description of this dystrophica in other females of domestic animals does not mean a negligence, but a misinter preparation of the lesion of this low commercial value viscera. Besides, the lesion is not demonstrated in endometrial biopsies and associated to processes of clinical significance, as such endometrial cystic hyperplasia; polycystic ovaries, tumor of granular cells, etc. It is important the registration of this pathology, and appropriate study in this species.

Osawa (2006) studied the clinical and pathological abnormalities of the reproductive tract and observations were made on a case of pyometra accompanied by a large encapsulated abscess in the perimetrium in a three years old primiparous Holstein cow (body weight 549kg). With no signs of estrus since calving (on August 19, 2003), rectal palpation was conducted in September 2004, and an indurated softball-sized mass was detected on the left uterine horn. A conspicuous bulge was seen at the lower left of the abdomen when the cow was examined on February 28, 2005, and rectal palpation showed that the uterus had swollen further. Blood biochemistry and bacterial tests and ultrasonography showed a poor prognosis because of the pyometra with chronic inflammation. Autopsy performed the following day, revealed purulent inflammation of the endometrium in addition to a giant (100x 70 x 70cm) encapsulated abscess in the perimetrium and a severely trophied rumen. The encapsulated abscess contained a large amount of creamy to muddy pus and blood clots. Both ovaries had no functional or regressing corpus luteum, and had become atrophied. This was considered to be a case where an abscess that developed in the perimetrium became large, in the process of which causing atrophy of the ovaries and anoestrus, and this encapsulated abscess, which eventually grew to a size that occupied most of the abdominal cavity caused systemic symptoms such as total anorexia.

Patel (2007) studied a total of 4188 animals among them 2570 buffaloes and 1618 cows, the reproductive disorders were categorized as anatomical, functional pathological origin. The anatomical abnormalities observed in buffaloes and cattle were infantile genitalia (9.38 and 5.99%), kinked cervix (0.59 and 3.39%) and uterine adhesion (0.93 and 1.36%, respectively). The percentages of functional form of infertility were anoestrus (27.32 and 24.73%), sub-estrus (28.99 and 21.38%), cystic ovarian degeneration (1.48 and 6.62%) and repeat breeding (8.68 and 18.79%, respectively). The pathological causes included salpingitis (0.43 and 0.18%), endometritis (5.80 and 2.90%), pyometra (0.78 and 1.86%), metritis (10.38 and 8.90%) and mummification (0.11 and 0.12%) in buffaloes and cattle, respectively. Ovarian tumor was observed only in buffaloes (0.11%).

Manda-Srinivas (2007) studied the incidence of reproductive disorders in buffalo heifers and cows in Krishna and Guntur districts in Andhra Pradesh, India, was determined during January 2004 to November 2005, they examine 1118 (47.70%) composed of 560 breed able heifers and 558 lactating buffalo cows. The incidence of reproductive disorders was significantly different, with a higher incidence of anatomical (30.36%) and pathological (53.41%) causes in cattle and buffaloes, respectively, while functional causes (46.25%) were equally distributed between species. Endometritis and quiescent ovaries were the most prevalent conditions (63.77%).

Azawio (2009) studied the prevalence of oviduct abnormalities investigates bacteria accompanying hydrosalpinx, pyosalpinx and salpingitis. In addition, the study was designed to investigate the correlation between bacterial infection of the uterus and oviduct lesions in cow. Bacteriological examinations were performed on hydrosalpinx, pyosalpinx and salpingitis. Hydrosalpinx was found in 28 (6.9%) cases of which 20 (71.4%) were found unilaterally and 8 (28.6%) bilaterally. Pyosalpinx was recorded in 12 (2.9%). Three cases (0.7%) of oviducts filled with blood were recorded. Obstruction of oviducts was recorded in 5 (1.2%). Adhesions between mesosalpinx and perisalpingeal tissues were observed in 7 (1.7%) cases. One case of double oviduct was found in the left side of the tract examined. The most prevalent bacteria recovered from hydrosalpinx were *Corynebacterium hemolyticum* and *Actinomyces bovis*, 42.8%

and 28.6%, respectively. No correlation was noticed between bacteria isolated from the uterus and hydrosalpinx. The most prevalent bacteria recovered from pyosalpinx were *Escherichia coli*, *Archanobacterium pyogenes* and *Staphylococcus aureus*, 33.3%, 26.7% and 16.7%, respectively. Higher rates of leukocyte infiltration ($p < 0.01$) were observed in the uterine discharge and pyosalpinx than hydrosalpinx. In a conclusion, the current study disclosed that oviductal lesions seem to be an important problem in cows. In addition, there is no correlation between bacteria isolated from uterus and hydrosalpinx. There is a high correlation between bacteria isolated from uterus and pyosalpinx and salpingitis. The occurrence of pyosalpinx and salpingitis is mainly due to bacterial infection. Bacterial isolates from pyosalpinx and salpingitis might be related to ascending infection from the uterus.

2.2 Prevalence of the ovarian disorder

2.2.1. Congenital defects in the ovary

Gluhovachi *et al.*, (1972) performed a study on clinical, histological and cytogenetically aspects of congenital ovarian hyperplasia. They examined 650 Romanian Simmental cows. The incidence of congenital hyperplasia was found to be 4.8% and of the acquired from 11.2%. The clinical, histological, cytogenetic and genealogical differences between the two forms were investigated clinically, the heifer with congenital ovarian hyperplasia remained sexually undeveloped and in a complete anaphrodisia; cases with the unilateral condition, however developed estrus at irregular intervals and of varying intensity, though these two remained infertile. Nuclei with positive chromatin were found in 70-83% of all heifers with bilateral congenital ovarian hyperplasia.

Nair and Raja (1974) performed post mortem examination on 1250 female genitalia of cows and recorded various pathological disorders in ovaries or 82 genitalia. The conditions encountered were hypoplasia (0.08%), cystic Graafian follicles (1.44%), cystic corpus luteum (0.08%), inactive ovaries (2.24%) senile trophy (0.08%) and gibropapillary growth (0.08%).

Selunskaya (1975) culled 120 cows during his eight years study of 1100 Simmental and Black pied cows. He examined the cows after slaughter and found the following abnormalities: persistent corpus luteum (44) atrophied

ovaries (42), ovarian cysts or degeneration (19), mucopurulent endometritis (13) and oviduct lesions (4).

Kumi Diaka (1981) studied of 3000 cattle in different breeds and origin (*Bos indicus* and *Bos taurus*) in Northern Nigeria, an overall 22.7 percent incidence of anoestrus associated with organic genital abnormalities was observed. Of this 19.3 percent was due to ovarian atrophy. This was observed mostly during the pre-dry and dry seasons, periods of poor and inadequate feed. The average incidence of atrophic ovaries in the exotic breeds (*Bos taurus*) was 17.1 percent, while an incidence of 20.4 percent was observed in the indigenous (*Bos indicus*) cattle; there was no significant difference between the two groups. A relatively higher incidence of functional anoestrus (27.5 percent) which showed no seasonal pattern and no significant difference between the breeds was observed. Inadequate nutrition was the major cause of the ovarian atrophy and subsequent anoestrus. Other clinical genital abnormalities included hypo plastic ovaries (1.9 percent), follicular cysts (4.5 per cent), pyometra (4.5 percent) and freemartinism (0.3 percent).

Ahmed (1984) conducted an abattoir survey on 980 cows and heifers to investigate various pathological disorders of the reproductive system in Sweden. The pathological disorders recorded in this study included cystic ovary (20%), ovarian adhesion (4.2%), metritis (5%), salpingitis (2%), double cervix (0.3%), mummified fetus (0.1%), uterine aplasia (0.1%) freemartin (0.1%), testicular feminization (0.1%), ovarian hypoplasia (1.1%), twin fetus (0.2%) and uterus unicorns (0.1 %).

2.2.2. Pathological disorder in the ovary

Seitaris and Metaxopoulos (1971) performed a study on the affections of oviduct and ovaries in cows slaughtered in Athens slaughter house. They examined a total of 1097 cows among which 226 were found to be pregnant. They recorded certain reproductive disorders among the remaining 371 no pregnant cows. Such reproductive disorders included tuberculous salpingitis (34), hydrosalpinx (8), adhesion or the ovarian bursa (9), atrophied ovaries (91), ovarian cysts (24) and cysts of the corpus luteum (91).

Wettke and Jaham (1971) conducted a study on the incidence and treatment of sterility in herds (1019 cattle, 19-92 cows per herd). There were serious fertility problems on all farms; only 52% of the animals were pregnant after insemination (A.I. in 19 herds, civering with bulls in 15) and 49% showed a prolongation on the time between last parturition and conception to 5.6 months, compared with 2.8 months for 125 cows with undisturbed fertility. Uterine and ovarian disorders occurred in 50-60% of the cows after calving. Of 823 cows on 27 of the farms, 145 (17%) were slaughtered in 91 cases because of sterility; 96 animals showed the presence of cystic ovaries of which 43 conceived after treatment.

Antilia and Roine (1972) observation on cystic ovarian disease and its treatment in dairy cattle. Observations based on 605 cases of cystic ovaries in cattle diagnosed during 1968-71 in the practice of the ambulatory clinic. The cyst was located on the left ovary in 30%, on the right ovary in 45% and both ovaries in 22% of the cases.

Gluhovachi *et al.*, (1972) performed a study on clinical, histological and cytogenetically aspects of congenital ovarian hyperplasia. They examined 650 Romanian Simmental cows. The incidence of congenital hyperplasia was found to be 4.8% and of the acquired from 11.2%. The clinical, histological, cytogenetic and genealogical differences between the two forms were investigated clinically, the heifer with congenital ovarian hyperplasia remained sexually undeveloped and in a complete anaphrodisia; cases with the unilateral condition, however developed estrus at irregular intervals and of varying intensity, though these two remained infertile. Nuclei with positive chromatin were found in 70-83% of all heifers with bilateral congenital ovarian hyperplasia.

Romaniuk (1972) examined 1160 German Black pied cows recorded the incidence of ovarian diseases. During the period of observation he found cystic ovarian disease (COD) in 375 cows. The right ovary alone was affected in 53% of cases, the left in 37% and both ovaries in 10%.

Aranjo *et al.*, (1973) examined a total of 25000 cows in 20 herds to determine the causes of postpartum anoestrus. The authors found 1065 cows did not exhibit the signs of estrus for more than five months after calving in which 70 had smooth inactive ovaries and 3.3% had uterine infection persistent corpus luteum.

Vogler (1973) examined 1086 cattle and observed various disorders in these cattle such as ovarian cysts (89%), infertile heifers (13%) endometritis associated with ovarian disease (8%) and persistent corpus luteum (6%).

Franco (1974) examined 4811 Friesian cows and found endometritis (11%), ovarian cysts (2%).

Nair and Raja (1974) conducted post mortem examination on 1250 female genitalia of cows and recorded various pathological disorders in ovaries or 82 genitalia. The conditions encountered were hypoplasia (0.08%), cystic Graafian follicles (1.44%), cystic corpus luteum (0.08%), inactive ovaries (2.24%) senile trophy (0.08%) and gibropapillary growth (0.08%).

