Some reproductive abnormalities in domestic fowls

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Abstract

Of the 102328 birds presented to the avian ambulatory clinic of the Veterinary Teaching Hospital for diagnosis between March, 1976 and February, 1992, only 261 were found to have reproductive abnormalities. The abnormalities recorded were, oophoritis (39.2%), egg yolk peritonitis (11.9%), salphingitis (7.7%), rudimentary ovary (7.0%), ruptured ovary (2.8%), ectopic eggs (2.1%), hermaphroditism (2.1%), oviduct discontinuity (1.4%), oviduct impaction (1.4%), atrophied (1.4%), cystic (1.4%) and ruptured oviduct (0.8%), sex reversal (0.7%) and regressed testis (0.7%). Most reproductive abnormalities occurred in the second phase of egg production except rudimentary ovary which was common in the first phase of egg production. The results also showed that most of the cases of reproductive disorders were recorded in improved (exotic) breed of chickens and only a few cases were recorded in local birds. Oophoritis, egg yolk peritonitis and salphingitis were found to be the most important reproductive abnormalities of domestic fowls. These conditions are usually caused by infectious agents like bacteria and viruses, which can be controlled by very good management practices.

Keywords: Birds, abnormalities, phase, egg, production, reproduction

Introduction

Almost the entire cost of producing an egg accrues from maintenance of layers, an appropriate intensity of egg production per layer had to be maintained to ensure reasonable results (Marutisim, 1977). The major problem facing egg producers in Nigeria today is economic losses due to drop in egg production as a result of diseases and death of laying birds.

Although some abnormalities of the reproductive organs of chickens may be of economic importance because of their effect on production (Peckham, 1972) such abnormalities

are due to various causes (Hungerford, 1969; Pechham, 1972). This paper reports abnormalities of the reproductive organs of the domestic fowl (chickens) in Zaria, Nigeria.

Materials and methods

Clinic records of the Avian Ambulatory clinic of Veterinary Teaching Hospital were studied from March, 1976 to February, 1992. All cases with abnormalities in any part of the reproductive tract or complications resulting from it at different parts of the abdominal cavity were studied.

The reproductive abnormalities were studied based on breed, type and age of bird, flock size, and phase of egg production.

The following phases of egg production were considered:

1. Phase I (P1): Chickens that were 20-31 weeks old;
2. Phase II (P2): Chickens that were 32-59 weeks old;
3. Phase III (P3): Chickens that were 60-69 weeks old;
4. Moulting Phase (M3): Chickens that were 68-75 weeks old
5. Second year of production (2Y): Chickens that were 76 weeks old and older (Oluyemi and Roberts, 1979).

The morbidity and mortality rates, proportionate morbidity rates, and average morbidity rates for the different disorders were calculated. Also, clinical observations and gross lesions at post mortem were recorded.

Results

Distribution of abnormalities

A total of 143 cases of reproduction abnormalities were recorded in the period of study. These represent only (0.15%) of all cases presented to the clinic in the period under study. Of the 102, 328 birds presented, reproductive abnormalities were found in only 261 (0.03%) birds.

The abnormalities were mainly of the ovary and oviduct with some complications involving the peritoneum.

The following abnormalities were recorded: oophoritis (35.2%), rudimentary ovary (7.0%), atrophied and regressed ovary (6.3%), egg yolk peritonitis (11.9%), malformed eggs 94.2%), hermaphroditism (0.7%), salpingitis (7.7%) oviduct discontinuity (1.4%), oviduct impaction (1.4%), rudimentary (4.7%) and ruptured oviduct (0.7%), atrophied (1.4%) and cystic oviduct (1.4%), sex reversal (0.7%) and (0.7%) cases of enlarged and regressed testis (Table 1).

Most of the reproductive disorders were found in layers. Cystic ovary was recorded in breeders and regressed testis was recorded only in local birds. Rudimentary ovary and egg yolk peritonitis were recorded in layers, breeders and mixed type of birds (Table 2).

