Diseases of Female Genital Organs of Hen

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TABLE OF CONTENT

LIST OF FIGURES

LIST OF ABBREVIATIONA

Abbreviation	Elaboration
APEC	Avian pathogenic Escherichia coli
CVASU	Chattogram veterinary and animal sciences university
LL	Lymphoid Leukosis
CRO	Cystic Right Oviduct
et al.	et alia (and others)
Fig.	Figure
FVM	Faculty of Veterinary Medicine

ABSTRACT

In poultry, reproductive disorders are widespread, and the underlying reason is usually different than in other avian species. It is more common in backyard hens than commercial ones. Because backyard chickens typically live longer, are fed a better diet, and have more room than commercial hens, neoplasia, egg-related peritonitis, a persistent right oviduct, and old age are the most common causes of reproductive diseases. Other reproductive illnesses, such as vent trauma and calcium deficiency are infrequently detected. Common health problems in the poultry sector have a direct impact on egg production. Infectious diseases, which will be one of these issues, have a detrimental impact on the reproductive system by directly harming the animal's or animal's health and lowering egg quality. Bacterial and viral pathogens mostly affect the reproductive system, specifically the ovaries and oviduct. In fact, it is intended to underline the importance of disease diagnostic methods development, epidemiological knowledge, early stage illness diagnosis, and technical people being regularly trained with updated information on disease prevention based on scientific principles. Salmonella enterica infection can result in vertical transfer of germs via eggs. Understanding immunity in the reproductive tract is crucial in designing management measures for these infections for these reasons. Our understanding of the innate immune system in the hen's reproductive tract has substantially improved in recent years. Several viral infections that can harm the health of birds or cause reversible or irreversible lesions in the female reproductive organs wreak havoc on the egg industry. Viruses cause a temporary or permanent decline in egg production, as well as the generation of low-quality eggs, as a result of their detrimental impacts. The type of reproductive sickness experienced is influenced by a number of factors, including the bird's age, the infecting virus strain, and the area of the reproductive system implicated.

Keyword: Bacterial diseases, viral diseases, reproductive organs, egg production, hen.

CHAPTER I

INTRODUCTION

Avian reproductive system is a complex biological system that goes through a series of hormonal, neurological, biochemical, and cellular changes. Almost everywhere only the left ovary and oviduct are functioning in birds. During development, the right one usually regresses and is replaced. In the adult bird, it is non-functional. The left ovary is made up of a follicle which is a pile of yellowish, spherical particles, consisting of an ovum or a yolk (T. Mahajan and S. Joshi.; 2020). The avian oviduct is divided into five distinct regions: infundibulum, which receives yolk from the ovary; magnum, which synthesizes and secretes albumen; infundibulum, which receives yolk from the ovary; infundibulum, which receives yolk from the ovary; infundibulum, which receives yolk from the ova; isthmus, a fibrous membrane that surrounds the egg white; the uterus creates the egg shell and secretes the shell membrane. The vaginal canal connects the uterus to the cloaca (Aitken, 1971). As a result, the oviduct plays a crucial role of the reproductive system in the formation of egg, after receiving ova from the ovary. There are several issues that can affect reproductive system in hens, including management errors (lighting errors, incorrect temperature settings or ventilation, incorrect feeding, equipment errors), and infectious and non-infectious agents, which can cause sudden and dramatic decreases in egg production. Recording changes in nutrition, behavior, or appearance are among the key procedures that should be followed to eliminate the source of the decline in egg production (S. Yaman and O. Yapicier., 2019). Some of the most serious health challenges in the chicken industry also have an impact on reproductive tract. Infectious diseases, which are one of these problems, reduce egg production and quality either directly by damaging the genital system or indirectly by harming the animals' health (S. Yaman and O. Yapicier., 2019). Viral pathogens that cause diseases in the reproductive organs or indirectly impair the bird's health have negative effects on egg production. Despite the importance of egg production, there are few reviews that focus on viral infections that affect egg quality and output. The current study focuses on the reproductive forms of the primary viral infections that affect poultry. The focus will be on the fundamental processes by which viral infections wreak havoc on egg production (M. Hassan and M. Abdul-Careem., 2020). As a result, the major viral illnesses that affect egg production and quality can be divided into two categories: viral infections that affect the reproductive tract