Whitmore *et al.*, (1974) examined 375 Holstein- Friesian cows and to detect the incidence of cystic ovaries. The authors found that the average incidence was 5, 16 and 16% for 1st, 2nd and 3rd calving intervals respectively. They concluded that the occurrence of cystic ovaries much did not differ between high (10%) and 19w (12%) milk production or between high (9%) and average (13 %) planes of nutrition.

Rao *et al.*, (1975) studied the pathology of repeat breeding in cows. Different pathological conditions were found in 44 repeat breeder cows. Such disorders included segmental aplasia of fallopian tube, infantile genitalia, kink cervix, hydrosalpinx, hydrometra, tuberculous endometritis, follicular cysts, bursal adhesions and cervicitis. The significant changes in the uterus were periglandular fibrosis, cystic dilation of glands, lymphoid aggregates in the endometrium alone in various combinations indicating a low grade infection. The most common condition was granular vulvo- vaginitis among repeat breeder cows.

Selunskaya (1975) culled 120 cows during his eight years study of 1100 Simmental and Black pied cows. He examined the cows after slaughter and found the following abnormalities: persistent corpus luteum (44) atrophied ovaries (42), ovarian cysts or degeneration (19), mucopurulent endometritis (13) and oviduct lesions (4).

Al-Dahash and David (1977) studied bovine genital abnormalities by an abattoir survey. The most commonly encountered abnormality was cystic ovary 307

(3.8%) genitalia exhibited this condition.

Kruif (1977) examined 2720 cows in different herds and 20 farms which had recently calved. Of which 438 (16%) failed to reach estrus within 50-60 days after parturition. The failure was attributed to the following causes: ovary not contained within the uterus (sub estrus) 76%, ovary small and herd (genuine anestrus) 9%, pyometra 6%, ovarian cysts 7%, and gestation 1%, ovarian cysts and pyometra were diagnosed mostly in older cows.

Roine (1977) examined genitalia of 2010 Finish cows collected from abattoir quarterly over three years period for reproductive abnormalities. The abnormalities diagnosed were ovarian cysts (8.6%), bursal adhesions(2.7%),hydrosalpinx (0.40%), par ovarian cysts (2.3%), uterus unicorns(0.2%), uterus didelphys (0.1%), complete double cervix (0.10%) incomplete double cervix (1.6%), pyometra and endometritis (1.2%), vaginal cysts (1.0%). Of all the organs examined 18.2% showed these abnormalities. The location of the 172 ovarian cysts was as follows: left (27.9%) right (50%) and in both ovaries (22.7%).The location of 1039 corpora lutea was in left (42.8%), right (56.8%) and in both ovaries (0.4%).

Roine and Salonieme (1978) studied the infertility problem including anoestrus, sub estrus, delayed ovulation, cystic ovaries, repeat breeder cows and endometritis accounted for 20% of all the diseases encountered in 283 herds. Most cases of infertility occurred between December and April but did not correspond with seasonal variation in calving.

Alam and Rahman (1979) examined genital system of indigenous cows in Dhaka slaughter house of Bangladesh. They recorded one more abnormalities in the genital system of 276 (92%) animals. The commonest abnormalities recorded by the authors were ovarian cysts (129 cows). Other common conditions were granular vulvo vaginitis, small contracted cervix, pyometra, cystic corpus luteum and ovarian hypoplasia.

Bostedt *et al.*, (1979) performed a study on the occurrence of cystic ovaries in cows. No seasonal incidence of ovarian cysts was detected. During regular health examination diagnosis of ovarian cysts was made within 6 weeks of calving in 21.2% of cows between 7 and 12 weeks in 28% and after that time in

the remainder. Nymphomania occurred in 12.5% of cows and the incidence increasing with time after parturition. Cysts of 2 cm or more in diameter usually occurred singly while multiple cysts were seldom found.

Inubuchi (1978) examined Granulosa-cell tumors of 4 cases and theca cells tumor of one case were pathologically investigated. Two cases of Granulosa-cell tumor represented folliculoid type, forming folliculoid resembled to follicles of an ovary. On the other hand; parenchymatous type of two cases was composed of the cells with atypical characters, and revealed no obvious folliculoid structures. One case of them represented metastatic lesions in many organs. Theca-cell tumor was composed of atypical cells showing various cellular arrangements. Metastatic lesions were also noted ultra structurally, granulosa-cell tumor cells of folliculoid type contained well developed rough-surfaced endoplasmic reticulum's and Golgi- complex remarkably. Concentric lamellar bodies, fat droplets and fine filaments were also noticeable.

Kumi- Diaka (1981) studied of 3000 cattle in different breeds and origin (*Bos indicus* and *Bos Taurus*) in Northern Nigeria, an overall 22.7 percent incidence of anoestrus associated with organic genital abnormalities was observed. Of this 19.3 percent was due to ovarian atrophy. This was observed mostly during the pre-dry and dry seasons, periods of poor and inadequate feed. The average incidence of atrophic ovaries in the exotic breeds (*Bos taurus*) was 17.1 percent, while an incidence of 20.4 percent was observed in the indigenous (*Bos indicus*) cattle; there was no significant difference between the two groups. A relatively higher incidence of functional anoestrus (27.5 percent) which showed no seasonal pattern and no significant difference between the breeds was observed. Inadequate nutrition was the major cause of the ovarian atrophy and subsequent anoestrus. Other clinical genital abnormalities included hypo plastic ovaries (1.9 percent), follicular cysts (4.5 per cent), pyometra (4.5 percent) and freemartinism (0.3 percent).

Bargai (1982) diagnosed 185 cases of cystic ovaries in a large dairy herd during the year of 1971-1981. The manual incidence of cystic ovary in cows varied from 1.5% to 11.6% which appeared at all ages but 70% of cases observed in cows less than 6 years old.

Binemo-Madi and Mposhy (1982) performed postmortem examination of the complete genital tract from 700 cows aged 3-6 years culled from two ranches revealed pathologic lesions in 55.14%. The high rates of adhesions in ovaries and oviducts were attributed to rectal palpation by unskilled attendants and of bacterial infections in uterus, vagina and vestibule to lack of care of calving animals.

Kirk *et al.*, (1982) carried out a study on bovine cystic ovarian disease (COD). Cystic ovarian disease (COD) was investigated in closed 300 cows dairy herd using dairy herd improvement association and individual health records for a 7 years period (1974-1980). There were 2112 calving by 649 cows during the period and ovarian cysts were detected in 130 cows.

Bostedt and Himstedt (1983) examined 30 cows aged 2-12 years at three days interval for two months following abortion due to various infectious and non-infectious causes at 2-8 months of pregnancy. Irregular ovarian activity due to persistent corpus luteum, follicular atresia and ovarian cysts was observed in 80% of cow's up to 69 days of such abortion.

Kaikini *et al.*, (1983) investigated reproductive disorders in Holstein Frisian X Gir F1 crossbred cows. The overall incidence of reproductive disorders was 36.50%. Such disorders were lowest during 3rd lactations (29.17%) and highest during 5th lactations (60.53%). The most frequent disorder was metritis (8.76%) followed by placental retention (7.06%), cystic ovaries (6.81%) and dystocia (5.35%).

Berlel and Leschhorn (1984) studied the prevalence of genital diseases in cows and heifers. The authors collected records by health service for cattle for 8059 inseminations carried out during 1981 in 453 herds. They recorded vaginitis and/or endometritis in 248 cows being mild in 59% of cases. Ovarian cysts were found in 172 cows occurring in the left ovary in 27%, right ovary in 36% and both ovaries in 17% cases.

Frie *et al.*, (1984) investigated the seasonal distribution of ovarian cysts in German Red pied cattle during the period of January to December 1984. They diagnosed 684 (1.86%) ovarian cysts in 36707 cases of first insemination in 377 farms. The prevalence of ovarian cysts varied months to months, being

significantly higher than average in April and May and significantly lower average in the month of February. Occurrence of ovarian cysts was associated with nymphomania in 69 of cases, relaxed pelvic ligaments in 60% and anoestrus and endometritis in 18% and 7% respectively.

Hussain and Moniraju (1984) examined 889 cattle and 1155 buffaloes between January and June 1982 in Karnataka and to determine the incidence of female reproductive disorders. The authors recorded anoestrus in 42% and various other reproductive disorders in 36% cases. Hypoplasia of the genital system was observed in 9.7% cows and 15.7% of buffaloes, ovarian cysts in 6.4% and 8.0% and pathological conditions (endometritis, pyometra and vaginitis) in 29 and 9% respectively.

Kucharski and Zduncayk (1984) analyzed the records that kept for 996 calving of cows which showed that the placenta was retained in 52% of calving and it occurred more than once in 34 of the cows. Other disorders were retarded uterine involution (26%), endometritis (41%), ovarian cysts (11%) and ovarian dysfunctions (11%). These disorders occurred more often in spring and summer than in autumn and winter calving.

Kumar *et al.*, (1986) performed a survey on reproductive disorders in none descript cattle. In this survey of 810 indigenous cattle 52% were normal and 48% had reproductive disorders. Anoestrus was found in 19%, ovarian hypoplasia in 1.7%, atrophy/hypoplasia of uterus in 7% underdeveloped/ infantile genitalia 9.5%, cervicitis in 5% and endometritis in 1.2% of the cases. The frequency of various other disorders was each less than 1%.

Rahmathulla *et al.*, (1986) examined 331 cows and 181 female buffaloes to determine the main causes of infertility. The recorded causes were failure to conceive (74.7% of cows and 56% of buffaloes), anoestrus (5.4% of cows and 29.3% of buffaloes), and endometritis (8.5% of cows and 8.8% of buffaloes). Minor cases of infertility were found to be associated with ovarian cysts, cervicitis, vaginitis and persistent corpus luteum.

Hussain (1987) examined 571 bovine species consisting of 119 local cows, 241 crossbred cows and 211 buffalo cows over a period of two years in order to determine various reproductive disorders. The author reported the incidence of

smooth ovaries among crossbred cows was comparatively less than that of local cows (17.73%, v/s 56.60%), whereas luteal persistency, cystic ovary, endometritis and repeat breeding was comparatively less among local cows than those of crossbred cows. The author also found that the incidence of smooth ovaries was highest in buffaloes (41.93%) followed by genital hypoplasia (22.58%), luteal persistency (17.74%) and repeat breeders (8.06%).

Shamsuddin *et al.*, (1988) to detect various reproductive disorders in crossbred cows. The study was undertaken to find out the relative incidence of reproductive disorders after birth in cows of savar Dairy Farm. The relative percentage of retained placenta, metritis, pyometra, endometritis, cervicitis, persistent corpora lutea, cystic ovaries and non functional ovaries were 42.26%, 10.38%, 8.15%, 27.39%, 1.52%, 1.17%, 3.13% and 5.98% respectively. They concluded that the persistent corpora lutea and cystic were in right ovaries, whereas higher number of non functional ovaries were found in both the ovaries.