Oophoritis was the commonest reproductive disorders of poultry, followed by egg peritonitis, salpingitis, rudimentary, atrophied and regressed ovary in the order of frequency of occurrence. Morbidity occurred more in female than in male birds. Only 2 (1.4%) of the abnormalities affected male birds (Table 2).

Most of the reproductive disorders occurred in the second phase of egg production. An exception was rudimentary ovary which was commonest in the first phase of egg production. Oophoritis was the only abnormality recorded in the second year of production while cystic oviduct was recorded only in the first phase of egg production. Ectopic eggs were seen in both second and third phases of egg production and no reproduction disorder was recorded in moulting phase (Table 3).

Clinical and post mortem findings

- (i) *Regressed testis*: This was observed in a 25 months old cock. It has all the external features and normal behaviour of a cock. At post mortem the left testis was found to be 1/10th the size of the right testis. The regressed testis was also fibrotic.
- (ii) *Sex Reversal*: This occurred in a Babcock hen which became broody at 20 weeks of age and moulted for 4 months, lost its broodiness and developed the external features of a male. It crowed weakly, mounted other hens and was aggressive towards the cock in the flock. The spurs did not enlarge and female plumage was related. Necropsy at 30 months of age showed regressed left oviduct and small undeveloped ovarian follicles of even size of arrested over development.

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Table 1 *The frequency, average, morbidity and mortality rates due to reproduction disorders of chickens in Zaria*

Type Disorder	Number of care	Percentage of Total	Average Age (Weeks)	Average Morbidity (sp)	Proportionate Morbidity Rate (sp)	Average Morbidity (sp)	Proportionate Mortality Rate (%)
Oophoritis	56	39.2	44.7	25.2	9.4	20.2	10.6
Rudimentary ovary	10	7.9	41.7	32.5	12.1	31.2	16.3
Atrophied and regressed Ovary	9	6.3	39.6	3.8	1.4	3.7	1.9
Ruptured ovary	4	2.8	38.0	0.4	0.2	0.2	0.1
Cystic vary	5	3.5	41.6	5.3	2.0	4.4	2.3
Egg yolk peritonitis	17	11.9	37.0	5.6	1.8	2.8	1.5
Malformed Eggs	6	4.2	52.6	3.4	1.3	2.2	1.2
Ectopic eggs	3	2.1	34.6	3.8	1.4	6.3	3.2
Salphingitis	11	7.7	50.7	23.1	8.6	28.3	14.8
Rudimentary oviduct	7	4.9	38.1	1.9	0.7	1.5	0.8
Segmental aplasia of the oviduct	2	1.4	52.0	50.0	18.5	2.0	1.0
Oviduct impaction	2	1.4	36.0	26.2	9.8	1.2	1.6
Ruptured oviduct	1	0.7	40.0	3.5	1.3	2.3	1.2
Atrophied oviduct	2	1.4	32.0	2.3	0.9	2.3	1.2
Cystic oviduct	2	1.4	37.5	26.4	9.8	26.7	14.0
Sex reversal	1	0.7	27.0	13.1	4.8	12.8	6.6
Hermaphrodism	3	2.1	42.8	26.9	10.2	32.8	17.1
Enlarged testis	1	0.1	60.0	0.5	0.2	0.4	0.2
Regressed testis	1	0.1	-	15.0	5.6	10.0	5.2
Total	143	100.0		168.3	100.0		100.0

(iii) *Oviduct impaction*: Two cases of impacted oviduct were recorded: Case I. A 2-year-old starbro-broiler hen that had stopped laying for about 6 months was slaughtered for consumption. The farmer could not cook it because of the "swelling" seen in the abdominal cavity. At post mortem, the ova

were regressed and the oviduct was greatly distended with prominent blood vessels and twisted at two points. The enlarged oviduct was completely filled with a well defined mass. The mass was made up of elliptical formation that were made up of a caseous, cream coloured material arranged in layers, in the form of

concretions. This material had the odors of a cooked egg. The oviduct measured about 67.0 cm in length and at its widest point had a circumference of 32.0cm. The oviduct and the mass within it weighed 1.1kg.

