



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(7): 1877-1879
© 2023 TPI
www.thepharmajournal.com
Received: 05-05-2023
Accepted: 07-06-2023

Poonam Gupta

Veterinary Officer, Department of Animal Husbandry, Govt. Of Rajasthan, Pratapgarh, Rajasthan, India

Deepak Kumar Pankaj

Ph.D. Scholar, Division of Pathology, ICAR-Indian Veterinary Research Institute (ICAR-IVRI), Izatnagar, Rajasthan, India

Shesh Asopa

Assistant Professor, Department of Veterinary Pathology, CVAS, Bikaner, RAJUVAS, Rajasthan, India

Hemant Dadhich

Professor, Department of Veterinary Pathology, CVAS, Bikaner, RAJUVAS, Rajasthan, India

Pooja Prajapat

Veterinary Officer, Department of Animal Husbandry, Govt. Of Rajasthan, Nokha, Bikaner, Rajasthan, India

Priyanka Kalani

Veterinary Officer, Department of Animal Husbandry, Govt. Of Rajasthan, Nokha, Bikaner, Rajasthan, India

Corresponding Author:

Poonam Gupta

Veterinary Officer, Department of Animal Husbandry, Govt. Of Rajasthan, Pratapgarh, Rajasthan, India

Pathological findings of circulatory disturbances of intestine of pig (*Sus scrofa domestica*)

Poonam Gupta, Deepak Kumar Pankaj, Shesh Asopa, Hemant Dadhich, Pooja Prajapat and Priyanka Kalani

Abstract

This study is conducted in the districts of Bikaner, Jaipur, and Alwar in Rajasthan, both organised and unorganised farms provided a total of 380 tissue samples of pig intestine, regardless of age, breed, or sex. Out of them, 142 specimens with obvious macroscopic lesions were processed further for a further histological analysis. An overall incidence of circulatory disturbances of intestine of pig was observed as 35.21 per cent (50 out of 142). Different forms of circulatory alterations, including congestion, haemorrhage, and oedema, were observed to occur 23.94, 9.86, and 1.41 percent of the time, respectively.

Keywords: Pig, intestine, circulatory disturbances, histopathology, congestion, haemorrhage, oedema

Introduction

Native pigs have been raised for pig production for a very long time and have a big economic impact on small-scale farmers and underprivileged pig farmers (Singhal *et al.*, 2019) [24]. According to the 2019 census, there were around 9.06 million pigs in India. Pigs made up 1.7% of the entire livestock. The overall number of pigs has fallen from the previous census by 12%. The 20th livestock census shows that Rajasthan has 154.81 thousand pigs. Rajasthan produces 9.17 thousand tonnes of pork, compared to India's 404.46 thousand tonnes (BAHS, 2019) [3]. Pig has great potential for both the food production and fertility (Krishna, 2010) [10]. The digestive system is a very fragile and vulnerable organ to toxins, pollution, and vascular damage. Studying pig intestinal disorders and circulation issues seemed necessary as a result. Haemorrhage, congestion and oedema are examples of circulatory abnormalities.

Material and Methods

For the proposed experiment, 380 intestinal tissue samples from carcasses of pigs of either sex, regardless of age groups and breeds, were evaluated during post-mortem examination from January 2020 to December 2020. Out of these, 142 intestinal samples exhibiting obvious macroscopic lesions underwent further processing for histological analysis. For histopathological analysis, all representative tissue samples were correctly stored in 10% buffered formalin. Using an acetone and benzene method, the tissues were mechanically prepared for paraffin embedding (Lillie, 1965) [15]. As part of standard procedures, intestinal tissue sections with a thickness of 4-5 microns were cut and stained using the haematoxylin and eosin method (Luna, 1968) [17].

Results and Discussion

In the current study, there were 50 out of 142 cases of pig's intestines experiencing circulation abnormalities, or 35.21 percent of cases. There were found to be, 1.41, 9.86, and 23.94 percent of various forms of alterations, such as oedema, haemorrhage, and congestion.