Rao *et al.*, (1993) comparative studied the incidence of reproductive disorders among 1860 crossbred Hersy and Holstein cows and heifers that were classified as half bred, three quarter bred or higher (seven- eight). The overall incidence of anatomical functional and infectious (non specific) from of infertility were 3.0, 56.4 and 40.6 respectively. The highest incidence of specific conditions was for cystic ovaries 49.7% and endometritis 32.8%.

Scheidegger *et al.*, (1993) studied the effect of retained fetal membrane and other puerperal reproductive disorders on postpartum fertility in Holstein cattle. From calving of Holstein cows from 3 high production dairy farm (6500 kg/lactation) in central Chile. A total of 822 parturition were selected of which 433 calving showed retention of fetal membranes (RFM), reproductive system infection (RI), ovarian cyst (OC) or recombination of these disorders. Records of 400 calving were kept as controls. The incidence of RFM, OC and RI were 12.6, 13.2 and 23.8% respectively.

Allen H. Garverick (1995) conducted a study on ovarian follicular cysts which are anovulatory follicular structures that occur in 10 to 13% of dairy cows. This review focuses upon the dynamics of cyst growth, development, and persistence as well as on associated endocrine and cellular mechanisms. During the estrous cycle of cows, two to four waves of follicular growth occur. From a cohort of recruited follicles, one is selected for continued growth and dominance while the others undergo atresia and regress. In contrast, cysts have long been thought to be static structures that persist for extended periods. Although cysts can persist for extended periods, most regress over time and are replaced during subsequent follicular waves. The next dominant follicle either ovulates or develops into a new cyst. The recruitment of a cohort of follicles from which a cyst develops and the growth rate of cysts to ovulatory size are similar to ovulatory follicular waves, but the cyst continues to grow for a longer period.

Chawdhury (2000) to assess the reproductive status, pregnancy wastage and incidence of gross genital abnormalities in cows slaughtered at Maiduguri abattoir, 7375 female genitalia were examined over a period of 36 months from July 1997 to June 2000. A total of 55.49% organs were cyclic while 44.51% were non-cyclic. The cyclic organs included 12.64% at pro-estrus, 12.0% at estrus, 13.03% at met estrus and 17.82% at dioestrus stage of the estrous cycle. Out of 3283 non-cyclic organs, 1676 were gravid from which 1676 fetuses were recovered. The fetal crown-rump (CR) lengths ranged from 6 to 85 cm with corresponding age range of 60 to 265 days. Juvenile organs with smooth ovaries were 3.78%. The gross abnormalities of the genitalia recorded included cystic ovaries (3.35%), ovaro-bursal adhesion (2.9%), ovarian hypoplasia (2.2%) and endometrocervicitis (1.7%). Oviductal occlusion accounted for 0.75%, hydrosalpinx 0.54%, pyometra 0.48%, par ovarian cyst 0.26%, hypo plastic uterus 0.24% and uterine cyst 0.08% cases.

Fathalla (2000) conducted a survey in Northern Jordan to determine the incidence of gross reproductive tract abnormalities in cattle. A total of 200 specimens of bovine reproductive tracts were collected from cows slaughtered at a local abattoir in Irbid, Jordan between 1993 -1994. The results of the investigation showed that a large number of slaughtered cows (n=27; 13.5%) were pregnant. A total of 27 (13.5%) specimens had lesions. The predominant

lesion of the ovaries was ovarian inactivity (21 cases; 10.5%), ovaro-bursal adhesions (16 cases; 8%) and cysts (14 cases; 7%). Other, interesting rare pathological lesions of the ovaries were bilateral ovarian haematoma and tuberculosis. Twenty specimens (10%) had uterine lesions, the most common of which were infections, presenting as metritis and pyometra. Seven specimens (3.5%) had oviduct lesions, which included hydrosalpinx, pyosalpinx and haemosalpinx.

Douthwaite (2000) studied the accuracy of different common methods of differentiating between follicular and luteal ovarian cysts, and to monitor the response of the cysts to 12 days treatment with a progesterone-releasing intravaginal device (PRID). On the basis of agreement between the different methods 25 of the 46 cases examined were diagnosed as follicular and 14 as luteal cysts; for the other seven cases the methods disagreed. The use of ultrasound was more accurate in diagnosing follicular cysts than luteal cysts, and combined with plasma progesterone concentrations gave the most accurate assessment of cyst type (92 percent for follicular cysts and 82 percent for luteal cysts). The mean (se) plasma progesterone concentration was lower in the cows with follicular cysts than in those with luteal cysts (0.29 [0.05] v 3.90 [0.63] mg/ml; $P < 0.05$). Luteal cysts had thicker walls (5.3 [0.04] v 2.5 [0.2] mm; $P < 0.0001$), and the wall thickness of all the cysts was positively correlated with plasma progesterone concentration ($r = 0.52$, $P < 0.0004$). Cows with luteal cysts had more additional follicles greater than 5 mm in diameter ($P < 0.01$). In cows with follicular cysts and other follicles greater than 5 mm in diameter, the mean oestradiol concentration was 7.9 (1.8) mg/ml compared with 24.2 (3.1) mg/ml ($P = 0.002$) in cows without other follicles greater than 5 mm in diameter on either ovary. At the time of PRID removal, plasma progesterone concentration had increased in the cows with follicular cysts to 1.59 (0.06) mg/ml ($P < 0.05$) and decreased in the cows with luteal cysts to 0.87 (0.01) mg/ml ($P < 0.05$), although there was no change in original cyst structure in 45 percent of the cases. However, new ovarian structures were frequently observed during the treatment. The overall pregnancy rate for cows with both types of cyst after treatment was 50 percent after three inseminations, but the first service pregnancy rate was only 18 percent for cows with follicular cysts and 28 percent for cows with luteal cysts.

After treatment, the fertility of cows with follicular cysts was similar to that of paired herd mates, whereas cows with luteal cysts took 40 days longer to calve again than healthy herd mates. However, the culling rate was higher for cows with follicular cysts (41 v 11 percent).

Farooq (2000) recorded 3760 crossbred cows at various locations in Northwest Frontier Province (NWFP), Pakistan, revealed 379 (10.08%) cases of reproductive abnormalities. Cervicitis had the highest incidence at 45.12%, followed by abnormalities of uterus (38.26%), vagina (10.29%) and ovary (6.33%). The frequencies of endometritis and vaginitis were 28.69 and 4.76%, respectively. Ovarian cysts were found in 6.33% of the cases. The incidence of pyometra, vaginal tumors, pyometritis and metritis were 6.53, 1.83, 5.56 and 1.58%, respectively. Genetic group, season and locality had significant effect ($P < 0.01$) on incidence of various reproductive abnormalities. Cows possessing 75% Holstein Friesian (HF) inheritance were the most susceptible to reproductive disorders. Summer was the peak (35.88%) season and spring the rough (15.57%) season of incidence. The highest incidence of reproductive disorders was found in Peshawar (34.31%), followed by cows in Bannu (26.13%), Mardan (13.18%), Risalpur (8.97%), Nowshera (6.58%), Kohat (6.33%) and Dera Ismail Khan (4.23%). It was concluded that reproductive disorders were more prevalent under stressful environment, within or around thickly populated areas, during hot summer months and among crossbred.

Kotowski (2001) determined the health condition of mammary glands and reproductive organs of cows selected for slaughter. The studies were carried out in Poland in 1999 on 84 black and white cows 3 to 16. It was found that most of the cows subjected to slaughter (31 %) were in the 6-8 age bracket and it was at this age that most of the inactive udder quarters were noticed. Mammary gland irritation was diagnosed in 41 cows, i.e. 48.80%. In the post-slaughter examination fetuses in the uterus were discovered in 6 cows (7.16%) whereas various pathological changes in the reproductive organs were recorded in 49 cows, i.e. 58.34%. The pathological changes more often affected the uterus (59.18%) than the ovaries (40.82%). The bacteriological examination of uterine swabs revealed the presence of potentially pathogenic bacterial flora in all cases. The predominant microorganisms were of the following types: *E. coli* 33.33%,

Staphylococcus epidermidis 12.5%, *Pseudomonas aeruginosa* 12.5%, and *Enterococcus sp.* 20.83%. Practical conclusions include: advisable physical check-up of cows prior to slaughter and that chronic illness of the reproductive organs most often affects cows at their peak of performance.

Parmigiani (2001) observed 8900 dairy cows in 3 large areas of Milan, Cremona and Brescia, Italy. The incidence of genital tract diseases at the post-partum period in the last 5 years was approximately 35% with follicular cysts representing about 30% of all cases. The culling rate due to reproductive disorders was 4%. It is suggested that close cooperation between farmers and veterinarians is fundamental for improving productive performance of animals and economic results.

Khurshid Shah (2002) conducted a study that hydrometra or mucometra develops in untreated cases of cystic ovarian degeneration (Kaikini 1992). Hydrometric containing gallons of fluid associated with retained corpus luteum was reported in goats, sows and cows (Roberts and Fox, 1968) (Bearden and Fuquay, 1980), (Robert, 1984).

Kubar (2002) observed the reproductive organs of 20 Estonian Holstein Breed (EHF) cows and 3 heifers and culled because of infertility that were examined by palpation perrectumand ultrasonography. In addition, pathoanatomical and histopathological studies were carried out after slaughter. The histopathological study revealed that small cysts less than 2.5 cm in diameter, often (12 animals) existed in culled cows. These cysts were frequently accompanied by changes in secondary and Graafian follicles, rete ovarii, ovarian stroma, and the endometrium. Three cows had follicular cysts in the ovaries, which were 25-35 mm in diameter. Two cows revealed luteal cysts in the ovaries and one of them had vaginal prolapse. Four animals (one heifer and three cows) manifested tumors or tumor-like malformations: ovarian endosalpingiosis, germ and stromal cell tumor, oviductal myolipoma, and haemangiosarcoma in the uterine blood vessels. One heifer had been culled because of 2 abscesses in the -vaginal wall close to the cervix and another had chronic endometritis. The research findings indicated that the most common cause of infertility in the culled cows was cystic degeneration in ovaries (85%), accompanied by pathological changes elsewhere in the reproductive organs.

Asseyl (2004) examined the reproductive organs from mature Small East African Zebu (SEAZ) heifers and cows slaughtered at the Morogoro abattoir were collected twice a month and evaluated over a period of 12 months. Out of the 402 animals from which reproductive organs were taken, 54% were pregnant, 24% were actively cycling and 22% were non-cycling. Various gross abnormalities were observed in the reproductive organs of about 16% of the cattle, and the major reproductive abnormality in both total and the noncycling animals was various degrees of fibrous adhesion between the ovary and infundibulum and mesosalpinx. It is concluded that, contrary to common belief, a majority of the female SEAZ cattle that are slaughtered are fertile.