directly and viral infections that affect egg production indirectly (M. Hassan and M. Abdul-Careem., 2020). Poultry is subjected to immunosuppressive stresses and infectious illnesses on a regular basis. Animals kept in artificial habitats are exposed to a variety of potentially harmful stimuli (Glaser and Kiecolt-Glaser, 2005; Shini *et al.*, 2010). The stress response is a comprehensive and sophisticated system. It is a set of behavioural, physiological, metabolic, and immunological processes that the body uses to redistribute, adapt to, and sustain the pressures placed on it (Shini et al., 2010). Furthermore, management and environmental issues like as confinement, climatic and seasonal variations, poor food, and worm infestations have been linked to stress and a diminished immunological response in reproductive tract. Chickens have been documented to experience functional and morphological alterations as a result of stressful situations (Horning et al., 2003; Umar et al., 2014). The neuroendocrine system's functions in governing animal coping mechanisms and productivity are determined by genes. Selective breeding of chickens for genetic or phenotypic characteristics linked to specific behavioural and physiological parameters has become a powerful method for improving the health of birds. The ability of the chicken host to resist immunosuppressive drugs is a genetic trait. Genetic selection for immunosuppressive disease resistance has yielded encouraging outcomes (Hoerr, 2010; Cazaban, 2015; Rehman et al., 2016). For better reproductive tract, an adequate and appropriate nutritional approach is essential (Jain et al., 2019). However, in order to understand the detailed nutritional strategy for layers to maximize egg production, it is necessary to understand the reproductive structure of layer chickens. A number of viruses, including avian leukosis virus and chicken infectious anemia virus, can infect the hen's reproductive tract. Salmonella enterica infection can result in vertical transfer of germs via eggs. Understanding immunity in the reproductive tract is crucial in designing management measures for these infections for these reasons. Our understanding of the innate immune system in the hen's reproductive tract has substantially improved in recent years (P. Wigley., 2014). In backyard hens, reproductive disorders are widespread, and the underlying reason is usually different than in commercial-production hens. Because backyard chickens typically live longer, are fed a better diet, and have more room than commercial hens, neoplasia, egg-related peritonitis, a persistent right oviduct, and old age are the most common causes of reproductive disease (C. Greenacre, 2015).

CHAPTER II

CLINICAL DISEASES

There are many clinical diseases in reproductive tract of hen such as bacterial, viral, fungal and so many others. Maximum diseases are bacterial which causes different conditions in reproductive tract.

2.1. Bacterial diseases:

2.1.1. Colibacillosis:

The Enterobacteriaceae family's avian pathogenic *Escherichia coli* (APEC) causes coli-septicemia, hemorrhagic septicemia, coli granuloma, air sac illness, swollen head syndrome, venereal colibacillosis, cellulitis, peritonitis, salpingitis, osteomyelitis, yolk sac infection, and enteritis. APEC is frequently isolated from avian species, as are the O antigen serogroups O1, O2, O8, O15, O18, O35, O78, O88, O109, and O115. O2 and O78 are serogroups that are typically isolated and account for 80% of occurrences globally. Most animals' gastrointestinal tracts contain E. coli, which is expelled in large volumes through feces. It takes roughly 21 weeks for it to colonize in the oviduct after ingestion. Contact with diseased animals can result in transmission or by the ingestion of feces-tainted water and food inhalation of substances from dust and bedding materials is also a risk. Transmission can also happen when laying fowl breeds develop oophoritis and salphingitis before the development of the egg, the eggshell, or after it has been produced during the process of passing through cloaca. Due to APEC-induced oviduct inflammation, egg production is reduced and occasional death occurs. Exudate, which accumulates as a result of the inflammation caused by egg peritonitis, induces the production of egg yolk, which coagulates in the body. Furthermore, coli-septicemia, which affects egg production, is common in young laying chickens but uncommon in adults.

