

PREVALANCE OF FALLOPIAN TUBE PATHOLOGIES
IN BUFFALOES (*BUBALUS BUBALIS*)

Vijay Gautam¹, Sushant Srivastava^{1,*}, Rajesh Kumar¹, Rabinder Kumar¹,
Vibha Yadav¹, Pushkar Sharma¹ and Saurabh²

ABSTRACT

The study on prevalence of anatomical and pathological abnormalities affecting fallopian tube of buffaloes slaughtered in Agra was undertaken to provide useful information to field level functionaries, practicing veterinarians and the academicians involved in improving the reproductive capacity of Indian livestock. In present study, one thousand sixty two genitalia of buffalo examined for macroscopic and microscopic lesion from the Modern slaughtered house, Kuberpur in Agra. Gross and histopathological studies were made and the lesions were reported. Pathological lesions were observed in 317 genitalia out of 1,062 examined accounting for prevalence of 29.83%. The prevalence of pathological lesions in descending order was observed as uteri (17.02%), ovaries (7.98%), oviducts (1.4%), cervix (3.00%) and vagina (0.374%). Out of 1,062 genitalia, fallopian tubes of 15 buffaloes (1.4%) were associated with pathological affections. Chronic salpingitis, pyosalpinx and hydrosalpinx were observed as 0.75, 0.28 and 0.37%, respectively. Ultrasonography a non invasive technique is the most efficient method of diagnosis of reproductive disorders in buffaloes. In view of the complexity

of the genital system, it can be concluded that multidisciplinary approach is required for more comprehensive studies on the buffalo reproductive disorders which will provide fruitful and authentic information.

Keywords: *Bubalus bubalis*, buffaloes, prevalence, reproductive abnormalities, ultrasonography

INTRODUCTION

The buffalo is the predominant domestic animal for milk and meat production in India. It plays a significant role in rural livestock production and economy of small and marginal farmers. Low productivity of buffaloes is considerably affected by the inherent problems like late maturity, long post partum interval, disease of genital system and infertility. The genital diseases are prevalent in all species of domesticated animals but they occur with higher frequency in dairy animals particularly in buffaloes.

Affections of the oviduct result in occlusion of the lumen preventing fertilization or creating an unfavorable environment for fertilization. A unilateral affection results in infertility whereas a bilateral affection results in sterility. Affections

¹Department of Veterinary Gynaecology and Obstetrics, College of Veterinary Science and Animal Husbandry, Narendra Dev University of Agriculture and Technology, Faizabad, India,
*E-mail: sushantvet@gmail.com

²Department of Veterinary Microbiology, College of Veterinary Science and Animal Husbandry, Narendra Dev University of Agriculture and Technology, Faizabad, India

of the oviducts have been diagnosed largely from abattoir studies. The overall incidence of affections of the oviduct varies from 10 to 29% (Sharma *et al.*, 1993; Kumaresan and Ansari, 2002; Azawi, 2009). A higher incidence of oviductal affections has been reported for buffaloes as compared to cattle (Kaikini, 1974; Dobson, 1986). The acquired oviductal pathologies include salpingitis, hydrosalpinx, pyosalpinx, adhesions of the oviduct, oviductal occlusions and pachysalpinx (Shivhare *et al.*, 2012).

Salpingitis is usually caused by infections in the uterus, cervix or vagina. Buffaloes with salpingitis may be sterile depending on the severity of the condition (Azawi, 2009). Salpingitis develops due to upward infection from the uterus following abortion, retained fetal membranes, septic metritis and pyometra (Mac, 1987). Tuberculosis is also one of the causes for oviductal lesions. Uterine irrigation with strong antiseptic solutions may escape into the oviducts and cause inflammation.

