



# PATHOLOGY OF BACTERIAL GASTRO-ENTERITIS IN PIGLETS

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## Abstract

The present study involved cases of piglet autopsies done at the Dept. of Veterinary Pathology, College of Veterinary and Animal Sciences, Mannuthy during April – July 2014. Pathological and bacteriological examination of samples collected from carcasses showing gastrointestinal lesions were also conducted. Analysis of the post-mortem data revealed an increased susceptibility of piglets to gastroenteritis in the post-weaning stage. Bacterial isolates obtained were *E.coli*, *Salmonella* sp., *Pseudomonas* sp. and *Staphylococcus* sp.; *E.coli* being most predominant. The major gross lesions noted were perihepatitis, haemorrhagic gastritis, various degrees of enteritis, diphtheritic membrane formation and button ulcers in caecum and colon. In conclusion, the incidence of gastroenteritis in the immediate post-weaning stage might be due to the weaning stress and subsequent proliferation of commensals viz. *E.coli* to a highly pathogenic state had eventually resulted in gastroenteric disease.

**Keywords:** *Bacteria, Gastroenteritis, Piglets*

Gastroenteritis is a major cause of

diarrhoea and mortality in piglets. The effects of diarrhoea are dehydration, poor nutrient absorption, electrolyte loss, septicaemia, toxæmia and predisposition to other diseases ultimately resulting in mortality of piglets (Atulya, 2009). It also leads to poor growth efficiency. Various causative factors of diarrhoea are dietary or nutritional, bacterial, viral and parasitic (Taylor, 1999).

There have been reports of high mortality of piglets in and around Thrissur district, which lead to heavy economic loss to the pig farmers. On preliminary examination of the records available with the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Mannuthy, since April 2011, an average of 85 carcasses of piglets were received for post-mortem examination every month. Out of those cases recorded 70% had shown lesions in the gastrointestinal (GI) tract. Management of a sustainable swine production system entails control of enteric pathogens and it involves preventing multiplication and spread of the infection. Hence, the present study focuses on pathological and microbiological investigation of piglet gastroenteritis.

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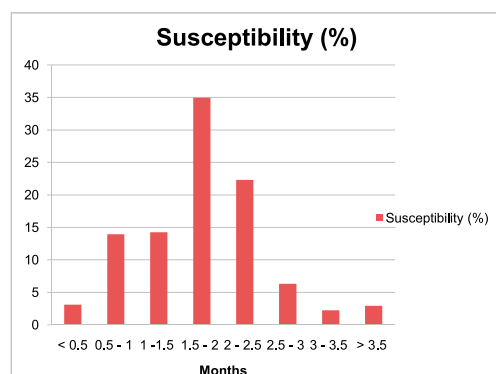
## Materials and Methods

The present study material involved cases of piglet autopsies done at the Department for a period of four months from April 2014 to July 2014. Details of each piglet such as age, sex and gross lesions were noted. Age-wise susceptibility percentages of piglets were determined.

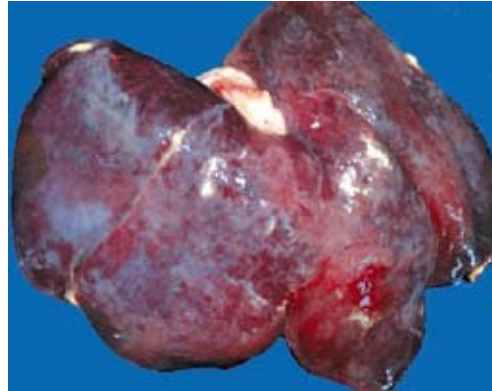
Representative samples of tissues from different segments of GIT were collected for bacteriological examination from those carcasses showing gross gastrointestinal lesions. Isolation of bacteria was done by culturing on Brain heart infusion agar (BHIA), MacConkey Agar and Eosin methylene blue (EMB) agar. Bacterial isolates obtained were identified based on various biochemical tests mainly Indole, Methyl red, Voges-Proskauer and Citrate utilization reactions.

