

Umbilical infections in calves reared under traditional system and their management

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Navel ill or omphalitis is one of the most common diseases of newborn calves characterized by infection of umbilicus and its associated structures. The infection leads to inflammation of umbilical cord causing hot and painful swelling. Besides omphalitis, the infection may also spread to joints and other organs via haematogenous route causing joint ill and other serious complications. This spread of infection to different body organs enhance the mortality rates many fold in calves. Anatomically, umbilicus is the remnant of maternal and foetal connections which comprises of umbilical vein, paired umbilical arteries and urachus along with amniotic membrane. Physiologically, umbilical vein supplies the oxygenated blood to the fetus via dam's portal vein, umbilical arteries carry waste and oxygen-poor blood to placenta and urachus connects the fetal bladder with allantoic sac before birth (Figure 1). After calving, umbilical arteries retract into abdomen and later transformed into lateral ligaments of urinary bladder, umbilical vein get fibrosed in to lateral ligament of liver and urachus retracts as rudimentary part of bladder (Baird, 2008). Umbilical vein and urachus remain open for few days after birth as compared to umbilical arteries predisposing to navel ill in calves. The stalk of umbilicus usually dries out within a week of calving, however if infection occurs then swelling starts at the site. The infection in umbilicus can be urachal infection (most common), omphalophlebitis, omphaloarteritis (less common due to shrinkage of smooth muscles at time of parturition) or combination of any of these (Rings and Anderdson, 2009). Later on, older calves may also develop umbilical abscess in form of thick and nonreducible umbilical mass. These infections are collectively called umbilical infections. Etiology of umbilical infections in calves is usually mixed bacterial pathogens among which most commonly found are *Staphylococcus aureus*, *Streptococcus bovis* and *Escherichia coli* (Radostits *et al.*, 2010).

In India, traditional livestock rearing practices are commonly adopted where animals are kept as integral

part of agricultural system. In traditional rearing system, animals of all age groups are kept at one place; hence separate calving pens are not used. In such rearing systems, hygienic conditions remain compromised for dams as well as calves. These unhygienic environmental conditions for calving along with various other factors viz insufficient colostrum feeding, non-ligation and dipping of umbilical stalk in antiseptic solution etc. enhance the risk of umbilical infections. The umbilical infections in calves born in intensive cattle rearing systems range from 5 to 15% (Mee, 2008) and unhygienic conditions during calving time as in traditional rearing systems further increase the prevalence of infections. These infections further enhance the risk of arthritis, pneumonia and diarrhoea along with decreased body weight gain leading to increased morbidity and mortality (Gorden and Plummer, 2010; Wieland *et al.*, 2017). The present study has been conducted on calves reported to the hospital with the objective of analysing the occurrence of umbilical infections in traditional Indian rearing system, their types and effective management to ensure calves health and adequate growth.

Sixty cow and buffalo calves suffering from umbilical infections reported at Government Veterinary Hospital, Khanda (Animal Husbandry & Dairying Department, Sonipat, India) during the period of July to December 2019, were investigated in the present study.

Buffalo and cow calves aged up to 3 months irrespective of breed with swelling of navel area were presented to the hospital (Figure 2 and 3). The owners reported loss of body condition in most of the cases with lethargic behaviour and decreased milk intake. All the calves presented to the hospital were diagnosed on the bases of manual palpation of navel, aspirating fluid from the swelling using sterile needle & syringe, palpation of hernial ring & umbilical mass retracting back to abdomen while pressing the swelling and other clinical signs as hot and painful swelling, fever etc. Owners of the above said animals were surveyed using a simple schedule having close-ended questions regarding managerial practices followed for rearing of calves. A schedule comprises a set

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of structured questions related to the aims of survey asked by the investigator. Simple statistical tools of frequency distribution and percentage were used for comparisons.

Calves born in unhygienic environment are more prone to umbilical infections as navel structures remain open for a period of time predisposing the calves to infections. Results of the present investigation have revealed five umbilical conditions affecting calves. Among these omphalitis (60%) is the most common condition followed by umbilical abscess (30%). Uncommon navel affections include joint ill and umbilical hernia. Moreover; male calves are significantly more affected than female calves with the two most common conditions i.e. omphalitis and umbilical abscess as 66.7% of total calves affected were male. Types of umbilical affections in calves and their percentage of occurrence are shown in Fig 4. Occurrences of calf umbilical infections in India are generally associated with poor managerial conditions because of adoption of traditional cattle rearing practices in most of rural areas of the country. Results of the survey conducted during study revealed that hygienic environment at time of calving and clean bedding provided to calves by only 5% owners and navel ligation & antiseptics was followed by 15% owners. Colostrum feeding practice was followed; however, only 28.3% owners fed colostrum within 2 hours of birth i.e. ideal time of colostrum feeding to calf for maximum passive immunity (Table 1). Sample t test was performed through SPSS 23 and revealed statistical significance (@ 95% Confidence interval) of rearing practice on occurrence of umbilical infection.

Calves suffering from omphalitis without development of abscesses were treated using antibiotic therapy. Streptomycin sulphate and Procaine Penicillin (Inj Dicrystin-S; Sarabhai Zydas Animal Health Ltd.) having additive or synergistic bactericidal action against both Gram-positive and Gram-negative bacteria at a dose rate of 1ml/25kg body wt. (add 7 ml distilled water to 2.5g of strepto-penicillin to make 10 ml solution) was administered intramuscularly for five days. Non-steroidal anti-inflammatory analgesic and anti-pyretic drug flunixin meglumine (Inj Megludyne; Virbac Animal Health Care Pvt Ltd.) at a dose rate of 1.1 mg/kg body wt. was also administered intramuscularly to relieve from pain and inflammation. Improvement in calves was reported and animals recovered completely following 3-5 days of treatment.