Yener (2004) examined the 'surface epithelial' tumors originating from the modified colonic mesothelial cell covering of the ovary, constitute a group of tumors in dogs and humans but are uncommon in mares, cats and cows. Tumours of this group are subdivided into four categories according to their main morphological features: papillary adenoma, papillary adenocarcinoma, cyst adenoma and cystadenocarcinoma. Cyst adenomas, which appear to arise from the epioophoron and/or rete ovarii, are comparatively rare in domestic animals. This article discusses the occurrence, pathology, histopathology and diagnosis of serous papillary cyst adenoma in the ovary of a cow from Turkey

McDougall (2005) examined thirty-six cows that had one or more gross lesions which involved the ovary, uterine tube, uterus or vagina. Bacteria were isolated from the uteri of 22 (21%) cows. Isolates included *Archaeobacterium pyogenes* (n=1), *Escherichia coli* (n=1), *Fusobacterium spp.* (n=1), *Haemophilus somnus* (n=5), *Streptococcus acidominimus* (n=12), *S. bovis* (n=2), *S. uberis* (n=1) and *S. salivarius* (n=1). In only five cows were both gross pathology and bacteria detected. There was no relationship between the isolation of bacteria and the diagnosis of gross pathology of the uterus. There were no differences in the of histopathological changes in the uteri from the three groups of cows examined, and lesions present were minor. Gross pathological changes and intrauterine bacteria were found in 34% and 20% of cows, respectively, but the correlation between the two was poor. Histopathological changes were unremarkable, suggesting the bacteriological findings were coincidental, that causative agents of infertility were not present at the time of examination, or that unrelated causes

such as nutritional anoestrus may have been responsible failure of some cows to conceive.

Abaltil (2006) studied the type and prevalence of abnormalities occurring in the female reproductive tracts of 201 Zebu cattle of Fogera type (161 cows and 40 heifers) slaughtered at Bahir-Dar town, north-west Ethiopia. Out of the 201 female genital tracts collected and examined, abnormalities were recorded in 74 (36.8%). The most common abnormalities encountered were ovaro-bursal adhesion (5.5%), endometritis (3.9%) and cystic ovaries (3.5%). Other abnormalities recorded were ovarian hypoplasia, vaginitis, cervicitis, tortuous cervical canal, mucometra, vaginal cyst, par ovarian cyst, hypo plastic cervical rings,

cervical cyst, freemartins, closed external cervical os, uterine and oviducts adhesion, cystic uterine tube, remnant of retained fetal membrane and cyst in the uterine wall. The prevalence of the abnormalities was significantly ($p < 0.05$) higher in parous than in nulliparous cows. Moreover, evidence of ovarian cyclicity was found in 51.6% and 30% of non-pregnant parous and nulliparous cows examined, respectively.

Ali *et al.*, (2006) examined the reproductive tracts of 110 non descriptive cows, collected from Faisalabad abattoir, were studied for biometrical values and pathological changes during disease condition. The average length of right ovary was 2.40 ± 0.06 cm and that of left ovary was 2.31 ± 0.05 cm. The average width of right ovary was 1.15 ± 0.02 cm and that of left ovary 1.14 ± 0.03 cm. The average thickness of right ovary was 1.61 ± 0.04 cm and that of left ovary was 1.52 ± 0.03 cm. The average weight of right and left ovaries was 4.29 ± 0.29 and 3.97 ± 0.24 g, respectively. The average size of right and left horns was 0.69 ± 0.59 and 19.76 ± 0.58 cm, respectively. The average length of circumference and cervical rings were 6.0 ± 0.22 , 8.40 ± 0.21 and 4.62 ± 0.09 cm. The incidences of pathological conditions observed were ovaro-bursal adhesions, cystic ovary, cystic corpus luteum, par ovarian cysts, teratomas, pyometra, metritis, mummified fetus, mucometra, cervicitis, fibrosity of cervix, tortuosity of cervix and double cervices. No abnormalities of oviducts were found.

Isobel (2007) observed follicular cysts which are the most critical reproductive disorder in dairy cows and disturb the normal ovarian cycle, resulting in a

prolonged interval from calving to conception. Therefore, this condition causes significant economic losses to the dairy industry. Two direct causal factors for cysts are suggested in this review; ovulation disorder and the delay of regression. Ovulation disorder has been accepted to be a main etiology of cystic follicle. This seems to be caused by the deficiency of positive feedback of estrogen to hypothalamus, leading to the lack of luteinizing hormone surge. On the other hand, if a large anovulatory follicle is regressed immediately after the failure of ovulation, its follicle does not continue to grow, resulting in no cystic being formed. Therefore, it is proposed that another cause of a cystic follicle is the delay (or absence) of the degeneration system of the follicle. This review will introduce these two causes separately, referring to recent advances in understanding the follicular cyst in dairy cows.

Patel (2007) recorded a total of 4188 animals, composed of 2570 buffaloes and 1618 cows, the reproductive disorders were categorized as anatomical, functional pathological origin. The anatomical abnormalities observed in buffaloes and cattle were infantile genitalia (9.38 and 5.99%), kinked cervix (0.59 and 3.39%) and uterine adhesion (0.93 and 1.36%, respectively). The percentages of functional form of infertility were anoestrus (27.32 and 24.73%), sub-estrus (28.99 and 21.38%), cystic ovarian degeneration (1.48 and 6.62%) and repeat breeding (8.68 and 18.79%, respectively). The pathological causes included salpingitis (0.43 and 0.18%), endometritis (5.80 and 2.90%), pyometra (0.78 and 1.86%), metritis (10.38 and 8.90%) and mummification (0.11 and 0.12%) in buffaloes and cattle, respectively. Ovarian tumor was observed only in buffaloes (0.11%).

2.3. Infertility occurs in the heifers and cows

Afanasievs (1971) conducted an experiment on endometrial biopsy and pathological changes in the endometrium in infertile cows. The author examined endometrial biopsy specimens from 427 cows; the examined 56% cows had cystic hyperplastic endometritis, noncystic endometrial hyperplasia, endometritis or diffuse inflammatory cells with desquamation of the endometrial epithelium and vascular changes. He found 73% of cows with various forms of endometritis due to nonspecific infection.

Wettke and Jaham (1971) conducted a study on the incidence and treatment of sterility in herds (1019 cattle, 19-92 cows per herd). There were serious fertility problems on all farms, only 52% of the animals were pregnant after insemination (A.I. in 19 herds, civering with bulls in 15) and 49% showed a prolongation on the time between last parturition and conception to 5.6 months, compared with 2.8 months for 125 cows with undisturbed fertility. Uterine and ovarian disorders occurred in 50-60% of the cows after calving. Of 823 cows on 27 of the farms, 145 (17%) were slaughtered in 91 cases because of sterility; 96 animals showed the presence of cystic ovaries of which 43 conceived after treatment.

Vogler (1973) examined 1086 cattle and observed various disorders in these cattle such as ovarian cysts (89%), infertile heifers (13%) endometritis associated with ovarian disease (8%) and persistent corpus luteum (6%).

Izquierdo and Angelow (1984) examined 118 oviducts from 59 infertile Cuban zebu cows. This study revealed acute salpingitis (6), sub-acute salpingitis (15) and chronic salpingitis (61). The disorders were unilateral in 29 and collateral in 24 animals.



CHAPTER III
MATERIALS AND METHODS

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3.1. Experimental area, animals and duration

The investigation was carried out in the Department of Pathology and Parasitology, Faculty of Veterinary and Animal Science, Hajee Mohammad Danesh Science and Technology University (HSTU), Dinajpur. A total of 258 cattle were examined and samples were collected and brought for diagnosis to the laboratory of the Department of Pathology and Parasitology (HSTU). Systemic dissection and investigations were carried out that include the examination of vagina, cervix, uterus, uterine horn, fallopian tube and ovary. The diagnosis of different diseases or disease conditions was made on the basis of characteristics gross lesions and histopathological study. The samples were collected from January to December, 2011. The followings methods or techniques were used in this experiment

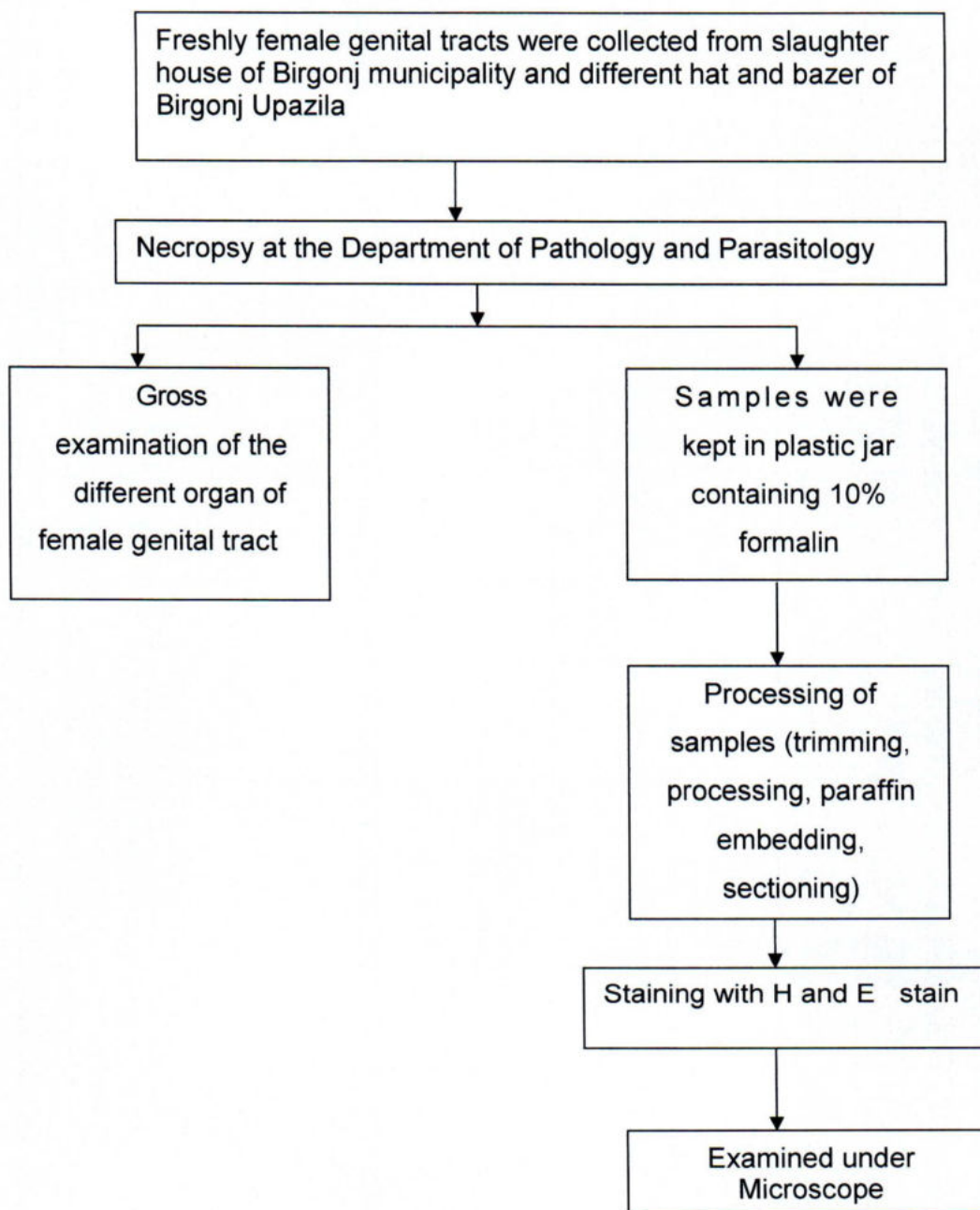
3.2. Selection of slaughter house area

The female genital tract was collected from the different abattoirs house of Birgonj municipality and different hat and bazer of Birgonj Upazila of Dinajpur district. The samples were collected with protective clothing using sterile instrument and transferred in the laboratory of the Department of Pathology and Parasitology for necropsy and histopathological examination.

