Egypt. J. Vet. Sci. **Vol. 51,** No. 1, pp. 55-59 (2020)

Egyptian Journal of Veterinary Sciences
https://ejvs.journals.ekb.eg/

Morphometric Parameters and the Dynamics of Development of Quail (*Coturnixcoturnix*) Spleen

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IN THE present studyquails *Coturnixcoturnix* **(**Linnaeus, 1758) of 3 breeds- Pharaoh, English White quail, Manchurian Goldenwere studied from Azerbaijan from June to September 2018. 120 quails were kept in 3 compartments of a large cage. Materials were referred to in neonatal, juvenile sexual maturity, morphofunctional maturity periods.

Up-to the end of researches the spleen grows intensively for 3 months. The decrease of all morphometric indicators of quails' lifespan was recorded on the 120th day of quails. Comparing the recorded absolute weight of the spleen at 90 days it was decreased from 0.60g to 0.07g in Pharaoh breed, from 0.63g to 0.08g in the English White quails and from 0.57g to 0.06g in the Manchurian Golden quails.

Keywords: Quails (*Coturnix coturnix*), Spleen, Pharaoh, English White quail, Manchurian Golden.

Introduction

Quail *(Coturnix coturnix*) is the smallest poultry [1]. According to zoological systematics, this include the *Aves* class*, Neornithes* subclass*, Galliformes* order*, Phasiantidae* family and *Carinatae* superorder. Quail eggs are good source of nutrients for human health. Quail is tasty for its flesh and egg [2]. Because these birds have a very high level of natural resistance, to infectious diseases than other poultry[3, 4].

At recent times, concern on health lifestyle is increasing among the people. In this respect, the demand for balanced food, the ecologically fresh products enriched with vitamins and minerals vital for organism is daily increasing. Flesh and egg of quail hold the first place for the amount and abundance of vitamins, amino acids containing in poultry products and useful microelements necessary for organism [5].

Various chemical and synthetic components used in their feeding and disease less management effect on immunologic features of organism and in the meantime influence on their living endurance and productivity [6-8].

Organs of the immune system due to their role and function are peripheral organs that implement complex morphofunctional alternations to form immune responding reaction, after central and antigenic effects, which the formation of T- and B-lymphocytes occurs [3].

Central organs of immunity in birds include jaundice, bone marrow, bursa of Fabricius, thymus [9], peripheral organs include Harderian gland, Meckel's diverticulum, spleen, lymphoid nodules of caecum, lymphoid elements accumulated in intestine and around bronchus and pharynx [10, 11].

Recently, morphologic, physiologic and immunologic features are in studying phase. Immunity of birds during incubation period, several phases of formation completed go through in incubation period. The success of this process defines the forward life activity and its endurance to different diseases [12]. Purpose in research

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(*Received* 18/09/2019; *accepted* 28/10/2019)
DOI. 10.21608/ejvs.2019.16861.1096

is to study the dynamic of the development of morphometric features of spleen of quail being one of the organs of the peripheric immune system regardless with the age at postnatal stage of Pharaoh, English White, Manchurian Golden quail breeds.

Materials and Methods

The studies were conducted at the Institute of Zoology, National Academy of Sciences of Azerbaijan. The object of research was 150 bird heads aged 1-120 days. The studied birds belonged to 3 breeds - Pharaoh, English white, Manjurian gold. Quail were kept in 50 birds in 3 cages in the vivarium of institute. Birds were fed standard feed, 3 times a day. In the studied birds of all breeds, on the 1st, 7th, 14th, 21st, 28th, 35th, 60th, 90th and 120th day, the spleen parameters were measured and average data were displayed, processed using the Statistics v. 12 program.

The research material was a spleen of clinical healthy quails, which belongs to peripheric organs of the immune system. Materials were referred in neonatal (24 hours - daily), juvenile (30 days) sexual maturity (of 60 days), morphofunctional maturity (90-120 days) periods in conformity with postembryonic periods of ontogenesis to study the changes happened in spleen depending on the age. 5 samples have been taken from each group of age. The opening of the abdominal cavity of quailswas carried out according to the method of S.B.Seleznev [13].

