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ANTIBODY DETECTION OF NEWCASTLE DISEASE VIRUS IN SOME SPECIES OF POULTRY IN MAIDUGURI NIGERIA.

Veterinary Science

Amina Lawan Adam Department of Veterinary Microbiology, Faculty of Veterinary Medicine, University of Maiduguri, PMB-1069, Nigeria.

Babangida Abdullahi* Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry Jabalpur - 482001, Jabalpur, India. *Corresponding Author

Yasheruram M. Shettima Department of Veterinary Microbiology, Faculty of Veterinary Medicine, University of Maiduguri, PMB-1069 Nigeria.

ABSTRACT

This study was conducted to determine the presence of Newcastle disease (ND) virus in Poultry in Maiduguri. A total of 100 blood sample were collected for laboratory examination. The HA and HI tests following the procedures described in the OIE reference manual. ND viral antibody was detected in sera. The prevalence of 66 (66.0%) ND among different avian species was recorded, this research further revealed that 43 (60.5%) Local chicken, 3 (100%) Broilers and 20 (76.9%) Pigeons were sero-positive for ND virus antigen. The prevalence of ND among species based on age was reported with an overall prevalence of 66 (66.0%), This research also revealed that 22 (81.4%) Young and 44 (60.0%) Female were sero-positive for ND virus antigen. This result further revealed 9 (9%) Male and 57 (57%) Female were sero-positive for ND virus antigen, based on Gender distribution. Furthermore the geometric mean of Haemagglutination titre value of 76.5068 was recorded.

KEYWORDS

Newcastle disease, Poultry, Prevalence, Antibody.

INTRODUCTION

Newcastle disease (ND) is one of the diseases with greatest health and economic impact on poultry production worldwide (MacLachlan, and Dubovi, 2011). Newcastle disease (ND) remains one of the most popular ravaging viral diseases limiting poultry production in Africa (Ashraf, and Shah, 2014). It is caused by an RNA virus (ND virus [NDV]) of avian paramyxovirus designated as type 1 paramyxovirus which is a serotype under the genus *Avulavirus* of the family Paramyxoviridae (Ashraf, and Shah, 2014). It has negatively polar single stranded genome that undergoes capsid assembly in the cytoplasm (Nidzworski D, et al 2013). NDV is Pleomorphic in shape, single stranded negative sense RNA genome (Diel DG, et al., 2012). Chemical analysis was performed on the highly purified Newcastle disease virus (NDV) obtained from infected allantoic fluid. Mean values of RNA content of the virus based on optical density (Nakajima, H., and Obara, J 1967). The virus causes rapidly spreading, highly infectious nervous, respiratory, and gastrointestinal diseases in birds (Alexander D.J. 2000). ND is endemic in many parts of the world and its economic pressure on poultry industry lingers (Terregino et al., 2013). In developing countries, the losses caused by ND outbreaks are not only due to high mortality but also additional expenditure used for prevention and control programs (Alexander D.J. and Jones R.C. 2008). Disease diagnosis can be done through a series of activities involving observation of clinical symptoms, histopathological lesion, and laboratory tests (FAO. 2009). Recently, a method was developed to detect NDV using reverse transcriptase-polymerase chain reaction (RT-PCR) diagnostic tool (Van Steenwinkel et al., 2011). Although vaccination provides good protection against clinical disease and mortality in general, evidence shows that it might not provide sufficient protection against virus transmission to prevent outbreaks of ND (Esaki, M., et al., 2013). However, Literature on poultry Newcastle disease virus in the study area is rare. Therefore, the aim of this study is to detect Newcastle disease virus (NDV) antibody in poultry of different sex and ages in Monday market Maiduguri, Borno state.

MATERIALAND METHOD

This study was conducted in Maiduguri, Borno State, Nigeria. A total of 100 blood samples were collected daily from apparently healthy birds in Monday Market Maiduguri using simple random sampling, efforts were made to prevent discomfort to the chickens, data such as Age, Sex, and Type, of the bird were recorded. Ages were categorized into Young (0-3 weeks) Growing (>3 – 6 weeks) and Adult (>6 weeks) bird. Sex was recorded as Male or Female. Types were categorized in to Broiler, Pigeon, and local fowl.

Preparation of RBC

A total of 5 ml of SPE chicken blood were collected aseptically in a disposable syringe containing 1 ml of Alsevain solution as an anticoagulant. The blood were centrifuged at 1500 rpm for 15 min. The plasma and buffy coat were pipetted off, washed thrice with phosphate buffer saline (PBS), 1% suspension in PBS was used in HA/HAI test. The test were performed as described by Allan and Gough (Allan WH, Gough RE 1974).