2.1.2. Salmonella infection:

Pullorum disease (PD), fowl typhoid (FT), and illnesses of chicks and hens characterized by septicemia are infections caused by *Salmonella Gallinarum* (S. Gallinarum) and *Salmonella Pullorum* (S. Pullorum). Young birds are susceptible to pullorum disease, while adult fowl are susceptible to fowl typhoid. Hatcheries, feed, and poultry houses are all potential sites of *Salmonella Gallinarum* (S. Gallinarum) transmission. *Salmonella Pullorum* (S. Pullorum) transmission can begin within 48 hours of hatching, resulting in a decreased rate of shell penetration and feed contamination ((S. Yaman and O. Yapicier., 2019). S. Pullorum is found in the reproductive tracts of layers, among other places with sexual maturation, densely in the ovary and oviduct. When chronic infection develops, amorphous and cystic follicles can generate minor lesions such as tiny nodules or ovarian follicle regression. In this scenario, the oviduct fills with a caseous exudate, causing the ovary and oviduct to malfunction, resulting in peritonitis.

FIGURE: 1 Salmonella affected ovarian follicles of chicken shows congestion

2.1.3. Fowl Cholera:

Pasteurella multocida (P. multocida) of the pasteurellaceae family causes this septicemic disease in domestic and wild fowl with significant death and morbidity rates. Adult chickens are more susceptible to the disease than young fowl, and broilers are more resistant to the disease than layers, resulting in laying hen fatalities at higher rates. Transmission occurs via the digestive tract, respiratory tract, skin, and conjunctiva, with feces or oral/nasal discharge of animals that have recovered from infection being particularly effective. In laying chickens with acute cholera, the ovaries are infected. The follicular content is spilled into the peritoneum as soon as the follicles break, giving them a flabby and heavily vascularized appearance. The stroma of immature follicles and ovaries is hyperemic, resulting in a decrease in laying hen output.

2.1.4. Egg yolk peritonitis:

Egg peritonitis is a reproductive condition in chickens that includes peritonitis, salpingitis, and oviduct impaction, as well as cannibalism and vent pecking. It can be a serious flock issue, and when it happens, it's usually due to inadequate management. There are a variety of etiologic causes that can induce egg peritonitis, but *Escherichia coli* is frequently blamed as one of the most common etiologic agents. The inflammatory reaction of the peritoneum produced by the presence of yolk material in the coelomic cavity is known as egg yolk peritonitis. Yolk material causes a modest inflammatory reaction and can be reabsorbed by the peritoneum on its own. Peritonitis can arise from secondary bacterial infection, which can lead to secondary ascites and organ inflammation, causing morbidity, death, and reduced egg production in affected flocks. Antibiotics are frequently ineffective in treating peritonitis caused by E coli infections. The best preventive strategies include body weight and uniformity management, reproductive development (ovary follicle growth and maturation), and drinking water sanitation.

2.2. Viral disease:

2.2.1. Infectious Bronchitis Virus:

A coronavirus causes infectious bronchitis in chickens, which is uncommon in backyard poultry. However, this includes a description since IB affects the female reproductive tract and can cause chickens to produce uneven and roughened eggshells with watery albumin, as well as decreased egg production (M. Hassan and M. Abdul-Careem, 2020). Younger immunocompromised hens will show clinical indications that are more severe than those seen in older immunocompromised chickens. IB is a very contagious upper respiratory disease. Clinical indications appear in chickens 36 to 48 hours after exposure and remain for about 4 days. For about 10 to 14 days, infected older birds will have a 5 percent to 10% drop in egg output (M. Hassan and M. Abdul-Careem, 2020). Virus neutralization, hemagglutination inhibition, and the enzyme-linked immunosorbent assay are all diagnostic diagnostics for IB. Disinfect and repopulate, as well as utilize a commercially available live vaccine in commercial populations, are the best ways to control and avoid exposure to the IB coronavirus. The IB vaccine is not recommended for use in backyard poultry. There is no treatment that is indicated for infected birds exhibiting clinical signs.