Case II: The bird presented exhibited a penguin-like posture, could not balance itself and walked with difficulty. The abdomen was greatly distended and firm. The uterus was greatly distended and was impinging on the abdominal organs. Its blood vessels were prominent and some portions of the uterine wall were either congested or necrosed. A collection of shell-less eggs and caseated connections of yolk and albumin occupied the lumen of the uterus. An egg yolk was found in the upper portion of the magnum and there was torsion at the junction of the uterus and vagina. The ova were flabby but mostly of the normal yellow colour. The collection of egg-yolk albumin weighed 0.86kg while the hen weighed 1.62kg.

(iv) *Cystic oviduct*: This abnormality was seen in a 15-month old Olymphian-black hen.

The hen weighed 5.5kg, was alert, exhibited a penguin-like posture, its abdomen was greatly distended and turgid and its vent was dorsally located. At slaughter, much of the abdominal cavity was occupied by a thick walled cyst, supplied by a prominent blood vessel. It contained 1.4 litres of a milky and foamy fluid, membranes of ruptured ova, several intact but floating ova and small to medium sized ova still attached to the body by stalks. There was no connection between the cyst, the abdominal cavity and the oviduct. The tubular infundibulum was thin walled and contained a colourless fluid.

(v) *Ectopic eggs*: In all the cases with ectopic eggs, fully formed eggs were found in the abdominal cavity. In one of the cases the shell was hard, while in the other case the shells were soft-shelled.

(vi) *Atrophied/regressed ovary*: This condition was usually noticed at post mortem, the

ovarian follicles were almost of the same size, some of them were flattened and the oviduct looked like that of a juvenile.

(vii) *Egg yolk peritonitis*: At post mortem egg yolk was found in the abdominal cavity. In chronic cases the yolk formed clumps around the intestines and the mesentery in some cases the serosal surface of the intestine were adhered together with or without fibrin deposits and the abdominal air sacs were usually cloudy.

(viii) *Malformed egg*: In this condition, eggs of various shapes and sizes were seen. Some of the eggs had blood spots on them, other eggs were soft-shelled while some were shell-less.

(ix) *Salphingitis*: In this condition the whole length of oviduct was inflamed. In others the inflammation was limited to some portions of the uterus.

(x) *Segmental aplasia of the oviduct (oviduct discontinuity)*: In both cases seen here the middle portion of the oviduct was missing and both segments contained a serous fluid.

(xi) *Rudimentary ovary and oviduct*: In cases where the ovary was rudimentary the oviduct was also rudimentary. Both organs looked like that of a juvenile even after the hen had attained sexual maturity and the flock mates were already laying.

(xii) *Ruptured oviduct*: In this case the wall of the oviduct was ruptured at the anterior end (uterus) and a large fully, formed egg and accumulated blood clot were found in the abdominal cavity.

(xiii) *Cystic ovary*: Here the ovarian follicles were of even size and shape and contained a colourless fluid.

(xiv) *Atrophied oviduct*: This condition was seen in birds that had attained sexual maturity and had produced eggs. However, at the time of examination the ovary was inactive and the oviduct of subnormal size.

(xv) *Oophoritis*: This was a common disorder

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characterized by ovarian follicles of normal size that were usually congested, discoloured, flabby and misshapen.

- (xvi) *Enlarged testis*: This was seen in an adult local cock that was brought to the Clinic for post-mortem examination. The left test was approximately 3 times the size of the right testis which was of normal size.

Discussion

It appears as reported earlier (Peckham, 1972) that the incidence of abnormalities of the reproductive organ of chickens is low. Sex reversal due to neoplasm of ova (Gupta, 1973) and impaction of oviduct due to atresia of the oviduct (Gupta, 1973) has been reported. The impaction of the oviduct reported here may be as a result of any of the following causes, torsion, poor nervous tone of the oviduct, increased abdominal fat and hereditary factors. (Hungerford, 1969; Peckham, 1972). Similar signs were also recorded in the cases reported in this paper. The cause of the sex reversal in the hen and cock in this report could not be identified but the changes may be as a result of the anatomical changes in the ovary. In order of frequency, the occurrence of reproductive abnormalities found in non-laying hens were oviduct dysfunction, cystic oviduct, ovarian dysfunction and presence of soft-shelled eggs in the peritoneal cavity (Hutt *et al.*, 1956). These abnormalities were also found in the present study.