Antigen detection (HA)

Hemagglutination (HA) test and HI test were used in detecting presence of Antigen Antibody interaction. HA and HI tests following the procedures described in the OIE reference manual (OIE 2012). ND viral antibody was detected in sera. The serum samples were tested for antibodies against NDV, using the standard HI method (OIE 2012).

Antigen and Antibody (HAI)

Plate HA inhibition (HAI) tests was conducted according to the method employed by Alazawy AK, and Al Ajeeli KS, 2020. Four HA units/0.1 mL of test allantoic fluids were reacted against HA serum prepared and serially diluted two-fold in PBS. Thereafter, an equal volume of 4% chicken RBC in PBS were added. The HI endpoint were determined as the reciprocal of the highest dilution of serum that caused 100% HA inhibition.

Data analysis

Data generated were analyzed using SPSS version 16 software. Variables were assessed using Chi Square at 95% confidence interval for statistical association. Also tables were used for data descriptions and presentations.

RESULT

1. Prevalence of Newcastle Disease (NCD) among different species of birds in Maiduguri Monday market.

The prevalence of NCD among different poultry species (Local chickens, Broilers, and Pigeons) in Monday market Maiduguri was reported (Table 4.1) with an overall prevalence of 66 (66.0%), this study revealed that 43 (43.0%) Local chicken, 3 (3.0%) Broilers and 20 (20.0%) Pigeons were sero-positive for passive immunity against NCD virus antigen, this report further shown no statistically significant association observed in the prevalence of NCD amongst species. ($p > 0.05$) (Table 1).

Table - 1 Distribution of Newcastle Disease among different poultry species in Monday market Maiduguri.

		NCD		Total Tasted
		Positive (%)	Negative (%)	
Specie	Local chicken	43 (43.0)	28 (28.0)	71
	Broiler	3 (3.0)	0 (0.0)	3
	Pigeon	20 (20.0)	6 (6.0)	26
Total		66(66.0)	34 (34.0)	100

CI= 95%
P= 0.145

2. Prevalence of NCD among different poultry species based on Age group.

The prevalence of NCD among different avian species in Monday market Maiduguri based on age was reported in Table 4.2) with an overall prevalence of 66 (66.0%), the report further revealed that 22 (22.0%) Young and 44 (44.0%) Female were sero-positive for passive immunity against NCD virus antigen.

Table 4.2 Prevalence of NCD among different poultry species based on Age group.

Table 4.2 Prevalence of NCD among different poultry species based on Age group.				
		NCD		Total Tasted
		Positive (%)	Negative (%)	
Age	Young	22 (22.0)	5 (5.0)	27
	Adult	44 (44.0)	29 (29.0)	73
Total		66 (66.0)	34 (34.0)	100

CI= 95%
P= 0.047

3. Prevalence of NCD among different poultry species based on Gender distribution.

The prevalence of NCD among different species of birds in Maiduguri Monday market based on Gender distribution was reported (Table 4.3). The result further revealed 9 (9%) Male and 57 (57%) Female were sero-positive for passive immunity against NCD virus antigen with no statistically significant association observed with the occurrence of NCD in local chicken with respect to Region ($p > 0.05$).

Table 3 Distribution of NCD among different poultry species based on Gender.				
		NCD		Total
		Positive (%)	Negative (%)	
Gender	Male	9 (9.0)	4 (4.0)	13
	Female	57 (57.0)	30 (30.0)	87
Total		66 (66.0)	34 (34.0)	100

CI= 95%
P= 0.792

4. Prevalence of NCD among different poultry species in relation to the antibody titre.

The prevalence of NCD virus among different species of birds in Maiduguri was reported (Table 4.4) with antibody titre ranging between 16-256, with no statistically significant association observed with the occurrence of NCD in local chicken with respect to Region ($p > 0.05$)

Table 4 - Prevalence of NCD among different poultry species in relation to the antibody titre.							
		HI(Titre)					Total (%) +ve
		1:16	1:32	1:64	1:128	1:256	
Species	Local chicken	4	9	2	21	7	43 (43.0)
	Broiler	0	1	1	1	0	3 (3.0)
	Pigeon	1	3	0	12	4	20 (20.0)
Total		5	13	3	34	11	66 (66.0)

CI= 95%
P= 0.372

Table 5 - Calculation of the GMT of antibody to NCD among seropositive birds in Maiduguri.