Quails and their spleens were weighted on electronic (Adventura Pro) and Torsion (WAGA Torsyjna WTW) scales at a precision of 0.001g. Absolute weight of body, absolute and relative weight of spleen and weight index of spleen included morphometric researches.

This formula A=w/W was applied in calculation of weight index and the formula N=w/W*100 in calculation ofrelative weight of organs. Here it is indicated as A- weight if organ, W – the absolute weight of the bird (g) and N – relative weight index of organ. Statistic use of results was implemented by virtue of Statistica V.12 program and the obtained digital indicators were expressed as in form M±Sd.

Results

Researches show that the absolute weight of quails' spleen has changed due to the period of age (Fig.1).

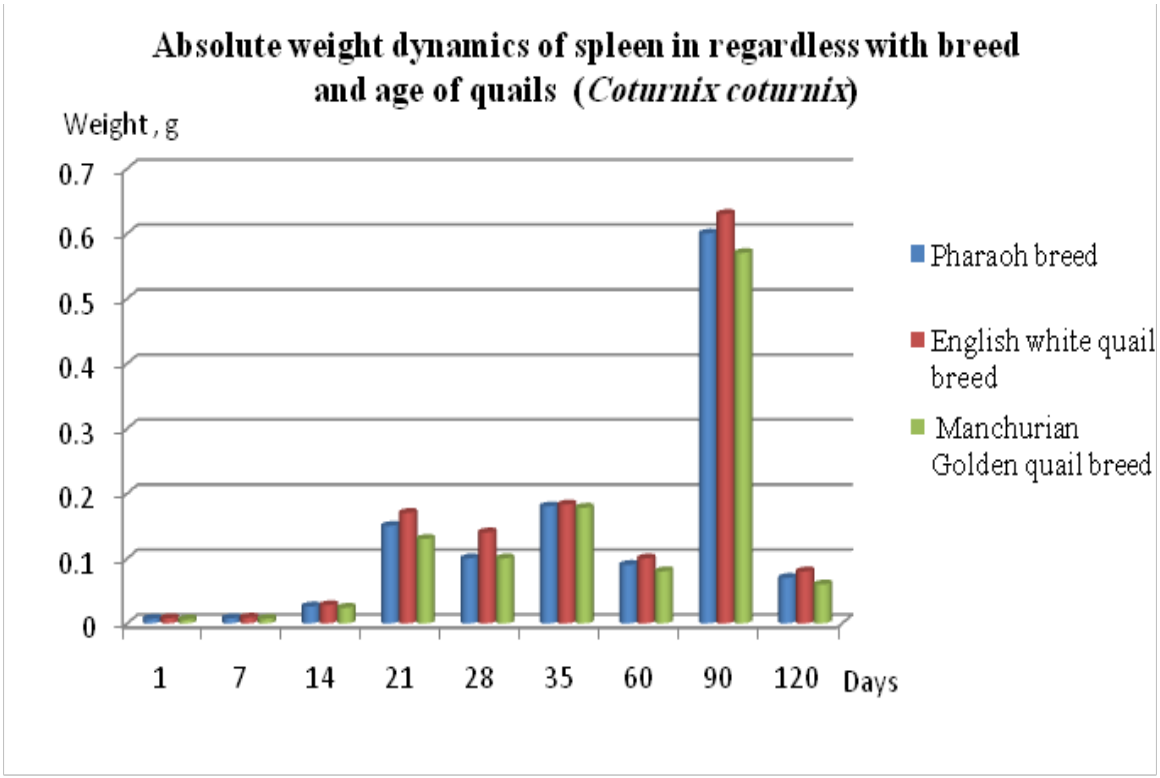

Fig.1. Absolute weight dynamics of spleen in regardless with breed and age of quails *Coturnix coturnix*).

Weight of spleen in a Pharaoh quail of one day (24 hours) is 0,007g, an English White quail 0,008g and Manchurian Golden quail 0,006. The relative weight of this organ is accordingly comprised of 0.08%, 0.09% and 0.08%. Weight index is 0,0008 in the Pharaoh and Manchurian quails and 0, 0009 in breed of the English white quail.

