OVARIAN TERATOMA IN A WATER BUFFALO (BUBALUS BUBALIS)

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ABSTRACT

The present short communication puts on record a case of ovarian teratoma in a water buffalo along with detailed description of its ovarian biometry, follicular fluid composition and functional assessment. The 2.0×2.3×2.9 cm teratoma was found in the right ovary of 2.4×2.6×4.2 cm size. The teratoma was firmly encapsulated with cartilaginous tissue and its cross section revealed tufts of hair matted in thick, dried, yellow sebaceous material. Surprisingly the largest surface follicle of about 10 mm size was on the same ovary which was bearing teratoma however the follicular fluid (buFF) collected from that follicle was little. The opposite ovary of the genitalia was normal presenting few numbers of small follicles on the surface. The histopathological investigation of the teratoma revealed a wide variety of mature tissues foreign to the ovary like scattered areas of hair follicles, thyroid gland like structures, fibrous connective tissue, apocrine and sebaceous glands. The buff was assessed for biochemical parameters like cholesterol, ascorbic acid and nitric oxide and relevant hormones for determining its functional status. The concentrations of cholesterol and

ascorbic acid were lower than the range reported in previous buffalo follicular fluid; however nitric oxide concentration was found to be much higher. The follicle was functionally inactive. Thus our study puts into records of findings of ovarian teratoma in water buffalo and its detailed microscopic study along with biometry and buFF composition. The possible culling of the animal may be because of the infertility caused by ovarian teratoma by disrupting the normal ovarian function.

Keywords: teratoma, buffalo, ovary, histopathology, biochemical, hormones

INTRODUCTION

Ovarian neoplasms that causes enlargement of the ovary have been divided into four classes by the World Health Organization: (1) gonadostromal tumors, (2) epithelial tumors, (3) mesenchymal tumors and (4) germ cell tumors. Teratomas fall under the fourth group of tumors i.e. germ cell tumors besides dysgerminoma (Harland *et al.*, 2009). Ovarian teratoma are rare in domestic animals (Schlafer and Miller, 2007;

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Vanhaesebrouck et al., 2010), but have been incidentally reported in cow, mare, camel and bitch (Ali et al., 2006; Vanhaesebrouck et al., 2010; Hamouda et al., 2011; Rota et al., 2013). They are composed of totipotential germ cells that undergo neoplastic transformation into two or more germinal cell layers and have a variety of mature tissues arranged haphazardly throughout the tumor (Card, 2011). Ovarian teratomas in which cavity is lined with skin and filled with hair are often named as dermoid cysts (Oliveira et al., 2004). Herein we report a case of a mature cystic teratoma in a water buffalo. Despite its rarity this entity should be recognized, as ovarian pathologies as whole are responsible for a great number of long standing infertility problems in the said species (Narnaware et al., 2007).

MATERIALS AND METHODS

The female reproductive tracts of water buffaloes were collected from large animal slaughter house aseptically in polythene packets in an ice bath and were transported to the laboratory within 30 minutes of collection. Out of 102 genitalia examined, one apparently normal looking genitalia was found to own a hard, tennis ball like ovary. Immediately, the ovary was subjected for further investigation. The surrounding fat and other tissues (adnexa) were trimmed off and the ovaries were weighed. Measurement of length, breadth and thickness was done with the help of a divider compass and metric scale. Briefly, length was taken as the distance from the anterior pole to the posterior pole, width as the greatest distance from the medial to the lateral surfaces and height or thickness as the greatest distance along an axis vertical to the longitudinal axis (base) at its centre or distance from attached to the free borders as described previously (Khan et al., 2011). The diameter of the largest follicle (vis-à-vis both ovaries) was subsequently measured as described (Khan and Das, 2011; Pande et al., 2013) followed by aspiration and measurement of its follicular fluid using a sterile insulin syringe. The follicular fluid sample was centrifuged in a refrigerated centrifuge at 1000 g and 4°C for 10 minutes and the supernatant was stored at 20°C until assayed. The follicular fluid samples were assayed for Nitric oxide (NO) and ascorbic acid (AA) as described for buffalo follicular fluid (buFF) in our laboratory (Khan and Das, 2011; Pande et al., 2013) and cholesterol with the help of commercial diagnostic kit (Span Diagnostics, India Ltd., Surat, India) adopting procedures recommended by the manufacturers.

Oestradiol (E_2) and Progesterone (P_4) were assayed by RIA using commercial kits (Estradiol-Immunotech, Marseille, France; Progesterone-BARC, Navi Mumbai, India). The intra-assay and inter-assay coefficients of variation and sensitivity for E_2 were 12.1%, 11.2% and 0.006 ng/ ml, respectively. For P_4 , the corresponding values were 5.8%, 9% and 0.3 ng/ml, respectively.

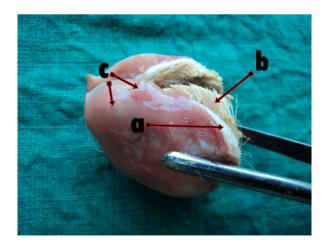
The teratoma was studied grossly for macroscopic changes followed by fixing in 10% buffered formalin and processing through graded alcohols and xylene. The processed tissue was embedded in paraffin wax and histological sections were cut. The resulting slides were stained in hematoxylin and eosin, according to routine histopathological procedures and examined by light microscopy.