Most of the disorders were recorded in the second phase of production, as this is the period when the ovary is under severe stress due to high rate of egg production (Oluyemi and Roberts, 1979). Few cases of reproductive disorders were recorded in the moulting phase and second year of production because birds in

these phases lay fewer eggs or none at all. In the moulting phase, the reproductive organs are less active and quiescent thus the bird is not under the stress of egg production. Also, most commercial egg producers keep birds for one year of production (Abdu *et al.*, 1992).

Oophoritis was the commonest reproductive disorder. This may be due to the high nutritious nature of the yolk which makes it a good medium for bacterial growth. The location of the ovary also makes it possible for infection of adjacent organs like the lungs, liver and kidneys to spread to the ovary. Arizona group of bacterial and streptococcus species are known to produce generalized infections and septicemia in laying birds, and they may localize in the ovary (Hungerford, 1969).

Reproductive disorders occurred mostly in improved strains of layers. This may be because mostly of the year flocks are kept for commercial egg production as such owners cared much for their investment, so they often submit dead or sick birds to the clinic for diagnosis and subsequent treatments. Few cases of reproductive disorders were recorded in breeders because there are few farms that raise parent stocks in Zaria and the few farms adhere strictly to disease control measures.

Local poultry appear to be less prone to reproductive disorders, because their reproductive organs are less active under the traditional husbandry system. The hen laid about 4-6 clutches of eggs in a year. Also, the owners of local poultry do not keep them for commercial purposes and the input in terms of capital is low (Ibrahim and Abdu, 1992; Abdu *et al.*, 1994) hence the farmers do not often present sick or dead birds for diagnosis and treatment.

Table 2 *Distribution of reproductive disorders in chickens by breed, type and age*

Type of disorder	Breed	Type	Number of cases	Average age (weeks)	Average morbidity (sp)	Average morbidity
Oophoritis	Improved	Layers	48	41	7.66	2.68
	Improved	Breeders	8	50	1.00	1.63
Rudimentary Ovary	Improved	Layers	8	28	5.37	1.79
	Improved	Breeders	2	61	7.14	4.45
Atrophied/regressed ovary	Improved	Layers	9	39	3.78	3.69
Ruptured ovary	Improved	Layers	4	79	0.38	0.23
Cystic ovary	Improved	Breeders	5	42	5.30	4.36
Egg yolk Peritonitis	Improved	Layers	16	41	4.95	2.71
	Improved	Breeders	1	33	0.03	0.03
Malformed Eggs	Improved	Layers	6	53	3.42	2.24
Ectopic eggs	Improved	Layers	3	35	3.67	6.25
	Improved	Layers	6	39	2.94	1.69
Salpingitis	Improved	Breeders	3	61	0.51	0.46
	Local	Mixed	2	52	19.64	26.16
Rudimentary Oviduct	Improved	Layers	7	38	1.88	1.49
Segmental Aplasia of the Oviduct	Improved	Layers	2	52	50.0	2.00
Impaction	Improved	Layers	2	36	26.2	1.2
Ruptured Oviduct	Improved	Layers	1	40	3.48	2.33
Atrophied Oviduct	Improved	Layers	2	32	2.25	2.25
Cystic oviduct	Improved	Layers	1	26	1.43	1.71
	Local	Mixed	1	29	15.00	25.00
Sex reversal	Improved	Layers	1	27	13.07	12.82
Hemorrhoidism	Improved	Layers	2	50	6.93	12.82
Enlarged testis	Improved	Layers	1	60	0.48	0.44
Regressed testis	Local	Mixed	1	-	15.00	10.00
Total			143			

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Table 3 *Distribution of reproductive disorders according to the phase of egg production*