The absolute weight of quail is almost 0.0005 in breeds of Pharaoh and Manchurian Golden quails and 0.0006 in breed of the English White quail descending the weight index 1.6 times though it is in the level of thespleen weight of young birds or poults of one day. The absolute weight of the spleen of Pharaoh quails in one-week comprises 0.008g, the English White quail 0.009g and the Manchurian Golden quail 0.007g. Relative weight is 0.05% inbreeds of Pharaoh and Manchurian Golden quails and 0.06% in the English white quail.

At the end of the second week of quail life time, the increase in absolute weight of the spleen was observed 3.7 times in breed of Pharaoh, 3.5 times in the English White quail breed and 4 times in the Manchurian Golden quails. Weight index is 0.0006 at every 3 breeds.

The noticeable increase has occurred in the morphometric indicators of quail spleens of a-3-week. In this period, the absolute weight ofPharaoh poults is 0.15g, the English White quail 0.17g and the Manchurian Golden quails 0.13g. The relative weight was accordingly 0.19%, 0.21% and 0.17%, the weight index was 0.0019 v, 0.0021 and 0.0017. 0.124g increased in the spleen of poults of the Pharaoh breed, 0.142g in the English White breed and 0.106g raised in the Manchurian Golden quails.

The slight decrease was recorded in the relative weight of spleens of quails from every three breeds on the 35th day:0.10g fell down inPharaoh and Manchurian Golden quails and 0.14g in English White quail, and the indicators of relative weight was 0.07% inPharaoh and Manchurian Golden quails and 0.10% in the English White quail breed.