3.3. Cleaning and sterilization of required glassware

Test tubes, glass slides, cover slips, beakers, pipettes, reagent bottles, glass bottles, spirit lamp, measuring cylinders etc were used in this study. New and previously used glassware were collected and dipped in 2% sodium hypochlorite solution and left there until cleaned. After overnight soaking in a household dishwashing detergent solution, the glassware were cleaned by brushing and washed thoroughly in running tap water and rinsed three times in distilled water. The cleaned glassware was then dried on a table at room temperature or an oven at 50-70°C.

3.4. Experimental Design



Schematic illustration of the experimental design

3.5. Age of the animal

The ages of slaughtered animals were mostly between 6-8 years. Some of female young animals were also slaughtered due to infertility.

3.6. Body condition of slaughtered animal

Most of the slaughtered animals were ill health. Their weight varied from 70-100kg.

3.7. Gross examination of the female reproductive tract

The gross examinations of the female reproductive tracts were performed in the laboratory of the Department of Pathology and Parasitology (HSTU).Gross changes were observed carefully and recorded.

3.7.1 Materials required for necropsy examination

- ❖ Samples (Female genital tract)
- ❖ Scissors
- ❖ Forceps
- ❖ Gloves
- ❖ Musk
- ❖ Scalpel
- ❖ 10% formalin
- ❖ Glass jar

3.7.2. Method of post mortem examination of female genitalia collected from slaughtered animals

In order to diagnose different pathologic disorders a total of 250 female genitalia were collected from different hat and bazer of Birgonj Upazila and Birgonj municipal. This abattoir study over the period of 12 months starting from January to December, 2011. The entire reproductive tracts were examined carefully according to the method of Mc Enttee (1983). The ovaries were examined for their functional activity as per method described by Ahmed (1992).The ovaries that did not show any developmental medium (10 mm) or large (20 mm.) sized follicle and did not exhibit the presence of corpus luteum were diagnosed as true

anestrus. The ovaries which exhibited developmental Graafian follicle of medium size were considered as sub-active. Both ovaries were also examined for the presence of different kinds of cyst and other pathological conditions including ovaro-bursal adhesions. The uterus also examined and found the presence of a huge amount of mucous and pus and some haemorrhagic lesion. The cervix of both horns was examined for inflammatory changes and other pathological abnormalities. The fallopian tubes were checked for obstruction or any other abnormalities. The lesions containing tissue segments were collected in 10% formalin for histopathological studies.

3.8. Histopathological study

During necropsy, various organs having gross lesions were collected and fixed in 10% formalin for histopathological studies. Formalin fixed tissue samples were processed and stained as per standard method (Luna, 1968).

3.8.1 Materials required for histopathology

- ❖ Samples (Uterus and Ovary)
- ❖ 10% formalin
- ❖ Chloroform
- ❖ Paraffin
- ❖ Alcohol
- ❖ Tap water
- ❖ Xylene
- ❖ Haematoxylin and Eosin stain
- ❖ Distilled water
- ❖ Clean slides
- ❖ Cover slips
- ❖ Mounting media (DPX).
- ❖ Microscope
- ❖ Microtome

3.8.2. Processing of tissue for histopathology

1. Collection of tissue and processing

During tissue collection the following points were taken into consideration –

The tissues were collected in conditions as fresh as possible. Normal and diseased tissues were collected side by side. The thickness of the tissues were as less as possible (5-7mm approximately).

The tissues (uterus and ovaries) were collected from the slaughtered cattle in the Histopathology Laboratory of Department of Pathology and Parasitology, HSTU, Dinajpur.

2. Fixation: 10% formalin was added in the plastic container (10 folds of the tissue size and weight) and fixed.

3. Washing: The tissues were trimmed into a thin section and washed overnight in running tap water to remove formalin.

4. Dehydration: The tissues were dehydrated by ascending ethanol series to prevent shrinkage of cells as per following schedule

- ❖ 50% alcohol – one hour
- ❖ 70% alcohol – one hour
- ❖ 80% alcohol – one hour
- ❖ 95% alcohol – one hour
- ❖ Absolute alcohol – three changes (one hour for each change.)

5. Cleaning: the tissues were cleaned in chloroform for 3 hours to remove ethanol

(One and half hour in each, two changes).

6. Impregnation: Impregnation was done in melted paraffin (56- 60°C) for 3 hours.

7. Embedding: Paraffin blocks containing tissue pieces were made using templates and molten paraffin.

8. Sectioning: Then the tissues were sectioned with a microtome at 5-7µm thickness. The sections were allowed to spread on Luke warm water bath (40-

42°C) and taken on a glass slide. A small amount of gelatin was added to the water bath for better adhesion of the section to the slide. The slides containing sections were air dried and stored in cool place until staining.

3.8.3. Routine Haematoxylin and Eosin staining procedure:

3.8.3.1. Preparation of Ehrlich's Haematoxylin solution

Haematoxylin crystals	4.0gm
Alcohol, 95%	200.0 ml
Ammonium or potassium alum	6.0 gm
Distilled water	200 ml
Glycerin	200.0 ml
Glacial acetic acid	20.0 ml

Haematoxylin was dissolved in the alcohol and the alum was dissolved in distilled water and mixed thoroughly. After these were in complete solution, the glycerin and acetic acid were added.

3.8.3.2. Preparation of eosin solution

1% stock alcoholic eosin

Eosin Y, water soluble	1 g
Distilled Water	20 ml
95% alcohol	80 ml

Eosin was dissolved in water and then 80 ml of 95% alcohol was added.

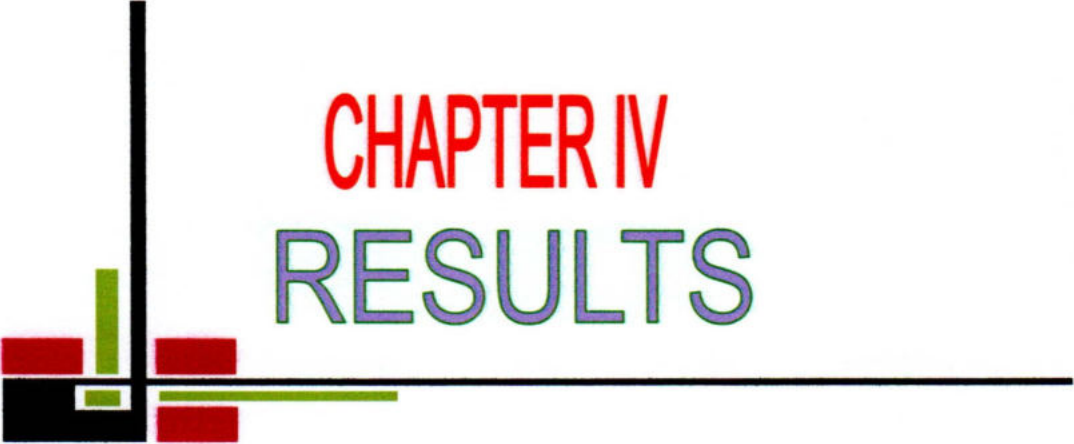
Working eosin solution

Eosin stock solution	1part
Alcohol, 80%	3 parts

0.5 ml of glacial acetic acid was added to 100 ml of working eosin solution just before use.

3.8.3.3. Staining protocol

- ❖ The sectioned tissues were deparaffinized in three changes of Xylene (three minutes in each)
- ❖ Then the sectioned tissues were rehydrated through descending grades of alcohol as per following schedule.
 - Absolute alcohol – three changes (three minutes for each)
 - 95% alcohol - two minutes
 - 80% alcohol - two minutes
 - 70% alcohol - two minutes
 - Dipping with distilled water for 10 minutes
- ❖ The tissues were stained with Harris haematoxylin for 2-10 minutes
- ❖ Washed in running tap water for 10-15 minutes
- ❖ Then the tissues were dipped in Lithium carbonate (few dips)
- ❖ Stained with eosin for one minute
- ❖ Differentiated and dehydrated in ascending grade of alcohol
 - 95% alcohol – three changes (2-4 dips for each)
 - Absolute alcohol – three changes (2-3 minutes for each)
- ❖ Cleaned in Xylene: three changes (five minutes each)
- ❖ Tissues were mounted with cover slip by using DPX
- ❖ The sections were examined under a low (10X) and high (40X, 100X) power objectives
- ❖ The images of relevant histopathological lesions were taken by a digital camera (Sony, China), slightly edited for the better illustration of the results.



CHAPTER IV
RESULTS

CHAPTER IV

RESULTS

4.1 Postmortem examination of female genitalia collected from slaughtered animals

Detailed postmortem examination was performed on 258 freshly female genitalia collected from slaughter house. On postmortem examination of 258 genitalia, one or more pathological disorders were recorded in 168 (65.11%) genitalia. The occurrence of various reproductive disorders in female genitalia encountered at postmortem examination has been presented in Table 1&2 and the seasonal incidence of the gynaeco-pathological disorder in cow showed in Table 3&4. The incidence of ovarian hypoplasia was found to be the highest (21.31%) followed by cystic ovaries (12.01%), par ovarian cyst (1.16%), ovarian hyperplasia (2.32%), ovaro- bursal adhesions (1.16%), hemorrhage in ovary (1.55%), endometritis (6.97%), pyometra (5.03%), mucometra (1.16%), gravid uterus (4.26%), haemorrhage in uterine horn (1.55%) and cervicitis (6.58%) .

The most common pathological disorder encountered at postmortem examination was hypoplasia of the ovary which was occurred either in single or both ovaries. The ovary becomes small in size than normal and smooth surface (Figure 1). The typical follicular cyst was detected during necropsy examination (Figure 2). The indication of anestrus had under developed follicle and absence of corpus luteum. The cysts were found either in left or right ovaries. However in few cases both the presence of such cysts. The majority of cyst appeared to be follicular cysts which were a typical in size. Luteal cyst was identified only in two genitalia. Such cyst was characterized by its thick wall at the centre of corpus luteum. The par ovarian cysts were found to be attached to the mesoovarium/ mesosalpinx or between their two peritoneal coverings as clear spherical cysts (Figure 3). They were found either in left or right sided ovaries. Ovaro -bursal adhesion was detected either in left or right sided ovary (Figure 4). Sub active exhibited developmental small or medium size Graafian follicle. Such Graafian

follicle appeared to be somewhat firm in consistency. Hyperplastic ovary was also found which were larger in size than normal (Figure 5). Persistent corpus luteum was found in 21 cases (Figure 6). Haemorrhage in the ovary was also found (Figure 7). The uterus affected with endometritis showed thickened leathery wall with slimy exudates in the mucosal surface. The organ appeared to be larger in size in almost all cases. The uterus affected with pyometra showed enlarged size contained huge amount brownish or cream colored pus with foul odour (Figure 8). Mucometra also a common case which was characterized by the presence of slimy mucus in the uterus (Figure 9). Inflammation of the cervix (cervicitis) was detected in seventeen cases. This condition was manifested by dilation and congestion of the cervix with excessive catarrhal exudation. Hemorrhage also found in the uterine horn in four cases (Figure 10). During postmortem examination gravid uterus was found in 11cases (Figure 11). Salpingitis was characterized by distended fallopian tubes and sometimes presence of pus within the tubular lumen. The condition was found to affect both the fallopian tubes in all cases. The condition was often associated with endometritis and pyometra. Hydrosalpinx was manifested by distention of the fallopian tube with clear fluids.