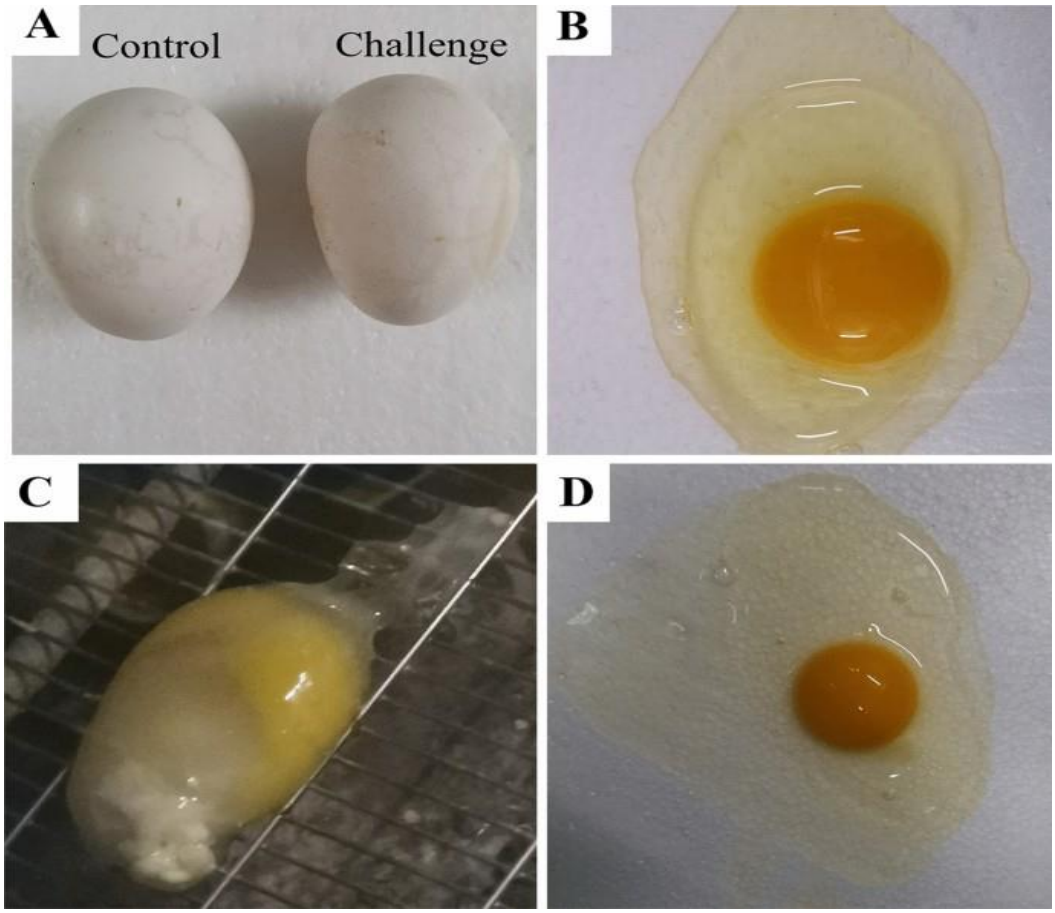

FIGURE: 2 A. A normal egg (left) and misshapen egg (right) **B**. Egg with normal albumen **C.** Shell-less egg and **D**. Egg with watery albumen.

CHAPTER III

DIFFERENT CONDITIONS OF OVIDUCT

3.1. Impacted oviduct:

A clogged oviduct is a common complication of dystocia or salpingitis. Excess mucus, albumen, and soft-shelled or deformed eggs might clog the oviduct. These materials frequently become inspissated after adhering to the oviduct wall. Depression, anorexia, a bloated abdomen, and may be dyspnea are all clinical indicators.

A history of persistent egg laying or dystocia is used to make the diagnosis. An enlarged oviduct can be seen on imaging (radiographs, CT scan, or ultrasound). It's possible that you have hyperostosis. The bird may have leukocytosis, as well as elevated levels of total protein, cholesterol, and triglycerides. Supportive treatment (fluids, analgesics, NSAIDs, and antimicrobials) is used.