The incidence of hydrosalpinx in buffaloes in different studies varied from 0.7% to 14.28%. Bilateral hydrosalpinx was recorded in a buffalo (Patra *et al.*, 2012). The exact etiology of the condition continues to be poorly known although extension of inflammatory exudates from the uterus is considered one possible reason (Naoman *et al.*, 2009) and congenital serous secretions as another possible etiology (Ellington and Schlafer, 1993). Mastroianni (1999) believed that the condition was the result of inflammation around the oviducts. The accumulated fluid creates a hostile environment that will prevent implantation of an embryo (Shivhare *et al.*, 2012). Grossly, the fallopian tubes are found distended, elongated and tortuous forming many coils in the mesosalpinx. Histologically, the wall is thin, translucent, and distended with large amount of clear fluid (Kumar

and Singh, 1985).

Pyosalpinx refers to presence of pus in the fallopian tube (Shivhare *et al.*, 2012). Infections may have their origins from the uterus or a result of prolonged salpingitis (Azawi *et al.*, 2008). Histologically majority of cases reveal marked infiltration of neutrophils, mononuclear cells and hoisting mucosal and muscularis layers (Khasatiya *et al.*, 1998). Some cases of pyosalpinx are associated with formation of sub mucosal cysts (Khasatiya *et al.*, 1998).

MATERIALS AND METHODS

The study was conducted on total of 1,062 female buffaloes slaughter at Municipality abattoir, Kuberpur, Agra. All buffaloes with any type's reproductive organ disorder were sampled from November 2017 to April 2018 for gross/microscopic pathological disorders and associated bacterial causes. General physical and clinical examinations were conducted before slaughtering of the female buffaloes, giving attention on sign of reproductive system such as vulva for any gross lesion, sign of vaginal discharge and pregnancy diagnosis were performed (Roberts, 1986). The body condition (BCS) were considered as poor, good and fat according to Nicholson and Butterworth, (1998) and the age of animals were estimated as per recommended of Puck *et al.* (2004).

After slaughter, the reproductive organs were removed from the animal inspected and palpated one by one for any gross pathological lesions and disorders before any incision (Assay *et al.*, 1998; Garcia, 1998). The gross lesions examination was performed which, included lesion distribution, texture, consistency, shape, size and color. Tubular part of reproductive tract

was dissected by giving dorso-longitudinal cut and examined. The vagina was the first part of the tract to be opened and examined and the observation were recorded. The cervix was dissected dorso-longitudinally from os- internum to os-externum and examined for prolapse of cervical rings and any contents inside. Uterus and fallopian tubes were opened by midline incision and examined for inflammation, presence of pus and other changes. The ovaries were examined externally and internally for the presence of cysts and other abnormalities (Kunbhar *et al.*, 2003).

Tissues with lesion were transported to the laboratory in icebox and giving a good attention to avoid any damage of tissue and further histopathological examination as well as bacteriological examination was conducted in the laboratory. The lesion part of the tissue was dissected to the size of 2 to 3 cm and transferred in the universal bottle containing 10% buffered formalin which stabilized the tissue to prevent any possible decomposition (Talukder, 2007).

Histopathological procedure was conducted following the procedure described by (Talukder, 2007). Ultra sonography of the genital tract was carried out at 5/7.5 MHz with linear probe after immersing the genitalia in a water tub as per previously described procedures (Saini *et al.*, 2008; Sevimli *et al.*, 2012).

RESULTS AND DISCUSSION

The overall abattoir prevalence of reproductive organ abnormalities in buffaloes in present abattoir study was reported as 29.83% (317/1062) and of the 10 different abnormalities observed. Based on the anatomical classification, uterine abnormalities were reported as 181

(17.02%) followed by ovarian abnormalities 85 (7.98%). Damodaran (1956); Kodagali and Kerur (1968) also recorded similar prevalence in their study whereas Mittal *et al.* (2010); Azawi *et al.* (2011); Fam (2016) reported less values than our findings but higher incidence was observed by Tomar *et al.* (2002); Modi *et al.* (2011) and Pesantez *et al.* (2016) in their abattoir studies. The difference in the incidence might be due to variation in the breed, region, management practices, provision of health cover, inclusion of pregnant animals, wide age range of animals selected for the study and inclusion of microscopic changes observed in genital organs.