Circulatory Disturbances

1. Congestion

A total of 34 (23.94%) cases of congestion were reported. Singh (2013) [23] found a nearly identical prevalence of 22.93% in dogs, but Kumar (2014) [12] reported a higher incidence of 27.18% in camels.

Grossly, the affected tissue of the intestine had distended veins and engorged blood vessels on the serosal surface (Fig.1).

Blood was present in the tortuous, blood-filled blood vessels on the intestinal serosal surface. It was discovered that the mucus membrane was red in colour. The afflicted portion of the intestine had some blood squeezed from the incision surface. Albassam *et al.* (1985) [1], Thomlinson and Buxton (1963) [26], Faubert and Drolet (1992) [9], Lan *et al.* (2011) [14], and Burrough (2017) [4] all found very similar findings.

Microscopically, the submucosa displayed congestion and significant localised infiltrating inflammatory cells (Fig. 2). In some instances, the intestine exhibits lymphocyte infiltration in the mucosa and submucosa in combination with submucosal congestion (Fig. 3). In a few other instances, the intestines showed signs of cellular infiltration, degeneration, and sloughing of the surface epithelium. Chawla (2002) [6], Callinan and Russell (1975) [5], Singh (2013) [23], and Kumari *et al.* (2019) [13] all reported findings that were close in comparison.

Because of intussusception, volvulus, rotation, or incarceration, the venous outflow from the intestine is compressed quickly, causing congestion. Other factors such as *Escherichia coli*, *Clostridium perfringens*, and Porcine Sapelo Virus may also contribute to intestinal congestion (Tzipori *et al.*, 1992; Thomlinson and Buxton, 1963; Songer and Uzal, 2005) [25, 26, 27].

2. Haemorrhage

The presence of this ailment was noted in 14 (9.86%) instances. Poonia (2018) [20] observed a substantially higher prevalence of 11.76% in buffalo.

Petechial haemorrhages were visible grossly on the mucosal surface (Fig. 4). The intestine's mucosa had haemorrhagic lines on the crests of folds. These had colours ranging from deep crimson to deep brown. Even through the serosal surface of the gut, the hemorrhagic lesions could be seen. These results closely matched those of other studies by Meena (2010) [18], Poonia (2018) [20] and Kumar (2014) [12].

Desquamation of the villous epithelium was visible under a microscope, along with cellular infiltration and haemorrhages in the mucosa (Fig. 5). Niilo (1988) [19], Das *et al.* (2014) [7], Datta *et al.* (2004) [8], and Posthaus *et al.* (2020) [21] all reported findings that were almost identical.

The bleeding in the gut may be caused by helminth infections like *Fasciola buski* (Datta *et al.*, 2004) [8] or bacterial infections like *Clostridium perfringens* (Niilo, 1988) [19], *Salmonella* (Wilcock, 1979) [28] and or *Erysipelothrix rhusiopathiae* (Das *et al.*, 2014) [7].

3. Oedema

There were 2 (1.41%) cases of this condition reported. Kumar *et al.* (2015) [11] showed an almost identical incidence of 1.94 percent in camels.

Grossly swollen and thickened due to the presence of clear to slightly yellow-colored fluid in the affected region of the small intestine. The observations made by Alsop (2005) [2], Burrough (2017) Kumar (2014) [12], and Rathi (2020) [22] were very similar to the results of this study.

Oedema, submucosal congestion, and a light lymphocytic infiltrate were seen under the microscope (Fig. 6). The submucosa of the gastrointestinal system underwent noticeable edematous alterations that thickened and enlarged it. Albassam *et al.* (1985) [1], Singh (2013) [23], Burrough (2017) [4], Love and Love (1979) [16] and Poonia (2018) [20] all noted nearly identical results.

Acknowledgments

For providing the facilities required to carry out the research, the author is grateful to the Dean of the College of Veterinary and Animal Science in Bikaner.



Fig 1: Photograph showing engorged blood vessels and distended venous network in serosal surface.