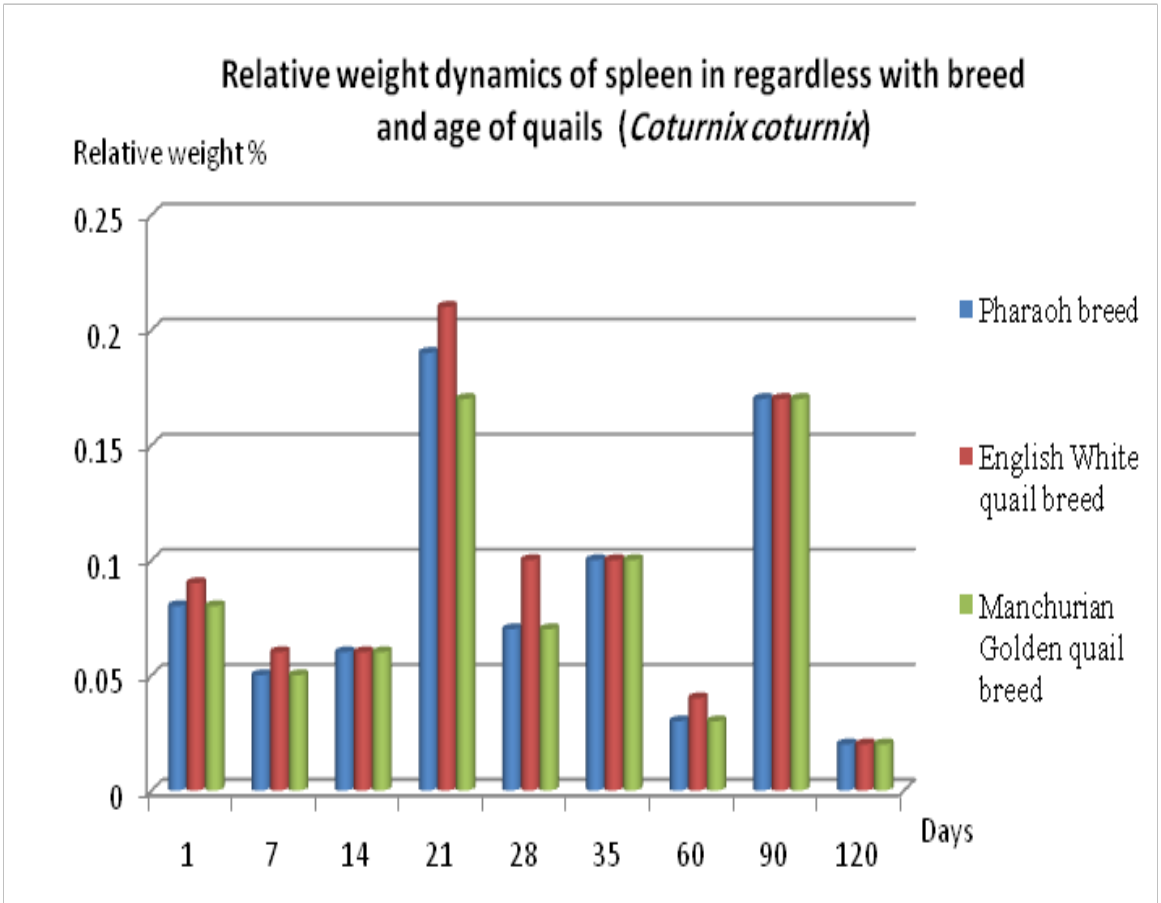

Fig.2.Relative weight dynamics of spleen in regardless with breed and age of quails (*Coturnix coturnix*).

The weight index has decreased to 0.0007 and 0.001 in the Pharaoh and Manchurian Golden quails and English White quails, respectively.

Absolute weight of spleens of the 2-month quails has keenly decreased from 0.09 g in Pharaoh poults of quails is to 0.10 in English White quails and the lowest (0.08g) was recorded in Manchurian Golden quails. Relative weightin the Pharaoh and Manchurian Golden quails is 0.03% and in the English White quails is 0.04%. Weight index is relevantly between 0.0003 and 0.0004.

The maximal increase in the 3-month birds was marked on all researching period. It has almostrisen more than 6.3 times in spleen in all tested breeds. Absolute weight of spleen in the Pharaoh breed became 0.60g ascending 0.51g, in the English White quails 0.63g raising 0.53 and in the Manchurian Golden quails 0.57g increasing 0.49g.Relative weight of spleen was observed 0.17% at every 3 breeds, and weight index was detected 0.0017 at every 3 breeds as well.

Up-to the end of researches, the decrease of all morphometric indicators of quails' lifespan was recorded on the 120th day of quails. The absolute weight of spleen of the Pharaoh breed fell down from 0.60g to 0.07g, of the English White quails from 0.63g to 0.08g and of the Manchurian Golden quails from 0.57g to 0.06g in comparison with quails of 90 days.The maximal descending has been marked at relative weight and weight index of spleen. Relative weight has become 0.02% at every 3 breeds, the weight index appropriately 0.0002.

Discussion

Spleen belongs to peripheral organ of immune system. In meantime, it is a blood-forming organ. Spleen, which acts as haemal biofilter function, prevents the alien proteins from entering the blood vessels that shape their lifetime. Spleen in Japanese quail is considered the biggest lymphoid. Turitsyna and Klimova , studied the morphometric characteristics of thymus, Fabricius bursa, spleens of quails in the postnatal ontogenesis is presented and were determined the age peculiarities of the quail immune system organ development from the daily to 120-days age [14]. This organ is located in the right hypochondrium and has a round shape like chickens in quails. Blood contained in spleen is solid, concentrate, it has more haemoglobin in amount of 15% in different with blood circulating generally in its component [15]. Vorobievskaya, studied the features of the morphology and topography of the bursa of Fabricius, thymus, spleen of quail and determined the coefficient between the mass of the quail and the weight of the bursa of Fabricius in order to give a morphofunctional characteristic to the immune organs at different age periods and to fix the start and end dates of the involution of the bursa of Fabricius and thymus. We also studied morphology spleen of quail and the data of literary sources and the data obtained by us are similar. Results of our research can be used in the development of preventive measures for quails, and for determining of age-related changes in the immunogenesis of quails.

Conclusion

In conclusion,the maximal descending has been marked at the relative weight and weight index of the spleen. This study on the dynamics of morphometric indicators of quail spleen which is one of immune system depends on breed and age. Also, it was generally recorded that spleen grows intensively for 3 months.

We recommended further studies on dyname ics of morphometric indicators of quail's immune organs.

Acknowledgment

The author would like to thank Doctor of Biological Sciences Elshad I. Ahmadov, Institute of Zoology National Academy of sciences of Azerbaijan for his support during this work.

Conflict of interest

The author has no conflict of interests to declare regarding the publication of this paper.

Funding statements

Also, the author declares that the work was self funded.

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