The higher incidence of lesions observed in the present study indicated that many of the reproductive tracts revealed microscopic lesions in more than one organ as well as in each organ, though they appeared normal grossly. The result of this study indicates that by rectal examination, it may not be possible to diagnose all reproductive disorders.

The fallopian tube lesions were observed in 15 genitalia (4.73%) out of 317 abnormalities of the reproductive tract of she-buffaloes (Figure 3). The incidence is close to the observation of few workers (Shokier, 1958; Shalash, 1958; Sharma *et al.*, 1967) whereas, Kumar (1981) had reported FT lesions in 40.65% cases.

Salpingitis was recorded in 8 specimens (53.33%) of 15 fallopian tube lesions, which were the most common fallopian tube affections. Five cases of Salpingitis were detected in right side and three on the left side of fallopian tube. Grossly, the salpinx were enlarged and thickened but did not reveal any changes in consistency and histologically characterized by focal or diffuse infiltration of lymphocytes in the lamina propria of mucosal folds and fimbriae (Figure 5). Our findings were similar

to the observation of Koadgali and Kerur (1968) whereas much lower prevalence was observed by some workers (Bhattacharya *et al.*, 1954; Rao and Rajya, 1976a; Ghora *et al.*, 1996) and higher incidence was observed by Kumar (1981); Azawi *et al.* (2015); Nibhal *et al.* (2016). In subacute nonsuppurative salpingitis, the inflammation had extended from serosa to the adjacent mesosalpinx in one case. Chronic nonsuppurative salpingitis was found associated with subacute nonsuppurative metritis and perioophoritis.

The present findings indicate that the inflammatory process might have extended from ovary and uterus which is in agreement with other workers (Damodaran, 1956; Kumar, 1981; Nagarajan *et al.*, 1987; Khanna *et al.*, 1995; Ghora *et al.*, 1996; Khasatiya *et al.*, 1998). The degeneration and desquamation of some epithelial cells associated with inflammatory reaction might be sufficient to change the special functions of the FT such as abnormal ciliary or FT motility and / or abnormal tubal secretion which generally lead to reduced conception rate (Dwivedi, 1968; Kodagali and Kerur, 1968; Rao and Rajya, 1976a; Kumar, 1981; Khasatiya *et al.*, 1998). In addition, Khasatiya *et al.* (1998) stated that higher incidence of tubal affections could be due to age associated changes and repeated infection at each breeding / calving.

Pyosalpinx were seen in 3 cases (20%). Pyosalpinx condition was visible either due to infections may have their origin from the uterus or a result of prolonged salpingitis (Figure 1 and 4). The accumulated pus hinders fertilization and might rarely result in the escape of the pus in the peritoneum and consequent peritonitis. Kumar and Singh (1985) have reported the higher incidence of 0.32%, whereas lower values were observed by Modi *et al.* (2011). The breeding prospects of these affected cases must be doubtful or grave due

to formation of network or incomplete septum by papillary epithelial hyperplasia and their frequent repeated anastomosis reducing the tubal lumen and rendering it impossible for passage of the ovum. Such cases could not be recognized grossly, clinically or by simple hydropatency tests in obscure sterility cases (Kumar, 1981).

Histologically majority of cases reveal marked infiltration of neutrophils, mononuclear cells and hoisting mucosal and muscularis layers. Macroscopic examination of the uterine endometrium of the buffaloes affected with pyosalpinx showed multiple hemorrhagic foci with nodules in the endometrium with mucopurulent exudates. *Archanobacterium pyogenes* and *Escherichia coli* had a higher prevalence of isolation in the uterus and pyosalpinx.