RESULTS AND DISCUSSION

Grossly, right ovary having size 2.4×2.6×4.2 cm and weight 28.39 g was larger and firmer than left (3.1×1.7×1.9 cm; 4.97 g) and contained teratoma of 2.0×2.3×2.9 cm size. Teratoma was oval in shape, well encapsulated in a smooth glossy cartilaginous layer (Figure 1), white to grevish pink in colour. On incision, it showed long matted hair along with pasty solid debris and dried vellow sebaceous material (Figure 1 and 2). Microscopically, the ovarian teratoma was composed of a wide variety of mature tissues foreign to the ovary and diffusely scattered. The tumour was lined by well-differentiated stratified squamous keratinized epithelium (Figure 3 a, b, c). It showed scattered areas of hair follicles, thyroid gland like structures, fibrous connective tissueand sebaceous and glands (Figure 3 d, e, f, g). Other tissues were also represented including cartilage. respiratory epithelium and glandular structures (Figure 3 c, d, h). Apart from the above, ovary also showed its own tissue representing primordial follicles (Figure 3 i).

Surprisingly, the largest follicle of about 10 mm size was also seen in the same ovary. However the follicular fluid aspirated from it was little. It was probably because although, the follicle appeared to be larger on the surface but in actuality it was a flattened medium sized follicle, which took an oval plane shape due to the pressure exerted by the teratoma. The ratio of oestrogen to progesterone was less than one in the follicle; the other parameters like NO, AA and cholesterol were 453.30 μ M, 9.52 μ g/ml and 30.60 mg/dl respectively and differed significantly than the values reported previously in normal buFF (Pande *et al.*, 2013).

In the present study the incidences of ovarian teratoma in buffalo appears although less than 1%, but it is slightly higher than the earlier reports on domestic cattle and mare (Ali *et al.*, 2006; Vanhaesebrouck *et al.*, 2010). This is in agreement with a report stating that water buffalo have a higher incidence of teratomas and dermoids than other domestic cattle (Kumar and Singh,



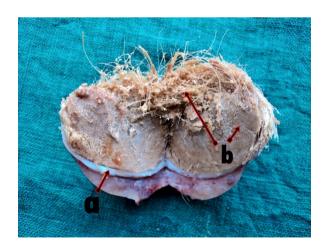
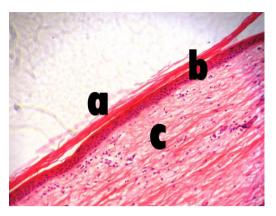
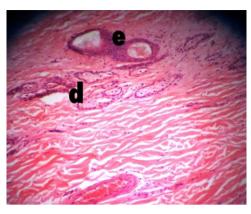


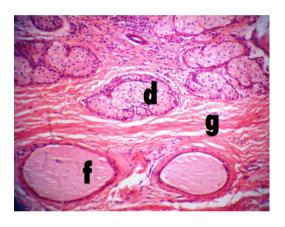
Figure 1. and Figure 2. Ovarian teratoma in a water buffalo. (a) Thick outer covering of teratoma. (b) Matted hair inside the cavity along with other secretions. (c) Follicles on the surface of ovary.



(a) Keratin layer (b) Stratified squamous epithelium (c) Cartilagenous tissue.



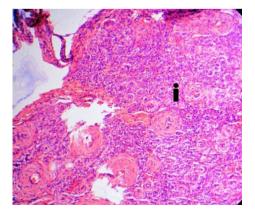
(e) Hair follicles.



(d) Sebacious glands (f) Presence of thyroid gland like structure at some places (g) Fibrous connective tissue.



(h) Presence of respiratory epithelium at some places.



(i) Ovarian tissue with primordial follicles.

Figure 3. Histopathology of ovarian teratoma showing various underlying structures (HE staining x 400).

1984). The weight and biometrical dimensions of the ovary bearing teratoma was higher compared to those in normal cycling buffaloes (Pande, 2011). The histopathological diagnosis indicated that the teratoma was benign in nature showing no immature or malignant components. Externally, the teratoma was fully covered with ovarian tissue and even follicles were present on its surface. The authors think that such type of fully encapsulated benign teratomas may sometimes be misdiagnosed.

Presence of follicles in both neoplastic and opposite ovary suggests that follicular wave dynamics perhaps continues even when teratoma of benign nature rests in ovaries. This is in agreement with earlier reports on cattle (Edwards, 2002). Although follicle was seen but its oestrogen to progesterone ratio was less than 1 indicating that it was functionally inactive (Khan *et al.*, 2011). The alterations in certain biochemical and hormonal constituents of follicular fluid in the present case suggest that ovarian teratoma may affect the normal follicular development. The results obtained in the present study suggest that ovarian teratoma may also causes infertility in buffalo by disrupting the normal ovarian function.

In conclusion, teratoma in buffalo results in abnormal ovarian biometry, although when fully encapsulated by normal ovarian tissue it may be misdiagnosed under field conditions. There is alteration in the physical characteristics as well as certain biochemical and hormonal constituents of follicular fluid in the affected animal.

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