3.2. Cystic Right Oviduct

Commercial chickens can develop cystic right oviduct (CRO), but it appears to be more common in home poultry. The right oviduct should regress embryologically, but if partial development occurs, a CRO develops. Chickens with CRO show ambiguous indications of fatigue, tiredness, decreased appetite, slowed or stopped egg laying, and, most importantly, a huge, fluctuant coelomic cavity. Coelomocentesis and aspiration of an opaque yellow fluid might provide a preliminary diagnosis. The presence of coelomic fluid can be confirmed by radiographic imaging. An ultrasonographic scan can also detect discrete pockets of fluid or cysts in the midcoelomic area, confirming the presence of coelomic fluid. Cysts associated with CRO can be rather big, measuring up to 10 x 20 cm2 (C. Greenacre, 2015).

CRO is treated through exploratory coelomic surgery, which involves the removal of cysts and fluid (Fig.3). Treatment resolution of CRO has a medium to poor prognosis. The bird should not

be positioned totally on its dorsum during the physical examination, radiological imaging, or surgery because it may drown in its own fluids if any of the coelomic fluid reaches the ostium of the caudal thoracic air sac. Secondary infection, as well as other concomitant illnesses, can occur in these situations (Fig.4).

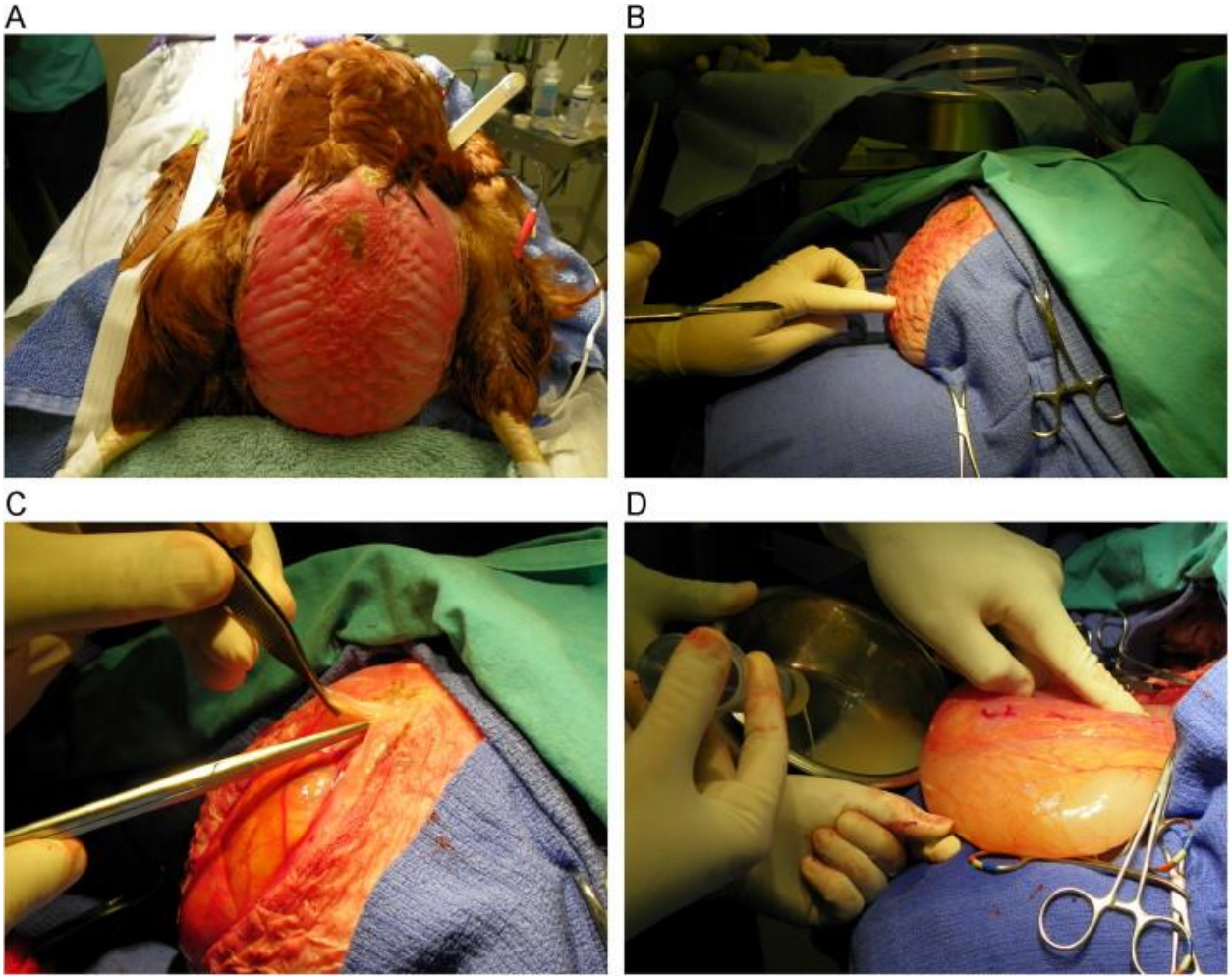

FIGURE: 3 Photographs taken during surgery of a hen with a cystic right oviduct. **(A**) Notice how the bird is positioned at nearly a 45-degree angle to avoid drowning in fluids. (**B)** To ensure sterility, proper draping is required. **(C)** An incision in the skin reveals the cyst's vascular and cystic characteristics. (**D**) By removing the fluid first and capturing it in a bowl, the remainder of the coelomic cavity can be seen more clearly.

FIGURE: 4 A chicken with a noncalcified egg blocking the left oviduct and a cystic right oviduct in gross necropsy. Before this photograph, the cystic right oviduct was significantly more fluid-filled and took up the majority of the space within the coelomic cavity. Photograph courtesy of Dr. Linden Craig, University of Tennessee.

3.3. Neoplasia:

Backyard chickens that are permitted to live to an advanced age and/or are exposed to the lymphoid leukosis (LL) virus are prone to neoplasia. LL and ovarian carcinoma are the two most prevalent types of neoplasia in backyard hens' female reproductive tracts, but carcinomatosis and other neoplasia can also occur. Lethargy, weakness, decreased appetite, decreased or stoppage of egg laying, and an enlarged hard coelomic cavity are all symptoms of LL and ovarian cancer (E. Gingerich, D. Shaw., 2015). A tissue mass or masses in the coelomic cavity can be confirmed

by radiographic imaging and ultrasound. For chickens with LL or ovarian cancer, there is currently no treatment available.

Lymphoid leukosis is caused by a retrovirus that only affects chickens and is linked to the development of neoplastic tumors in a range of tissues, including the reproductive tract. Clinical indications usually appear in older chickens between the ages of 24 and 40 weeks. Anorexia, weakness, a pale comb, and a bloated abdomen are some of the nonspecific symptoms linked with LL. Gray to white tumors involving the liver and other organs can be found on gross necropsy in hens with LL. The clinical signs of LL can be difficult to distinguish from those of Marek's disease; however, LL does not appear until after 14 weeks of age, whereas Marek's disease usually appears between 10 and 12 weeks. At around 18 to 20 weeks of age, most hens begin to lay eggs (S. Orosz et al., 1997). The easiest way to keep a flock of hens free of LL is to test them and remove any positive breeder birds. Ovarian cancer is most common in older birds, with infected hens displaying clinical indications that are similar to those seen in LL (Fig.3).

FIGURE: 5 Gross necropsy of a hen with ovarian carcinoma. Photograph courtesy of Dr. Linden Craig, University of Tennessee.

There is currently no treatment for avian ovarian tumors. Palpation of a mass, histopathologic study of an ovarian mass with aspiration or biopsy, radiological evidence of a tumor, or surgical exploration of the coelomic cavity are all used to make a diagnosis. The majority of birds are killed. If an inoperable neoplastic mass is discovered during an exploratory coeliotomy, death is advised while the patient is sedated (S. Orosz et al., 1997).