Type of Disorder	Phase of Egg Production					
	P1	P2	P3	M3	2Y	Total
Oophoritis	2	53	-	-	1	56
Rudimentary ovary	7	1	2	-	-	10
Atrophied/Regressed ovary	-	9	-	-	-	9
Ruptured ovary	1	3	-	-	-	4
Cystic ovary	-	5	-	-	-	5
Egg yolk peritonitis	-	17	-	-	-	17
Malformed eggs	-	6	-	-	-	6
Ectopic eggs	2	1	-	-	-	3
Salpingitis	-	8	3	-	-	11
Rudimentary oviduct	-	7	-	-	-	7
Segmental aplasia of the oviduct	-	2	-	-	-	2
Oviduct impaction	-	2	-	-	-	2
Ruptured oviduct	-	1	-	-	-	1
Atrophied oviduct	-	2	-	-	-	2
Cystic oviduct	2	-	-	-	-	2
Sex Reverse	1	-	-	-	-	1
Hemaphrodism	-	3	1	-	-	3
Enlargement Testis	-	-	-	-	-	1
Regressed Testis	-	-	-	-	-	0

P1 = Phase 1 (20-31 weeks of age)

P2 = Phase 2 (32 – 59 weeks of age)

P3 = Phase 3 (60-67 weeks of age)

M3 = Moulting Phase (68 – 75 weeks of egg)

2Y = Second Year of production (76 weeks and older).

More cases of reproductive disorders were recorded in the hens because most of the commercial egg producers raise chickens and the population of cocks is less than that of hens even in parent stocks and in the traditional system of management where the cocks are culled and sold more often than hens (Ibrahim and Abdu, 1992).

In conclusion, it can be said that though reproductive disorder are not very common, yet they are very important economically to the

farmer because they cause cessation or drop in egg production and also death of laying birds.

The farmers are advised to adhere strictly to disease control measures and maintain the poultry houses in good sanitary conditions. The farmers should also avoid over-stimulating the birds by adhering strictly to the lighting programme and there should be little or no noise around poultry houses.

References

- Abdu, P. A.; Jahun, B. M. and Sa'idu, L. 1992. Effect of disease on egg production in Chickens in Zaria. *Proc. Of national Workshop on Livestock and Veterianry Services*. Held at the National Research Institute Vom, Nigeria, 11th August, 1992, pp. 22-33.
- Abdu, P. A., Sa'idu, L. and Sa'idu, S. N. A. 1994. Productions and Prospects of Indigeneous Poultry Workshop on Integrated Rural Development. Held at the national Veterinary Research Institute Vom, Nigeria 15th – 18th February. 1994. pp. 70-79
- Gupta, B. N. 1973. *Case Report: Abdominal Mass in the Chicken: (Gallus domesticus)*. Av. Dis., 17 (1-4): 453-458.
- Hungerford, T. G. 1969. *Disease of Poultry including Cage birds and Pigeons*, 4th Edition. Published by agnus and Robertson, Sydney.
- Hutt, F. B. Goodwin, K. and Urban, W. D. 1956. Investigation of Non laying hens. *Corn Vet.*, 46: 257-273.
- Ibrahim, M. A. and Abdu, P. A. 1992. Ethnoagro-veterinary perspective of Poultry management, health and Production, among the Hausa/Fulani of rural Nigeria. *Proc. of the Scientific Session of the 29th Annual General Meeting of Nigeria Veterinary Medical Students Association*. Held at Durbar Hotel Kaduna 27th – 30th October, 1992 pp. 173-181.
- Marutram, B. 1977. Component analysis of cost of Poultry Rearing. *Ind. J. of Anim. Sc.*, 43 (8): 730-737.
- Oluyemi, J. A. and Roberts, F. A. 1979. *Poultry production in Warm West Climates*. 1st edition published by the Macmillan Press London.
- Peckham, M. G. 1972. *Vices and Miscellaneous Diseases*. In: *Disease of Poultry* Six Edition by Hotstad, M. S. Nalnek, B. W. Helmbnoldt, C. E. Peid, E. m. and yonder (Dr.). H. W. The Iowa State University Press, Ames, U. S. A. pp. 1055-1112

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