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Therapeutic management of mastitis in a mongrel bitch: A case report

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Abstract
The mammary gland is basically an exocrine gland, which basic function is to produce milk to feed the offspring. Mastitis is an inflammation with or without an infection of the mammary gland and a common problem in bitches of all breeds at various ages. The disease occurs primarily in non-spayed bitches during the postpartum period and more frequently, from 6th to 10th day after whelping. A two years old mongrel bitch was presented in Teaching Veterinary Clinical Complex, College of Veterinary Sciences and Animal Husbandry, Selesih with a history of anorexia, vomition and sudden swelling of mammary glands. The case was diagnosed as mastitis based on history, clinical signs and bacteriological examination. Bacterial culture showed presence of *Staphylococcus aureus* as a causative agent and then subjected to commonly used antimicrobials to determine their sensitivity. The bitch was successfully treated with a course of parenteral antibiotic and supportive therapy along with proper care and management till clinical recovery.

Keywords: mastitis, bitch, whelping, postpartum, mammary glands, *Staphylococcus aureus*

Introduction
The mammary gland is basically an exocrine gland, which basic function is to produce milk to feed the offspring and functionally connected with the secretion of ovarian hormones. Therefore, ovarian pathologies may have an influence on the mammary glands (Marti and Fernandez, 2010) [1]. Mastitis is a medical term, which refers to an inflammation with or without an infection of the mammary gland. Mastitis is a common problem in bitches of all breeds at various ages. The pathogens are usually bacteria (e.g. *Staphylococcus* spp., *Streptococcus* spp., *Escherichia coli*), but some cases of fungal mastitis in endemic areas or in dogs with immunodeficiency were observed as well (Ditmyer and Craig, 2011; Murai *et al*., 2013) [2, 3]. The disease occurs primarily in non-spayed bitches during the postpartum period and more frequently, from 6th to 10th day after whelping (Biddle and Macintire, 2000) [4]. It can also occur during pseudo-pregnancy, as well as after early weaning of puppies. The most common route of infection is the ascending route from the nipple, while trauma and haematogenous route are less frequent. Trauma may be produced by sucking puppies during lactation (Momont *et al.*, 2002) [5]. In early stage, there is abnormal mammary secretion and enlarged, painful, hot mammary gland(s) with red- to purple coloured abdominal skin. If acute mastitis progresses to septic mastitis, signs of systemic illness such as fever, depression, anorexia and lethargy as well as trembling and decreased in mothering behaviour. At a later stage, there is development of intramammary abscesses and secretion of brownish, purulent pus, with flakes or clots, subsequently yellowish and thick. Intramammary presence of nodules or diffuse hardness may be seen finding during the long-standing phase (Johnston *et al*., 2001) [6]. The present study attempts to provide early diagnosis and successful therapeutic management of canine mastitis in order to reduce pup mortality.

Materials and Methods
An intact 2 years old mongrel bitch was presented in Teaching Veterinary Clinical Complex, College of Veterinary Sciences and Animal Husbandry, Selesih with complaints of anorexia, vomition, sudden swelling of mammary glands and disallowing suckling past 3 days. The bitch had a history of whelping 2 weeks back as well as death of a puppy after six days of birth. The dog was timely dewormed and vaccinated.

General clinical examination revealed pyrexia (103.2ºF), tachypnoea (64/min), tachycardia (135beats/min), dehydration and congested conjunctival mucus membranes. Physical examination of mammary gland showed warm, erythematic, oedematous and painful condition with palpable soft mass (Fig. 1 and 2). When squeezed with fingers, purulent exudate from teats was observed which was subjected to White-Side Test (WTS) resulting in the formation of thick gel, indicative of severe mastitis.

Fig 1-2: Inflamed and Swollen mammary gland of affected bitch

Haematological analysis revealed mild anaemia (normocytic, hypochromic), decreased in MCV along with mild leukocytosis, neutrophilia and thrombocytopenia while Serum biochemistry revealed hyperproteinemia with hyperalbuminemia and hyperglobulinemia (Table 1).

Table 1: The haemato-biochemical parameters on day 0 and day 7

Parameters	Day 0	Day 7	Reference range*
Hb (g/dL)	10.2	13.6	12-19
TEC (10^6/mm^3)	4.8	6.6	5.0–7.9
TLC (10^3/mm^3)	15.8	12.9	5.0-14.1
Neutrophils (%)	88	79	58-85
Lymphocytes (%)	10	16	8-29
Monocytes (%)	03	03	5-11
Basophils (%)	01	00	0-4
Eosinophils (%)	10	05	0-9
MCV (fL)	64	70	66-77
Platelets count (lakhs/mm^3)	2.01	3.65	2.11-6.21
Total protein (g/dl)	8.3	5.4	5.4–7.5
Albumin (g/dl)	3.6	2.5	2.3–3.1
Globulin (g/dl)	4.7	2.9	2.4–4.4
ALT (U/L)	135	98	10 – 109
AST (U/L)	21	19	13 – 15
BUN (mg/dl)	20	15	8 – 28
Creatinine (mg/dl)	1.1	1.09	0.5 – 1.7