## Results and Discussion

Analysis of the post-mortem data revealed that a total of 894 piglet autopsies were done during the period, out of which 99% cases had lesions in GI tract either alone or in combination with lesions in other systems. Majority of piglets had the history of mild diarrhoea. The most susceptible age-group of piglets was found to be 1.5-2 months (34.95%), followed by 2-2.5 months (22.3%) and 1-1.5 months (14.26%) (Fig. 1). The study revealed an increased susceptibility of piglets in the post-weaning stage. Nabuurs (1998) reported that weaning results in the alteration of gut flora, morphology and function of the small and large intestines. The author also opined that



**Fig.1.** Age-wise susceptibility pattern of piglets for gastroenteritis



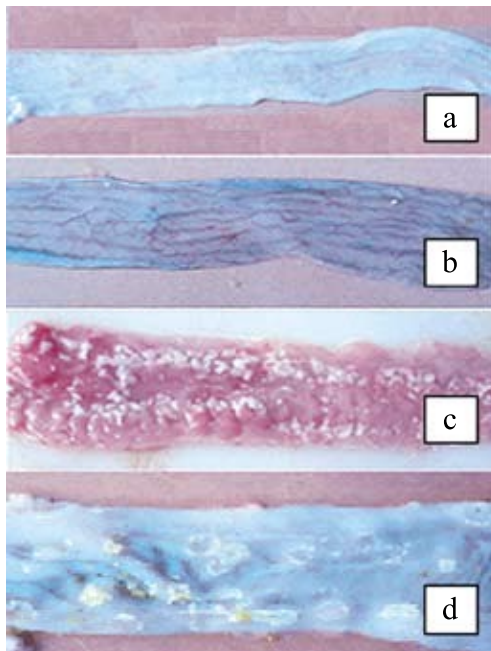
**Fig. 2.** Liver - perihepatitis



**Fig. 3.** Haemorrhagic gastritis - fundus

a considerable reduction in weaning age of piglets from 10 - 12 weeks to 3 - 5 weeks, was noted over the recent years might have led to susceptibility to infection. In the present study also the increased susceptibility of piglets to gastroenteritis in the immediate post-weaning stage can be attributed to the stress associated with weaning, changes in the gut microflora due to dietary changes related to weaning period and the practice of early weaning.

Out of 50 samples collected from both intestine and liver of the piglets showing marked gastrointestinal lesions, 39 bacterial isolates were obtained. Bacterial isolates were *E.coli* (76.9 %), *Salmonella* sp. (15.4 %), *Pseudomonas* sp. (5.1 %) and *Staphylococcus* sp. (2.6 %). Laine *et al.* (2008); Atulya (2009) and Dhanesh (2012) also reported predominance of



**Fig. 4.** Duodenitis – various degrees: catarrhal (a), haemorrhagic (b), necrotic (c) and ulcerative (d)

*E.coli* gastroenteritis in piglets. Nabuurs (1998) and Rossi *et al.* (2012) opined that stress associated with weaning creates a favourable environment in piglets for *E. coli* proliferation. In the present study also *E.coli* was isolated from all intestinal samples of diarrhoeic piglets at the immediate post-weaning age which confirms that *E.coli* is the major exciting cause for diarrhoea in piglets in the immediate post-weaning age. It could be concluded that other microbes might have flared up as a result of the unfavourable conditions in the GI tract due to the proliferation of *E.coli*.

On post-mortem examination, the carcasses revealed focal areas of necrosis in liver, hepatic congestion and perihepatitis (Fig. 2). The predominant lesions noted in GI tract were haemorrhagic gastritis (Fig. 3), various degrees of enteritis ranging from catarrhal, haemorrhagic and necrotic to erosive types (Fig. 4). Multifocal to diffuse areas of diphtheritic membrane formation in the intestines, especially in caecum and colon (Fig. 5); button ulcers in small and large intestines, especially in colon, were evident (Fig. 6).



**Fig. 5.** Colon - diphtheritic membrane



**Fig. 6.** Colon - button ulcers

Faubert and Drolet (1992) and Regon and Pathak (2013) also reported haemorrhagic gastroenteritis and hepatic necrosis associated with colibacillosis in piglets. Occurrence of necrotizing enterocolitis, diphtheritic membrane formation and ulcers, especially in the caecum and colon were associated with Salmonellosis in piglets as reported by Reed *et al.* (1986) and Songer and Uzal (2005). In the present study *E. coli* was isolated from majority (76.9%) of the piglets with diarrhoea followed by *Salmonella* sp. (15.4 %). As reported in earlier studies the

gross lesions observed in the present study were consistent with either one type of bacteria or mixed infections.

In conclusion, the present study revealed an increased susceptibility of piglets to gastroenteritis in the immediate post-weaning stage and it could be attributed to the stress associated with weaning and alteration of gut microflora due to dietary changes related to weaning period. This could be resulted in proliferation of normal commensals of GI tract viz. *E.coli* to a highly pathogenic state and eventually resulted in gastroenteric disease.

#### ACKNOWLEDGEMENTS

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