Prevalence of Hydrosalpinx was recorded as 0.37%. Two cases of Hydrosalpinx were detected in right side fallopian tube and two cases in left side. The condition was the result of inflammation around the oviducts (Figure 2). Dilatation of the affected tubes is common when the accumulations are large.

The distension was more marked in the infundibular region than the uterine end of oviduct and might be due to the thin muscular wall and the extensive secreting epithelial surface at the ampulla as suggested by Damodaran (1956). In the present study, cultural examination of oviduct fluid was attempted in two cases and the same did not yield any growth of bacteria or fungi which is also in agreement with Damodaran (1956). In the present study, inflammatory lesions were noticed in the ampulla region of oviduct. Dwivedi and Singh (1971b) suggested that hydrosalpinx resulted from the long standing cases of pyosalpinx and chronic nonsuppurative salpingitis where adhesions were formed and exudates absorbed leaving clear

Table 1. Prevalence and distribution of pathological condition of female genitalia of buffaloes.

Sl. No.	Pathological condition	Gross lesion	Percentage out of 1,062 genitalia examined
1	Ovary	85	8.00
2	Uterus	181	17.04
3	Fallopian tube	15	1.41
4	Cervix	32	3.01
5	Vagina	4	0.37
6	Total	317	29.83

Table 2. Prevalence and distribution of pathological condition of fallopian tube.

Sl. No.	Pathological condition	Genitalia with gross lesion	Distribution of right side	Leftside	Percentage of total affected in fallopian tube	Percentage out of 1,062 genitalia examined
1	Salpingitis	8	5	3	53.33	0.75
2	Pyosalpinx	3	3	0	20	0.28
3	Hydrosalpinx	4	2	2	26.66	0.37
4	Total	15	10	5		1.4



Figure 1. Pyosalpinx.



Figure 2. Hydrosalpinx.



Figure 3. Bilateral salpingitis.



Figure 4. USG image of pyosalpinx.

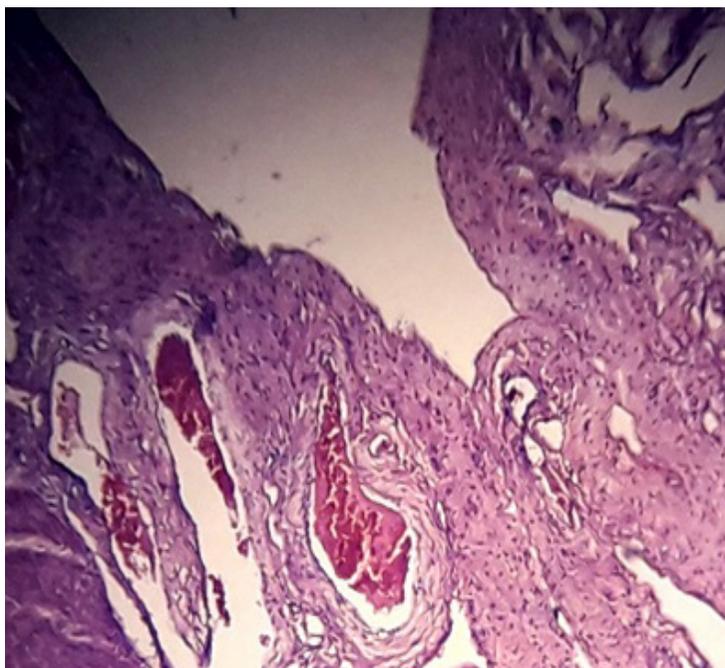


Figure 5. Salpingitis.