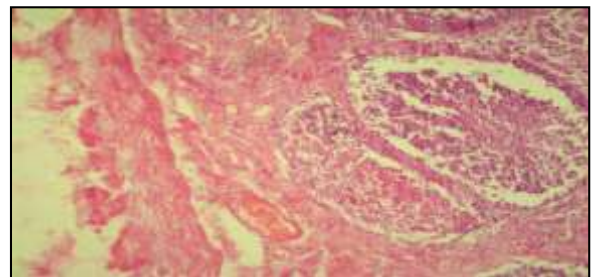


Fig 2: Microphotograph of intestine showing congestion along with severe focal infiltration of inflammatory cells in submucosa. H&E.100X

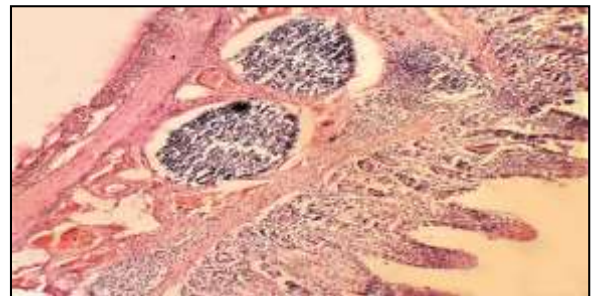


Fig 3: Microphotograph of intestine showing infiltration of lymphocytes in mucosa and submucosa along with congestion in submucosa. H&E.100X



Fig 4: Photograph of intestine showing petechial haemorrhages on mucosal surface.

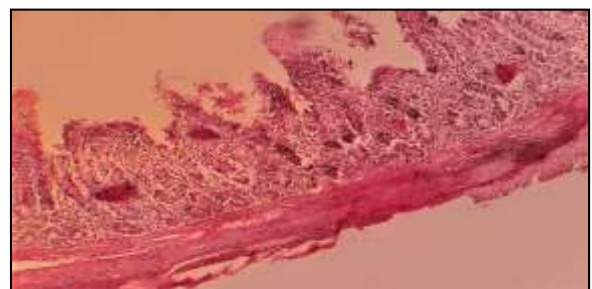


Fig.5: Microphotograph of intestine showing desquamation of villous epithelium with haemorrhages and cellular infiltration. H&E.100X

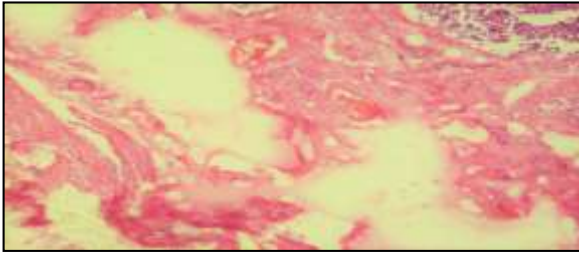


Fig 6: Microphotograph of intestine showing oedema, congestion in submucosa with mild lymphocytic infiltration. H&E. 100X