S/No	Reciprocal of Antibody titre (x)	Frequency	Log x	f.Log x
1	16	5	1.2041	1.2041
2	32	13	1.5051	19.5663
3	64	3	1.8061	5.4183
4	128	34	2.1072	71.6448
5	256	11	2.4082	26.4902
Total N= 66 ∑f.Log x = 124.3237				

Geometric mean titre (X Geo) = Antilog 1/N ∑ (f.Log x).
Where f is the frequency of occurrence of each reciprocal of antibody titre (s) and N is the total frequency.
GMX= X Geo= Antilog {1/66 (124.3237)}
X Geo = Antilog (124.3237/66)
X Geo = Antilog 1.8837
X Geo = 76.5068.

CONCLUSIONS

We identified NCDV that circulated among some poul¬try species in Maiduguri, from the result of this research it is concluded that NCDV is presence in poultry of Maiduguri with high sero-prevalence compared to other study conducted in some part of the country. Due to the high statistically significant titre values of the Newcastle Disease Virus among poultry species in Monday market Maiduguri, further study is needed to investigate the molecular characteristic and virus strain.

REFERENCES

[1] Alazawy AK, Al Ajeeli KS (2020) Isolation and molecular identification of wild Newcastle disease virus isolated from broiler farms of Diyala Province, Iraq, *Veterinary World*, 13(1):33-39.
[2] Alexander DJ. Newcastle disease and other avian paramyxoviruses. Rev Sci Tech Int des Epizoot. 2000; 19(2):443–455.
[3] Alexander, D.J. and Senne, D.A. (2008) Newcastle disease, other avian paramyxoviruses, and pneumovirus infections. In: Saif, Y.M., Fadly, A.M., Glisson, J.R., McDougald, L.R., Nolan, N.K. and Swayne, D.E., editors. Diseases of Poultry. 12th ed. Blackwell Publishing, Ames, IA. p75-115.
[4] Allan WH, Gough RE. (1974). A standard haemagglutination-inhibition test for Newcastle disease. A comparison of macro and micro methods. Vet. Rec; 95:120-3.
[5] Ashraf, A. and Shah, M.S. (2014) Newcastle disease: Present status and future challenges for developing countries. *Afr. J. Microbiol. Res.*, 8: 411-416.
[6] Diel DG, Miller PJ, Wolf PC, Mickley RM, Musante AR. (2012) Characterization of Newcastle disease viruses isolated from cormorant and gull species in the United States in 2010. Avian Diseases 56: 128-133.
[7] Esaki, M., Godoy, A., Rosenberger, J.K., Rosenberger, S.C., Gardin, Y., Yasuda, A. and Dorsey, K.M. (2013) Protection and antibody response caused by turkey herpesvirus vector Newcastle disease vaccine. *Avian Dis.*, 57(4): 750-755.
[8] FAO. (2009) A Review of the Current Poultry Disease Control Strategies in Smallholder Poultry Production Systems and Local Poultry Populations in Uganda. Prepared by Terence Odoch Amoki, Clovice Kankya, Eunice L Kyomugisha, Denis K. Byarugaba, Nicoline de Haan and Karin Schwabenbauer. AHBL - Promoting Strategies for Prevention and Control of HPAI, Rome.
[9] MacLachlan, N.J. and Dubovi, E.J. (2011) Fenner's Veterinary Virology. 4th ed. Raven Press, New York. p301 325
[10] Nakajima, H., Obara, J. Physicochemical studies of Newcastle disease virus. *Archiv f Virusforschung* **20,** 287–295 (1967). https://doi.org/10.1007/BF01241948.
[11] Nidzworski D, Wasilewska E, Smietanka K, Szewczyk B, Minta Z (2013) Detection and differentiation of Newcastle disease virus and influenza virus by using duplex real-time PCR. Acta Biochimica Polonica.
[12] Office of International Epizootes. (2012) Newcastle Disease. Manual of Diagnostic Tests and Vaccines for Terrestrial Animals. Ch. 2.3.14. World Organisation for Animal Health, Paris, France.
[13] Terregino C, Aldous EW, Heidari A, Fuller CM, De Nardi R, Manvell RJ, et al. Antigenic and genetic analyses of isolate APMV/wigeon/Italy/3920-1/2005 indicate that it represents a new avian paramyxovirus (APMV-12). Arch Virol. 2013; 158(11):2233–2243.
[14] Van Steenwinkel S, Ribbens S, Ducheyne E, Goossens E, Dewulf J. Assessing biosecurity practices, movements and densities of poultry sites across Belgium, resulting in different farm risk-groups for infectious disease introduction and spread. Prev Vet Med. 2011; 98(4):259–270.