4.2. Microscopic examination of female genitalia

Microscopically endometritis was characterized by massive infiltration of lymphocytes, macrophages, monocytes and plasma cells in the endometrial mucosa, troma and uterine glands (Figure 12). The glandular structure was almost found to be distorted (Figure 13). In addition to this there was proliferation of fibrous connective tissue. Cellular infiltration and proliferation of fibrous connective tissue were also seen in the caruncle region. In case of pyometra massive cellular infiltration in the lumen of the uterus (Figure 14). The most important microscopic features of cervicitis were congestion of blood vessels with edematous changes. Histological section through cystic ovaries exhibited the presence of follicular cysts. The cavity of such cysts remained empty (Figure 15). The surrounding cells of cystic wall appeared to be flattened that might have resulted from pressure exerted by the cysts. Edematous ovary microscopically characterized by presence of proteinacious mass containing ova. The ovarian blood vessels appeared to be flattened with thickening of the vascular wall and

hemorrhagic ovary characterized by rupture of blood vessel and RBC found in the surrounding tissues (Figure 16). There was degeneration of the granulosa cells and the oophorus wall. The significant histological features of hypoplastic ovaries were proliferation of fibrous connective tissue and often occupied the whole contents of the follicle (Figure 17). The hyperplastic ovary histopathologically contains a huge proliferation of fibrous tissue having no contained ova (Figure 18).

Table 1: Pathological disorders of female reproductive tract collected from Birgonj slaughter house

Month Year: 2011	Number of observation of reproductive tract	Endometritis	Pyometra	Mucometra	Gravid uterus	Haemorrhage in uterine horn	Cervicitis
January	21	2	1	0	2	1	0
February	22	3	2	0	1	0	2
March	32	2	2	1	1	0	4
April	29	1	1	0	0	1	3
May	22	1	1	0	1	0	0
June	25	2	1	1	1	0	1
July	26	3	2	0	1	2	0
August	15	0	0	0	0	0	0
September	17	1	1	0	3	0	1
October	12	0	0	1	1	0	1
November	19	2	1	0	0	0	3
December	18	1	1	0	0	0	2
Total	258	18	13	3	11	4	17
(%)		6.97	5.03	1.16	4.26	1.55	6.58

Gynaecopathological disorders of female reproductive systems of cows suspected for their culling at Birgonj of Dinajpur district

Table 2: Pathological disorders of ovaries of cows collected from Birgonj slaughter house

Month Year: 2011	Number of observation of ovary	Ovarian cyst	Par ovarian cyst	Ovarian hypoplasia	Ovarian hyperplasia	Ovaro bursal adhesion	Haemorrhage in ovary
January	21	2	0	4	1	0	0
February	22	2	0	4	0	0	0
March	32	4	1	6	1	1	1
April	29	4	0	5	1	0	0
May	22	2	0	7	0	0	0
June	25	4	0	5	0	1	1
July	26	2	1	5	1	0	0
August	15	2	0	2	0	0	1
September	17	3	1	3	0	0	0
October	12	1	0	4	1	0	0
November	19	2	0	6	0	1	1
December	18	3	0	4	1	0	0
Total	258	31	3	55	6	3	4
(%)		12.01	1.16	21.31	2.32	1.16	1.55

Gynaecopathological disorders of female reproductive systems of cows suspected for their culling at Birgonj of Dinajpur district

Table 3: Seasonal incidences of gynaeco-pathological disorders in reproductive tracts of 258 cows

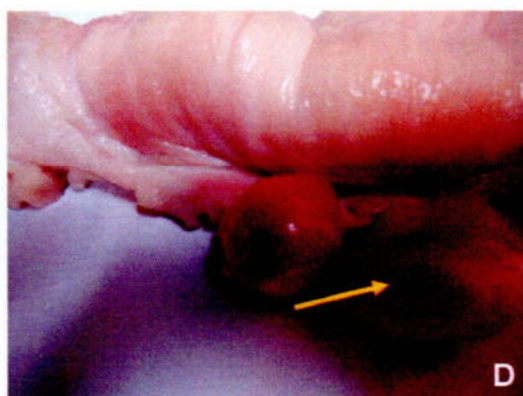
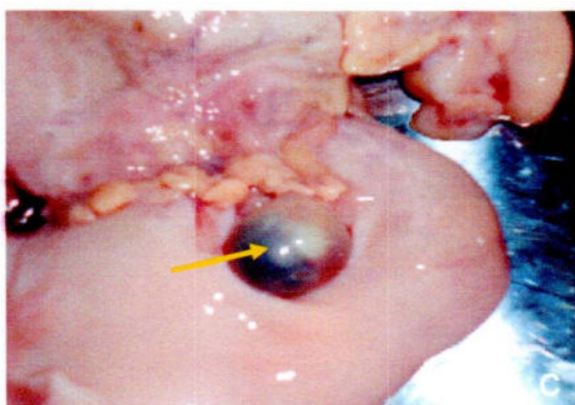
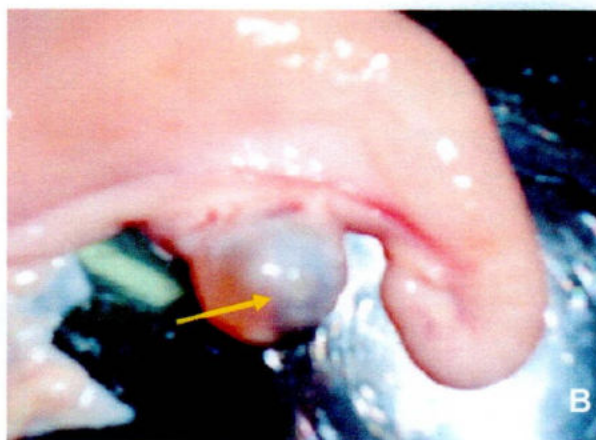
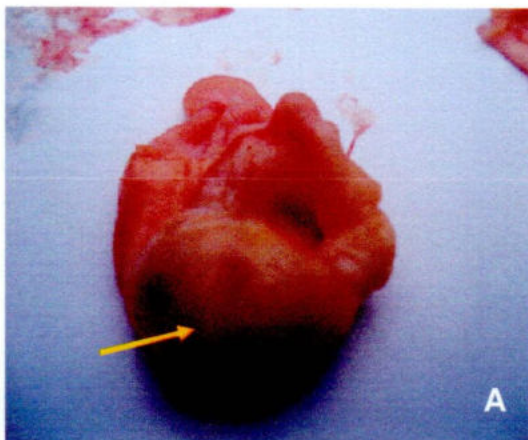
Season	Number of case	Endometritis	Pyometra	Mucometra	Gravid uterus	Haemorrhage in uterine horn	Cervicitis
Winter (November-February)	80	8 (10%)	5 (6.25%)	0 (0%)	3 (3.75%)	1 (1.25%)	7 (8.75%)
Summer (March-June)	108	6 (5.55%)	5 (4.62%)	2 (1.85%)	3 (2.77%)	1 (0.92%)	8 (7.40%)
Rainy (July-October)	70	4 (5.71%)	3 (4.28%)	1 (1.42)	5 (7.14%)	2 (2.85%)	2 (2.85%)

Gynaecopathological disorders of female reproductive systems of cows suspected for their culling at Birgonj of Dinajpur district

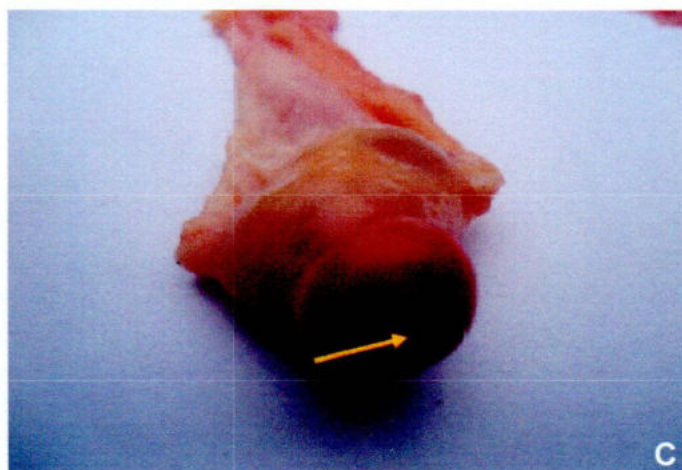
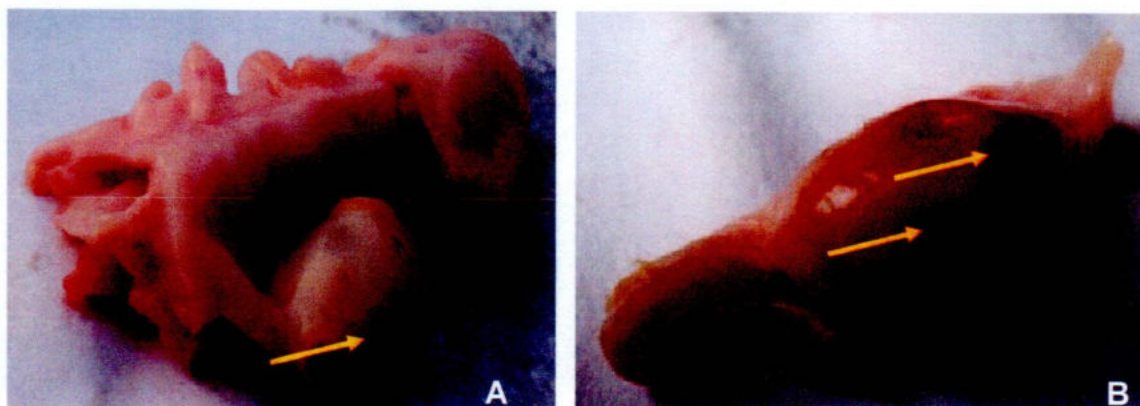
Table 4: Seasonal incidences of gynaeco-pathological disorders in ovaries of 258 cows

Season	Number of case	Ovarian cyst	Par ovarian cyst	Ovaro bursal adhesion	Hyperplasia of ovary	Hypoplasia of ovary	Haemorrhage in ovary
Winter (November-February)	80	9 (11.25%)	0 (0%)	1 (1.25%)	2 (2.50%)	18 (22.50%)	1 (1.85%)
Summer (March-June)	108	14 (12.96%)	1 (0.92%)	2 (1.85%)	2 (1.85%)	23 (21.29%)	2 (1.42%)
Rainy (July-October)	70	8 (11.42%)	2 (2.85%)	0 (0%)	2 (2.85%)	14 (20%)	1 (1.25%)