References

- Albassam MA, Olander HJ, Thacker HL, Turek JL. Ultrastructural characterization of colonic lesions in pigs inoculated with *Treponema hyodysenteriae*. Canadian Journal of Comparative Medicine. 1985;49(4):384-390.
- Alsop JE. An outbreak of salmonellosis in a swine finishing barn. Journal of Swine Health and Production. 2005;13:265-268.
- BAHS. Government of India. Ministry of fisheries, animal husbandry and dairying. Department of animal husbandry and dairying, Krishi Bhawan, New Delhi. c2019.
- Burrough ER. Swine dysentery: etiopathogenesis and diagnosis of a reemerging disease. Veterinary Pathology. 2017;54(1):22-31.
- Callinan RB, Russell EG. Aetiology and pathogenesis of swine dysentery-Recent advances. Australian veterinary journal. 1975;51(11):423-426.
- Chawla K. Pathology of intestinal lesions in goats. M.V.Sc. thesis, Rajasthan Agriculture University, Bikaner, Rajasthan. c2002.
- Das S, Ghatak S, Bhattacharya U, Puro K, Amarjit K, Kumar P. Identification of *Erysipelothrix rhusiopathiae* infection from a pig farm in Meghalaya. Journal Veterinary Practitioner. 2014;15(1):52-54.
- Datta S, Sasmal NK, Mukherjee GS, Ghosh JD, Basak, DK, Mukhopadhyay SK. Prevalence of gastro-intestinal parasites with special reference to pathology of *Fasciolopsis buski* infection in local pigs of West Bengal. Indian Journal of Veterinary Pathology. 2004;28(1):18-20.
- Faubert C, Drolet R. Hemorrhagic gastroenteritis caused by *Escherichia coli* in piglets: Clinical, pathological and microbiological findings. Canadian Veterinary Journal. 1992;33:251-256.
- Krishna N. Sacred Animals of India. New Delhi (India): Penguin Books India. c2010.
- Kumar S, Rani S, Dadhich H, Mathur M. Types, pattern and morphology of enteritis prevalent in camels of Rajasthan. Journal of Camel Practice and Research. c2015;22(2):289-293.
- Kumar S. Occurrence and pathology of various conditions of intestine in camels (*Camelus dromedarius*). M.V.Sc. thesis, Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan. c2014
- Kumari S, Ray PK, Singh R, Desingu PA, Varshney R, Saikumar G. Pathological and molecular investigation of porcine sapelovirus infection in naturally affected Indian pigs. Microbial Pathogenesis. 2019;127:320-325.
- Lan D, Ji W, Yang S, Cui L, Yang Z, Yuan C. Isolation and characterization of the first Chinese porcine sapelovirus strain. Archives of Virology. 2011;156:1567-1579.
- Lillie RD. Histopathological technique and practical histochemistry, Mc Graw Hill Book co., New York and London. c1965.
- Love DN, Love RJ. Pathology of proliferative haemorrhagic enteropathy in pigs. Veterinary Pathology. 1979;16(1):41-48.
- Luna AG. Manual of histological staining methods of the Armed Forces Institute of Pathology, 3rd ed. c1968.
- Meena S. Occurrence and pathology of various conditions of small intestine in cattle. M.V.Sc. thesis, Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan. c2010.
- Niilo L. *Clostridium perfringens* type C enterotoxaemia. The Canadian Veterinary Journal. 1988;29(8):658.
- Poonia R. Occurrence and pathology of various conditions of lower gastrointestinal tract in buffaloes (*Bubalus bubalis*). M.V.Sc. thesis, Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan. c2018.
- Posthaus H, Kittl S, Tarek B, Bruggisser J. *Clostridium perfringens* type C necrotic enteritis in pigs: diagnosis, pathogenesis, and prevention. Journal of Veterinary Diagnostic Investigation. 2020;32(2):203-212.
- Rathi R. Occurrence and pathology of various conditions of intestine with special reference to enteritis in buffalo calves (*Bos indicus*) in western region of Rajasthan. M.V.Sc. thesis, Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan. c2020.
- Singh G. Occurrence and pathology of various conditions of intestine in dog (*Canis familiaris*) M.V.Sc. thesis, Rajasthan University of Veterinary and Animal Sciences, Bikaner. c2013.
- Singhal SS, Ruchi M, Sunita P, Saini BS, Mamta S, Ashish J, Nalini K. Variations in erythrocytic antioxidants in indigenous pig from arid tracts during hot and cold ambiances. Veterinary Practitioner. 2019;20(1):18-20.
- Songer JG, Uzal FA. Clostridial enteric infections in pigs. Journal of Veterinary Diagnostic Investigation. 2005;17:528-536.
- Thomlinson JR, Buxton A. Anaphylaxis in pigs and its relationship to the pathogenesis of oedema disease and gastro-enteritis associated with *Escherichia coli*. Immunology, 1963;6:126-139.
- Tzipori S, Montanaro J, Robins-Browne RM, Vial P, Gibson R, Levine MM. Studies with entero aggregative *Escherichia coli* in the gnotobiotic piglet gastroenteritis model. Infection and Immunity. 1992;60:5302-5306.
- Wilcock BP. Experimental Klebsiella and Salmonella infection in neonatal swine. Canadian Journal of Comparative Medicine. 1979;43(2):200-206.