Table 1 Responses of owners on traditional calf rearing practices

S.N.	Questions asked	Frequency	Percentage
1	Hygiene of calving area		
	Yes	03	05
	No	57	95
2	Navel stalk ligation		
	Yes	09	15
	No	51	85
3	Navel antiseptics		
	Yes	09	15
	No	51	85
4	Clean calf bedding		
	Yes	03	05
	No	57	95
5	Colostrum feeding		
	Within 2 hrs of birth	17	28.3
	2-4 hrs of birth	28	46.7
	After dropping of placenta	15	25

Abscesses were drained by giving stab incision using B.P. Blade No. 22 and flushed with 5% povidone-iodine (Cipladine; Cipla Ltd.) regularly along with antibiotics and NSAIDs therapy as discussed above. Swelling subsided and animals showed tremendous recovery in 5-7 days of treatment.

Cases were referred to District Veterinary Hospital for herniorrhaphy, however, one of the two owners did not go for surgical treatment and spontaneous recovery occurred in that case after attaining 6 months of age (approx). This could be because of deepening of abdomen and relative shortening of mesentery as the age advances causing cicatrization of small hernial ring.

Umbilical infections are mixed bacterial infections and strepto-penicillin is quite effective antibiotic against these types of infections in calves. The present study has also shown effectiveness of streptomycin and penicillin in treatment of navel ill. Various other workers in India as well as abroad have shown efficacious treatment of navel ill by strepto-penicillin (Ganga Naik *et al.*, 2011; Abdullah *et al.*, 2015). Umbilical dipping with antiseptic solutions reduce the chances of navel ill. Tincture of iodine (7% w/v) is most commonly used navel antiseptic dip solution (Grover and Godden, 2011); however, some

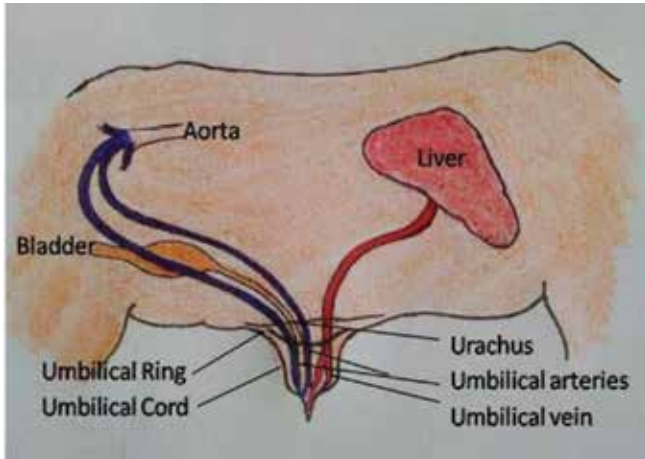


Fig. 1. Anatomical image of Umbilical contents



Fig. 2. Omphalitis in a Sahiwal Cow male calf



Fig. 3. Umbilical abscess in a Murrah Buffalo male calf

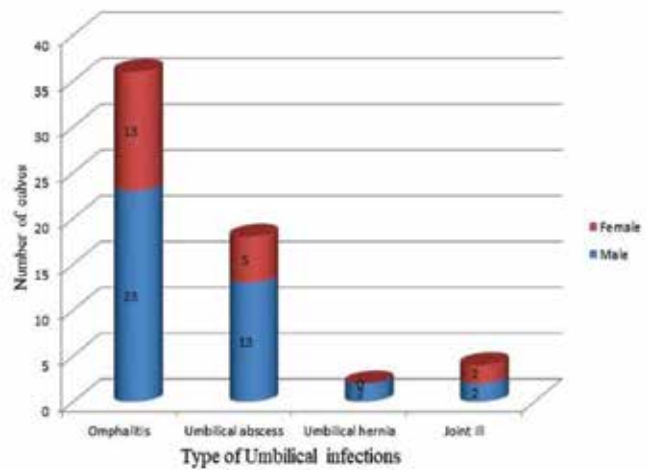


Fig. 4. Graphical representation of types of umbilical affections in calves

studies have reported inflammation and necrosis of tissues while using strong iodine solutions (Rings and Anderson, 2009), so 4% chlorhexidine should be used as umbilical dip solution. Umbilical infections in traditional calf rearing system occur due to dirty environment at time of calving and navel sepsis just after calving. As evident from the survey of present study, most of the calf owners participated in the survey have not taken care of hygienic environment at time of calving and navel antiseptic dipping. Timings of colostrum feeding are also essential for better absorption of immunoglobulins. Only 28.3% owners fed colostrum to their calves within 2 hrs of birth. Similar results on hygienic practices and colostrum feeding have been reported by various other workers (Saharan *et al.*, 2015; Godara *et al.*, 2017) indicating the role of hygienic environment, antiseptic navel dipping and colostrum feeding in preventing navel infections.

The present study has shown that omphalitis and navel abscess are the two most common umbilical infections in traditional calf rearing system. These infections can be successively treated with a combination of penicillin and streptomycin along with cleaning of umbilicus with antiseptic solution. However, prevention of navel infections is highly economical as compared to its treatment. Moreover, as navel infections affect adversely on the calf body condition and enhance the chances of morbidity and mortality, various steps like provision of clean calving area, antiseptic dipping of external umbilical cord, colostrum feeding within 2 hours of calving and umbilical monitoring 2-3times/week till drying of the umbilical stalk, are to be followed to prevent navel infections in calves. In this way, these conditions can be reduced to a greater extent.

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