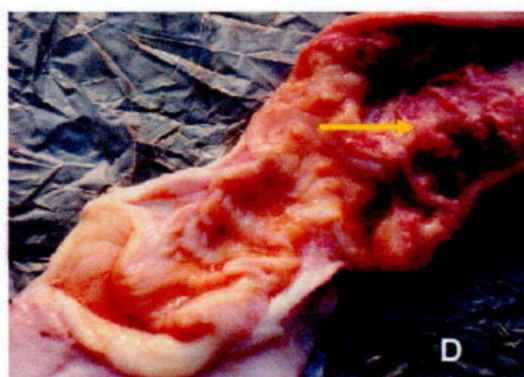
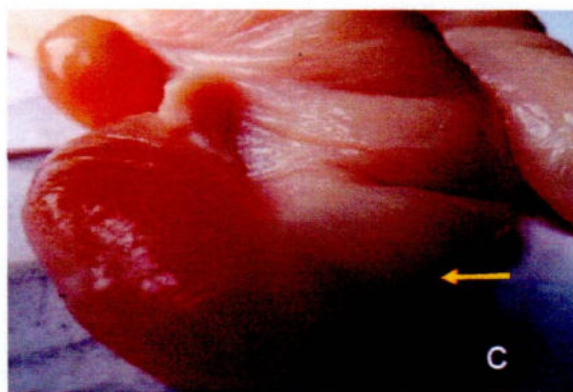
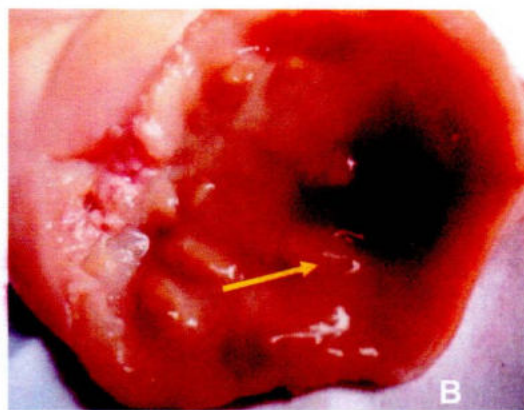
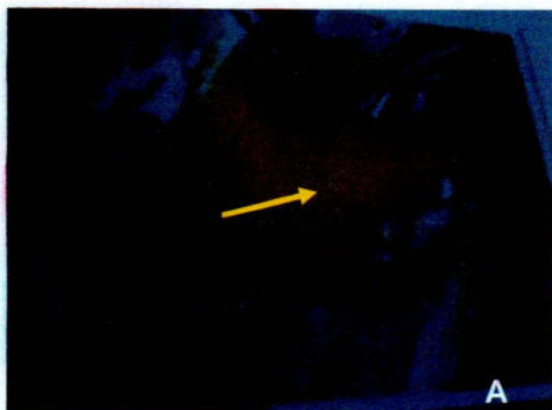
Gynaecopathological disorders of female reproductive systems of cows suspected for their culling at Birgonj of Dinajpur district



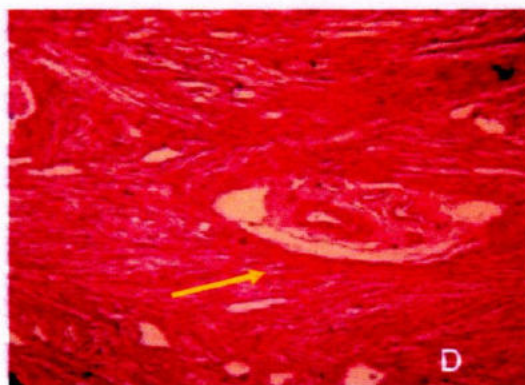
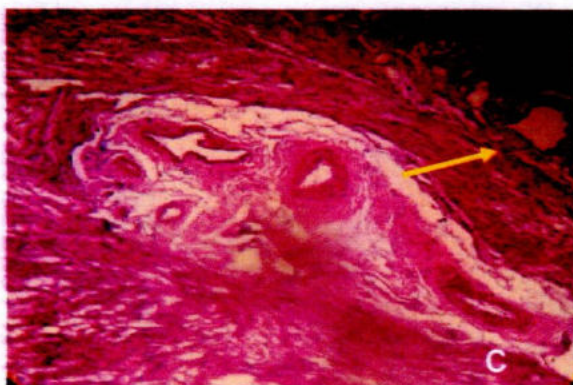
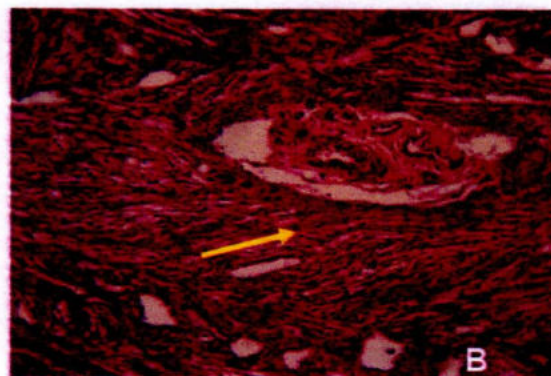
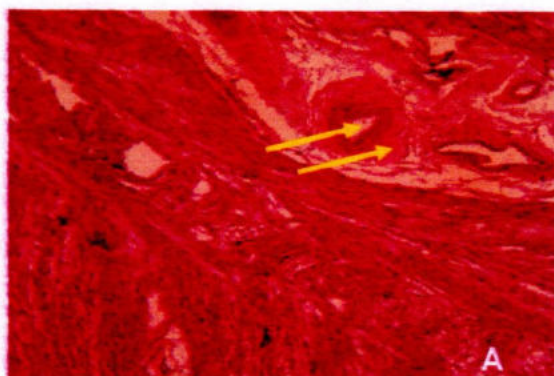
- A. Hyperplasia of the ovary
- B. Protruded follicular cyst in the ovary
- C. Ovaro-bursal adhesion
- D. Par-ovarian cyst



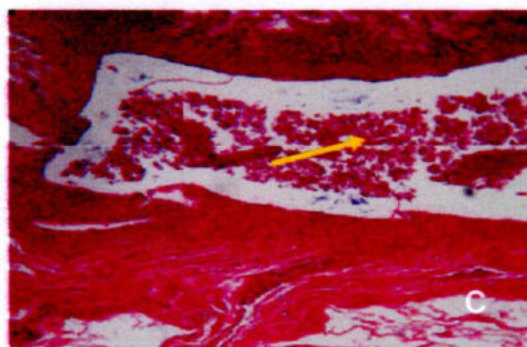
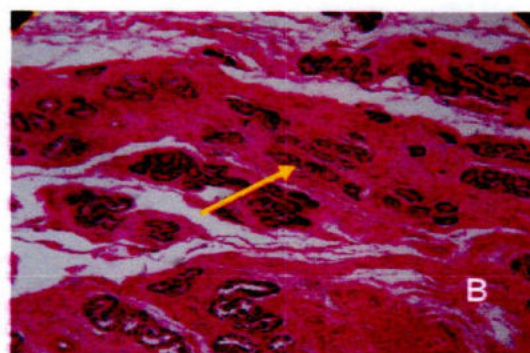
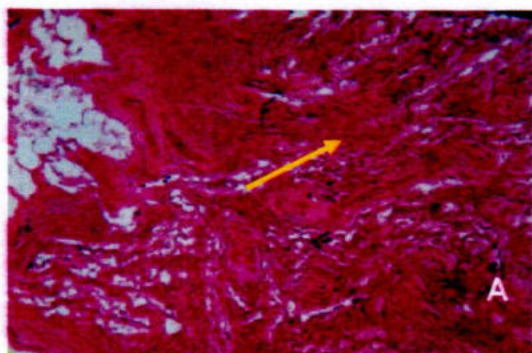
- A. Hypoplasia of the ovary
- B. Haemorrhage in the ovary
- C. Persistent corpus luteum



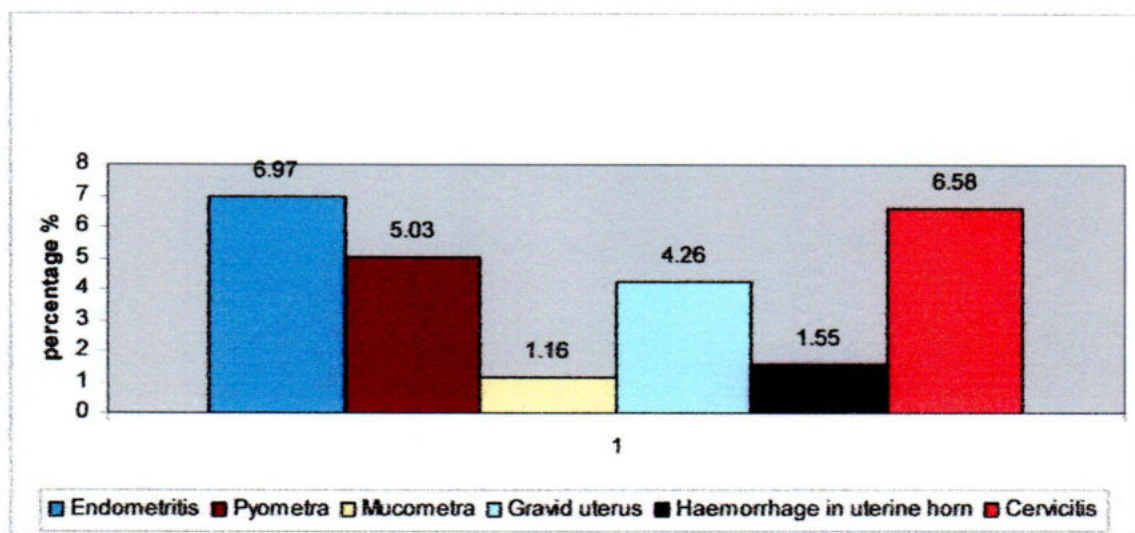
- A. A case of pyometra which is characterized by presence of cream colored pus in the uterine lumen
- B. A case of mucometra which is characterized by presence of slimy mucus in the uterine lumen
- C. Gravid uterus
- D. Haemorrhage in the uterine horn