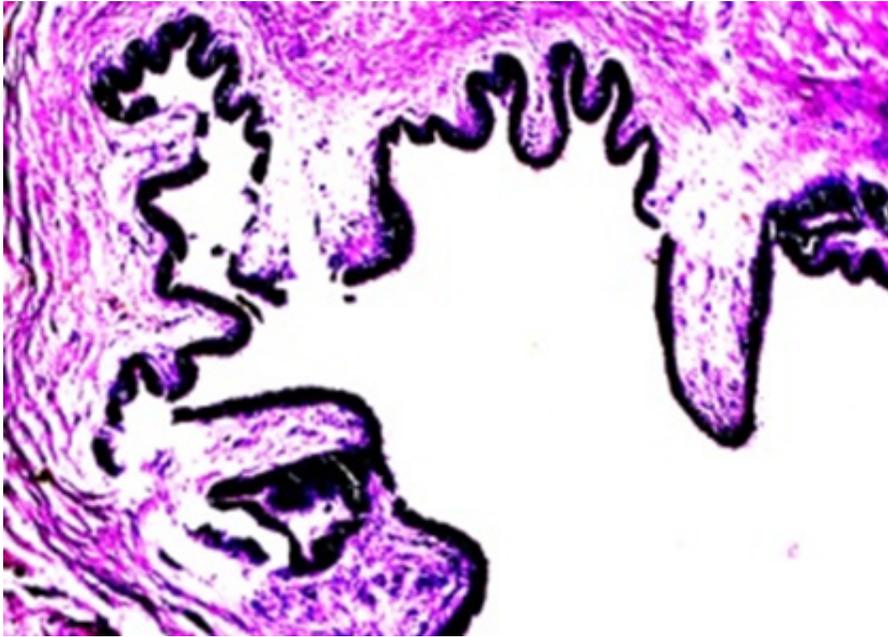


Figure 6. Hydrosalpinx (H&E).

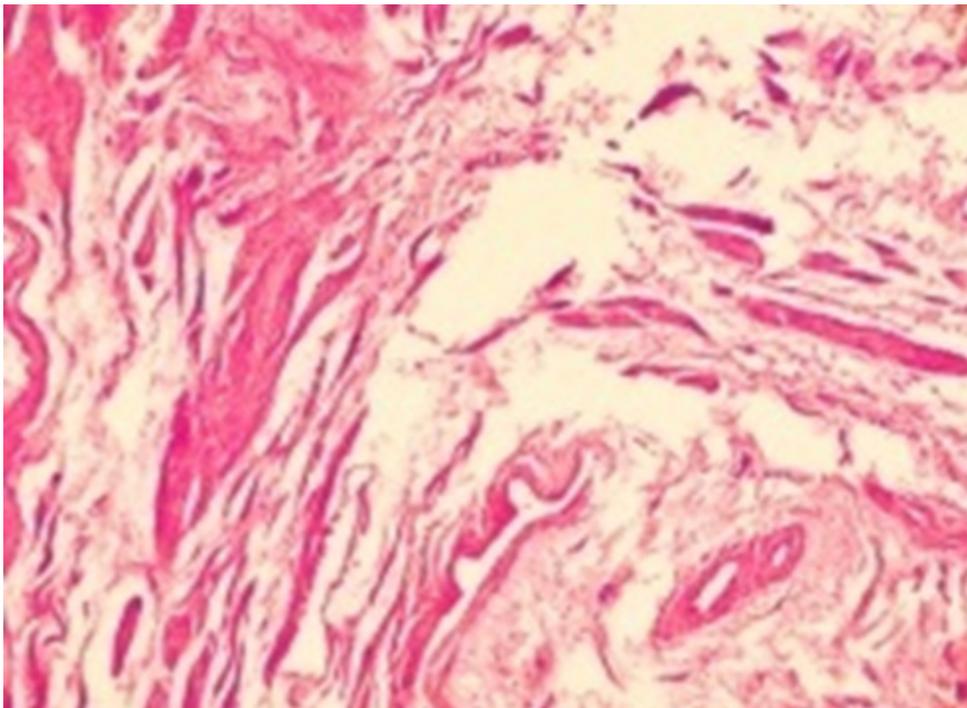


Figure 7. Hydrosalpinx.