(*Source: Haematological and serum biochemical reference ranges, 11thedn. The Merck Veterinary Manual)

The pH of milk was determined as alkaline by using pH strips. For microbiological examination mammary secretion was collected aseptically in properly labelled sterile container. Bacteriological culture revealed yellow colonies with yellow zones on Mannitol Salt agar (MSA) media plates (Fig. 3). Gram staining showed similar Gram +ve cocci while biochemical tests indicated catalase (+), coagulase (+), indole (-), MR (+), VP (+) citrate (+), and nitrate reduction (+). Based on these characteristics, the cultured agent was identified as *Staphylococcus aureus*.

In disc diffusion antimicrobial susceptibility test, the isolate was found sensitive to Cefotaxim, Ceftriaxone, Tetracycline and Cefoxitin and resistant to amoxycyllin, Azithromycin, Enrofloxacin, Streptomycin, Amikacin, Cefixim, Ciprofloxacin and Penicillin (Fig. 4).

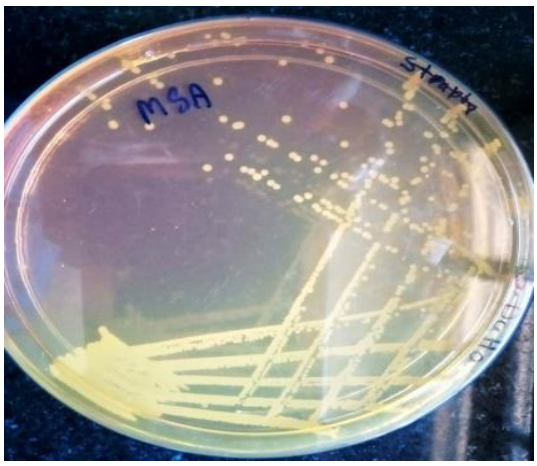

Fig 3: *Staphylococcus aureus* colonies appear yellow and shiny in Mannitol Salt Agar (MSA) media.

Fig 4: Disc diffusion test showing zone of inhibition

Result and Discussion

After diagnosis suitable treatment is recommended for a period of 7 days. The animal was initially stabilised using intravenous administration of Inj. NS @ 250 ml IV, Ringer's Lactate @ 250 ml IV and Inj. B-complex (Tribivet^{TM}) @ 1 ml IV. Based on the confirmatory diagnosis and result of antibiotic sensitivity test, the treatment was initiated by prescribing systemic antibiotic therapy by intravenous injection of Cetriaxone (Intacef Tazo Pet^{TM} 562.5mg) @ 25

mg/kg body weight SID for 7 days. Besides antibiotic therapy, to reduce the severity of the inflammation single dose of Injection Flunixin meglumine (Unizif™) @ 1.1 mg/kg body weight intravenously and injection Pantoprazole (Wonon™ 40mg) @ 1 mg/kg body weight, SID, for 7 days was recommended. The animal responded well to the treatment and an eventful recovery was observed after 7th day of treatment. All the hemato-biochemical parameters came to normalcy after7 days of treatment (Table 1). The case was followed for a month; the bitch remains healthy and active with no clinical or subclinical mastitis.

Mammary gland infections in canines are generally overlooked and normally arise due to the bacterial infection (Ververidis *et al*., 2007) [7]. Microbiology of the milk revealed pure growth of *Staphylococcus aureus* as main etiological agent in this present case. The nature of the clinical mastitis in bitches either may be localised or diffuse where single or multiple mammary gland may be affected (Barsanti, 2006) [8]. The clinical picture of the affected glands presented warm, erythematic, oedematous and painful condition similar to the findings of Vasiu *et al*. (2015) [9]. The alkaline pH and cytological finding of milk supported the clinical diagnosis and were in agreement with the findings of Hasegawa *et al*., (1993) [10] and Vasiu *et al*., (2016) [11]. The deviation of haematological and sero-biochemical parameters were found in accordance to the findings of Vasiu *et al*. (2016) [11]. The correct and early diagnosis of mammary gland infections in dams is the necessity to save the bitch and the pups. Therapeutic management of mastitis must be initiated immediately by the use of antibiotics whose spectra of action is wide and effective agents the common causative isolates of mastitis (Wiebe and Howard, 2009) [12]. However it shall be of interest to practice judicious use of antibiotics by regular antimicrobial susceptibility testing to avoid the emergence of multidrug resistant pathogens and their zoonotic transmissibility.

Conclusion

The present case study describes mastitis in a female mongrel dog and its successful therapeutic management with parenteral antibiotic and supportive therapy.

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