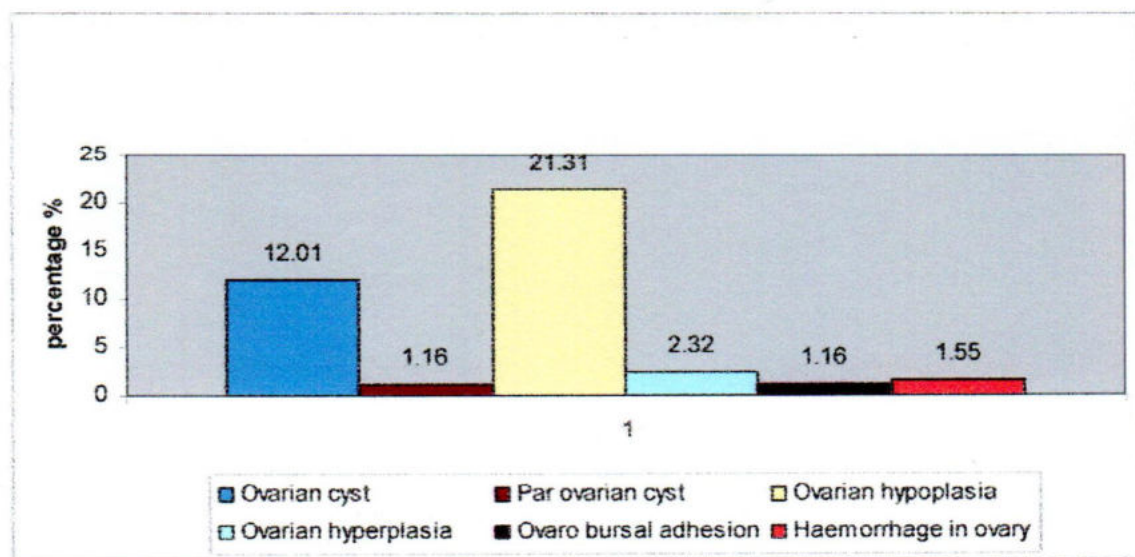
- A. Follicular cyst in ovary which is characterized by empty space, the follicular wall lined by flattened cell
- B. Hypoplastic ovary which is characterized by proliferation of fibrous tissue
- C. Haemorrhagic ovary which is characterized by presence of RBC
- D. Hyperplastic ovary which is characterized by proliferation of fibrous tissue



- A. A case of endometritis which is characterized by huge infiltration of reactive cells
- B. A case of chronic endometritis which is characterized by distorted glandular structure
- C. A case of pyometra which is characterized by infiltration of pyometra which is characterized by infiltration of reactive cells in the uterine lumen



Graph 1: Pathological disorders of female reproductive tract collected from Birgonj slaughter house



Graph 2: Pathological disorders of ovaries of cows collected from Birgonj slaughter house



CHAPTER V
DISCUSSION

CHAPTER V

DISCUSSION

The Cattle is an economically important animal in Bangladesh. But this economic important animal is often found to suffer from various reproductive disorders (Rahman, *et al.*, 1975; Ahmed, *et al.*, 1989; Rahman, *et al.*, 1993). The economic losses due to pathological disorders in the female reproductive system are resulted infertility and reduced production potentiality. The research on animal reproduction and reproductive pathology is scanty in Bangladesh. The incidence of various reproductive pathology has increased menacingly in this country probably due to introduction of intensive cross breeding programmed through artificial insemination. Therefore the present work on pathological disorders in the female reproductive system was under taken in order to monitor the present status of reproductive problems in cattle of Bangladesh.

In this study freshly collected female genitalia revealed hypoplasia of the ovary (21.31%) as the most common pathological disorder in the female reproductive system of cow. Alam and Rahman (1979) conducted a study on the diseases of female reproductive system of indigenous cows in Dhaka slaughter house for the first time in Bangladesh. In this study they recorded one or more abnormalities in 92% animals. The commonest abnormalities recorded by the authors were ovarian cysts. Occurrence of endometritis was not reported by them however pyometra was recorded. On the other hand Shamsuddin *et al.*, (1988) and Mollah, *et al.*, (1989) reported that about 8 to 27% cows suffered from endometritis among the principal causes of reproductive failure in cows of this country. Borsberry and Dobson (1989) recorded 14.80% incidence of endometritis alone or in combination with other Periparturient disorders. In recent years Simeri *et al.*, (1991) detected an overall incidence of endometritis as 10.50% which constituted as one of the most important postparturient disorders. The present findings of the high incidence of endometritis are in full agreement with reports of other workers (Hatch, *et al.*, 1986; Fivaz, *et al.*, 1978; Chaffaux, *et al.*, 1987; Shamsuddin, *et al.*, 1988 and Mollah, *et al.*, 1987). Dawson (1977) claimed that the endometritis as the major cause of breeding failure. Sandals, *et*

al., (1979) after a long term study reported 8.10% incidence of endometritis as high as 55%. Markusfeld (1984) reported that about 37% Israeli Friesian cows suffered from endometritis. Miller (1950) for the first time observed the histopathological changes of uterine sections and described endometritis into following types: chronic endometritis of lower intensity and interstitial endometritis at higher intensity. The interstitial endometritis is characterized by a decrease in number of glands, the glands being arranged singly or in groups, separated by fibrous band, being dilated, corkscrew shaped with a ragged margin and a dense round cell infiltration between the affected glands.

A characteristic change in the endometrium with variable degrees of infiltration of neutrophils, eosinophils and mononuclear cells including plasma cells and macrophages on an hpf (high power field) around uterine glands, with occasional interstitial accumulation of lymphocytic follicles were observed in cows with cloudy to mucopurulent genital discharge. While periglandular fibrosis or encapsulation, subsequent glandular degeneration and cystic dilatation of the lumen, mononuclear cells including epithelioid and plasma cell, (Rahman *et al.*, 2002). Endometritis (1.58%), pyometra (6.53%) (Farooq 2000). Endometritis and quiescent ovaries were the most prevalent conditions (63.77%) (Manda- Srinivas *et al.*, 2007).

In the post slaughter examination fetuses in the uterus were discovered in 6 cows (7.16%) whereas various pathological changes in the reproductive organs were recorded in 49 cows (58.34%). According to Kotowski, (2001) the pathological changes more often affected the uterus (59.18%) than the ovaries (40.82%).

In a study on the female genital tracts collected and examined, abnormalities recorded were 36.8% cases. The most common abnormalities encountered were ovaro-bursal adhesion (5.5%), endometritis (3.9%) and cystic ovaries (3.5%) (Abalti I *et al.*, 2006).

In the present study, the gross abnormalities in ovary detected cystic ovaries (12.01%), par ovarian cyst (1.16%), ovaro-bursal adhesions (1.16%), ovarian hypoplasia (21.31%), ovarian hyperplasia (2.32%) and haemorrhage in ovary (1.55%). pyometra (5.81%), Similar the gross abnormalities of the genitalia

recorded as cystic ovaries (3.35%), ovaro-bursal adhesion (2.9%), ovarian hypoplasia (2.2%) and endometrocervicitis (1.7%). Oviductal occlusion accounted for 0.75%, hydrosalpinx 0.54%, pyometra 0.48%, par ovarian cyst 0.26%, hypo plastic uterus 0.24% and uterine cyst 0.08% cases. The gross abnormalities ovaries were ovarian inactivity (21 cases; 10.5%), ovaro-bursal adhesions (16 cases; 8%) and cysts (14 cases; 7%). Other interesting rare pathological lesions of the ovaries were bilateral ovarian haematoma and tuberculosis (Chawdhury *et al.*, 2000). Twenty specimens (10%) had uterine lesions, the most common of which were infections, presenting as metritis and pyometra. Seven specimens (3.5%) had oviduct lesions, which included hydrosalpinx, pyosalpinx and haemosalpinx (Fathalla *et al.*, 2000). Various gross abnormalities were observed in the reproductive organs of about 16% of the cattle and the major reproductive abnormality in both total and the non-cycling animals were various degrees of fibrous adhesion between the ovary and infundibulum and mesosalpinx Asseyl *et al.*, (2004). Besides endometritis other pathological abnormalities encountered at postmortem examination of female genitalia were anestrus, cystic ovary, pyometra, cervicitis, par ovarian cyst, ovaro-bursal adhesions, sub active ovary, ovarian hypoplasia, salpingitis, hydrosalpinx and hydrometra. On the other hand similar abnormality found in the reproductive tracts of descriptive cows Ali *et al.*, (2006).

Other pathological disorders were recorded almost in conformity with the findings of earlier workers of Bangladesh and abroad (Dawson, 1967; Ramamohana *et al.*, 1965; Qureshi and Ahmed 1966; Onet, 1992; Al-Dahash and David *et al.*, 1977; Alain and Rahman 1979; Ahmed 1984).

The lesions observed at postmortem examination were more or less similar with the earlier observations (Jones and Hunt, 1983; Mc-Enttee, 1983; Ganti; A. Sastry, 1983). Apart from postmortem lesions, the histopathological features of some important reproductive disorders were almost in conformity with the earlier findings (Mc-Enttee, 1983; Meisser *et al.*, 1989; Powers *et al.*, 1990; Weishaupt and Erika, 1991; Nascimento *et al.*, 1994). However detailed histopathological findings of various reproductive disorders are still lacking.

Most researcher agreed that occurrence of different pathological disorders in the reproductive system are more frequent in high producing cows (44%) than the

medium milk producing (32%) counterparts (Nakao *et al.*, 1992). A number of factors influence the intensity and prevalence of reproductive disorders including the species and pathogenicity of the causative agent, the cellular and immunological defensive mechanisms, hormonal imbalance, and dietary status of the animal concerned and environmental sanitation.

The incidence of various reproductive disorders especially uterine infections in the form of metritis, pyometra and chronic endometritis has increased alarmingly in this subcontinent with the introduction of cross breeding programmed among high yielding varieties of cows. In addition to this, lack of proper education or hygienic management of the postpartum cows and limited veterinary services has aggravated the situation. Therefore, in order to combat the occurrence of reproductive problems cross breeding programmed through artificial insemination must be performed by skilled personnel under adequate veterinary inspection.



CONCLUSIONS

CONCLUSIONS

The study on pathological disorders in female reproductive system of cattle was conducted by the examination of freshly collected female genitalia from the slaughter house of Birgonj municipality and different hat and bazer of Birgonj Upazila abattoirs in Dinajpur district. This study revealed atrophy of the ovary (21.31%) as a most common pathological disorder. Other conditions diagnosed were cystic ovaries (12.01%), pyometra (5.03%), cervicitis (6.58), endometritis (6.97%), mucometra (1.16%), gravid uterus (4.26%), haemorrhage in uterine horn (1.55%), par ovarian cyst (1.16%), ovaro-bursal adhesions (1.16%), ovarian hyperplasia (2.32%) and hemorrhage in ovary (1.55%).

It may be concluded that various pathological disorders in the female reproductive system reasonably affect the reproduction potential and thereby suppresses subsequent calf production. Further it may be pointed out that various pathological disorders in female reproductive system are increasing menacingly along with introduction of cross breeding programme through artificial insemination. The problem became more aggravated due to inadequate veterinary coverage and gynaecological knowledge in controlling such problems. Therefore it is suggested that first of all required AI related well equipped laboratory then well trained (on AI) registered veterinary doctor should be provided to all central cattle breed station, Divisional AI center, District AI center, sub center upto Upazila and Union level to control the gynaecopathological disorder by proper therapeutic support.



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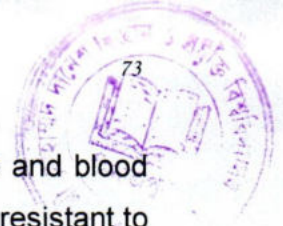
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