3.4. Abnormal egg production:

Several disorders, including bacterial infections, can induce irregular egg production. When elderly birds lay eggs with blood or flesh patches inside, this is an example of aberrant egg production. Senescence is accompanied by a reduction in or complete cessation of egg production. In general, a hen lays the most eggs during the first year of sexual maturity, fewer eggs during the second year, and a major decline in egg output during the third and fourth years. After 5 years of egg laying, the majority of hens stop producing eggs (O.A. Petritz et al., 2013). The "spent hen" of commercial production, which is caused by hypocalcemia and nutritional deficits at the age of two years, is not the same as age-related cessation of egg laying. Many backyard chickens are kept as pets that happen to lay eggs and are kept much into their prime egg-laying years. In addition, when the day duration shortens, egg production falls; as a result, egg production declines in the fall and winter (O.A. Petritz et al., 2013).

FIGURE: 6 Different types of abnormal eggs

3.5. Thin-Shelled, Soft Shelled, or Shell-Less Eggs:

Inadequate calcium supplementation causes thin-shelled, soft-shelled, or shell-less eggs to be generated. A optimum-laying ration should be given to laying hens. Calcium and protein levels in layer diets are higher than in maintenance diets (R. Crespo and H.L. Shivaprasad, 2008)Supplemental calcium is not necessary if the layer ration accounts for 90% of the overall diet (R. Crespo et al., 2008). Calcium supplementation for laying hens is commonly done with crushed oyster shell. Calcium depleted eggs are more common in high-volume commercial laying facilities, and are referred to as "caged layer fatigue." Weight loss, weakness, hypocalcemia, and feather loss are all symptoms of "caged layer fatigue" in birds. Due to oviductal inertia, a hypocalcemic hen is more prone to experience dystocia or egg impaction. Because calcium is essential for normal muscular contraction, oviduct dysfunction arises as a

result of insufficient muscle contraction (R. Crespo et al., 2008). Correction of the bird's food and intramuscular calcium gluconate at a dose of 30 mg/kg are used to treat hypocalcemia.

3.6. Cloacal or Uterine Prolapse:

The cloaca is normal to prolapse somewhat following egg laying, but the everted tissue usually recovers to its normal place within minutes. Cloacal or uterine prolapse is more common in commercial heavy-production hens with crowded conditions and cannibalistic behavior, which results in other hens pecking the vent (H.L. Bowles et al., 2006). This illness is not diagnosed in backyard poultry, but it may occur in some birds under particular conditions (e.g., significant egg laying and nutritional deficiencies).

FIGURE: 7 Cloacal or uterine prolapse

LIMITATIONS

All the clinical diseases could not be diagnosed due to insufficient facilities in poultry sector in our country. As a result, maximum diseases could not be identified and cure the poultry. Different conditions of oviduct like cystic right ovary could not be cured due to lack of surgery in poultry sector in our country.

CHAPTER IV

CONCLUSION

It has been proven that reproductive diseases can be related to a variety of factors other than establishment management mistake, including infectious agents lead by bacterial pathogens, viral pathogens and others. Pathogens, in particular, are highlighted. When it's contagious, when specific factors impacting egg production are considered, then it is necessary to consider the measures to be taken in poultry houses. Treatment of disease is less important than prevention. All efforts were made to disease-controlling agents should be considered as part of the overall plan. All measures to control disease agents should be considered within the framework of the biosecurity encompasses a wide range of issues, including disease prevention. The introduction of agents into the establishment, the prevention of disease transmission in the event of a disease breakout, the disease to healthy animals taking precautions to keep contaminated materials out of the environment dispersing throughout the environment and eradicating reproductive disease agents are required. With all information gathered from disease monitoring, a prevention, control, and eradication program for illnesses that impair egg production should be undertaken. The development of illness diagnostic procedures, the acquisition of disease epidemiological knowledge, early disease diagnosis, and the training of technical staff with fresh and updated information are all considered in this regard.

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BIOGRAPHY

I am Farjana Akter, daughter of Late Haji Ahamed Kabir and Khurshida Begum was born on February 25, 1998 at Jahanpur, Fatikchari. I passed Secondary School Certificate examination from Jamal khan Kusum Kumari Girls high School in 2013 (GPA-5.00) followed by Higher Secondary Certificate examination from Chattogram College in 2015 (G.PA-5.00). She is now enrolled in year-long internship programme for completion of Doctor of Veterinary Medicine (DVM) degree in CVASU, Chattogram, Bangladesh. She has immense interest to work as a veterinary practitioner.

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