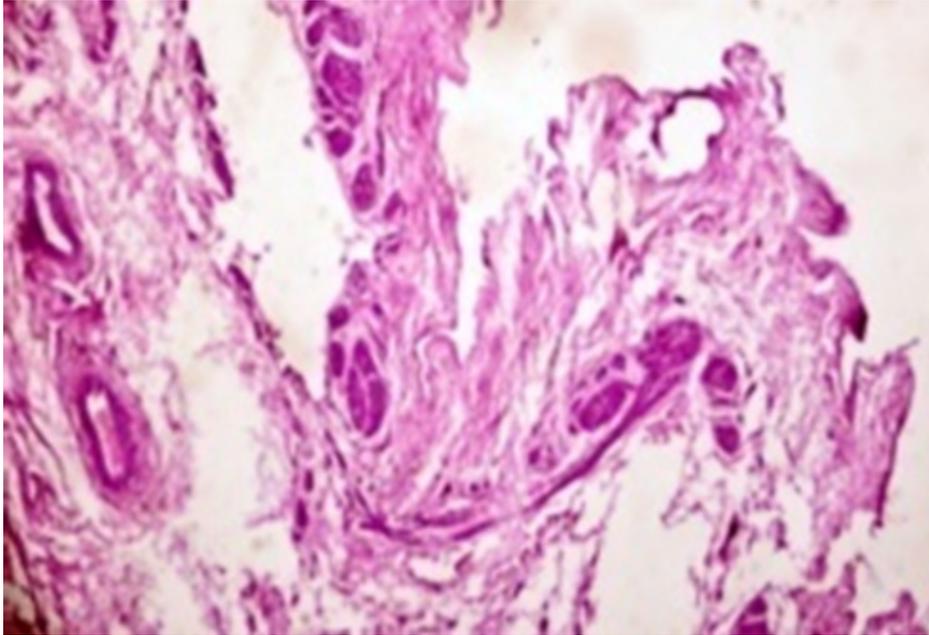


Figure 8. Hydrosalpinx, ampula of buffalo showing reduction in the mucosal fold.

watery fluid. Hydrosalpinx might interfere with the conception and might lead to infertility in unilateral cases and sterility in bilateral cases as the condition would interfere with sperm transport and passage of ovum through the oviduct as stated by earlier workers (Kumar, 1981; Khan *et al.*, 1989; Khanna *et al.*, 1995). Kumar (1981) also reported that hydrosalpinx was a common sequelae to salpingitis and considered them irreversible and made the animal sterile. Ghora *et al.* (1996) reported that hydrosalpinx might be a consequence of obstruction and segmental aplasia of uterine horns. In the present study, two cases were found associated with polycystic ovaries indicating the role of estrogen in the excessive secretion in the oviduct.

Grossly, the fallopian tubes are found distended, elongated and tortuous forming

many coils in the mesosalpinx. On histological examination, the wall is thin, translucent, and distended with large amount of clear fluid. The ampullary region was more affected. Degeneration and desquamation of the epithelial lining is common. An oviduct with hydrosalpinx does not have healthy cilia; hence, embryos that find their way into the fallopian tube become trapped resulting in infertility in unilateral condition. These results com agreement with Shivhare *et al.* (2012) who mentioned that fallopian tube with hydrosalpinx does not have healthy cilia; hence, embryos that find their way into the fallopian tube become trapped resulting in infertility in unilateral condition and sterility under bilateral conditions.

In conclusion, among the reproductive tract lesions, uterine and ovarian lesions were the most common in buffaloes. Salpigitis was the

most common lesion in the Fallopian tube. In the present study most of the lesions were detected microscopically and such changes may not be detectable by rectal palpation. Those conditions viz. subacute nonsuppurative perioophoritis, subacute nonsuppurative salpingitis, septate FT and subacute nonsuppurative endometritis are probable other causes of infertility in she-buffaloes leading to economic loss to the farmers. Ultrasonography a non invasive technique is the most efficient method of diagnosis of reproductive disorders in buffaloes.

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