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Incidence and clinical signs associated with septic arthritis in calves

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Abstract

Septic arthritis is one of the most common disease condition that affect young calves that are born in unhygienic environment. A total of 36 cases presented to the Department of Veterinary Surgery and Radiology, Veterinary College, Hebbal, Bengaluru; College of Veterinary Science, Tirupati and Veterinary Hospital, Visakhapatnam. Among all calves, clinically fit calves were treated with intra-articular administration of ceftiofur sodium microspheres and honey. Preponderance of septic arthritis was reported in the age group of less than one month and male calves outnumbered the females. Carpal joints were most commonly affected with septic arthritis followed by tarsal and fetlock joints. The clinical signs recorded in the present study were fever, early fatigue, inappetance, synovial effusion, lameness, hot and swollen joints with open wounds, limited range of joint motion, pain on manipulation and flexion of the affected joints and varying levels of hypersensitivity.

Keywords: Septic arthritis, incidence, clinical signs, chitosan drug delivery system impregnated with ceftiofur sodium and honey

1. Introduction

Septic arthritis is very important disease that frequently affects newborn calves especially within first eight weeks of their life. It is supposed to be resultant of secondary bacterial colonization in the joints. If early treatment is not initiated it may lead to severe, self-perpetuating and potentially irreversible damage [1]. Treatment of septic arthritis in calves was tough and time consuming, but it had good outcomes when the disease was involved only one joint and/or without other systemic disorders [2]. Due to the long treatment period, expensive costs and lack of effective treatment, a considerable number of animals are being culled every year [3, 4].

2. Materials and Methods

The study was carried out among the clinical cases of calves suffering from septic arthritis presented to Department of Veterinary Surgery and Radiology, Veterinary College, Hebbal, Bengaluru; College of Veterinary Science, Tirupati and Veterinary Hospital, Visakhapatnam for a period of two years from April 2017 to March 2019. Among these, twelve calves which were found otherwise clinically fit were selected for the study and were divided in to two groups of six animals each. Affected joints in Group I calves were treated with intra articular infusion of chitosan drug delivery system impregnated with ceftiofur sodium (100 mg) and honey (5 ml) was infused in to joints of calves in Group II.

3. Results and Discussion

Out of 2412 cases presented, 432 cases were calves with an overall occurrence of septic arthritis of 8.34%. Similar high prevalence of septic arthritis in new born calves was also reported earlier (5-15%) [5]. In the present study, exotic crossbred calves were most commonly affected by septic arthritis. The incidence was more frequent in Holstein Friesian calves (63.87%) than crossbred Jersey calves (36.1%). These findings were in contrast to that of Ramanathan (2007) [6], where in, the Jersey cross calves (73.33%) outnumbered HF cross calves. The highest incidence of septic arthritis in crossbreds could be due to the presence of more crossbred population in this area.

In the present study, higher incidence of septic arthritis was recorded in males (55.5%) than females (44.4%). Similar findings have also been reported by Singh *et al.* (1989) [7], Dogan *et al.* (2016) [2] and Ibrahim (2019) [8].

In contrast, higher incidence of septic arthritis in females than males was documented by Van Pelt (1972) [9], Ducharme *et al.* (1985) [10], Butson *et al.* (1996) [11], Kofler (1996) [12], Rohde *et al.* (2000) [13] and Ramanathan (2007) [6].

Septic arthritis was frequently reported as neonatal polyarthritis in young calves [14]. An abnormal birth circumstance was also may be a reason for increased susceptibility to neonates to septic arthritis in calves [15]. The calves studied were of different ages ranging from 20 days to 5 months and was prevalent in calves of less than one month age (n=14, 38.8%) followed by 1-2 months (n=11, 30.5%), 2-3 months (n=6, 16.6%), 3-4 months (n=3, 8.33%) and 4-5 months (n=2, 5.55%). Similar findings were also reported by Jackson (1999) [1] in first 8 weeks of age. Rohde *et al.* (2000) [13] observed higher incidence in calves of below 1 year age (70.49%) than adults (29.51%). Whereas Merckens *et al.* (1984) [16] reported that the incidence was not age dependent. The failure of passive transfer of immunity lead to high risk of developing calf hood infections in neonatal calves [17][18].

In present study, a total of 48 joints were found to be affected among the 36 calves with septic arthritis. Carpal joint (85.41%) was most commonly affected one followed by tarsal (10.4%) and fetlock (4.1%) joints (Fig. 1 and 2). Similar findings were also reported by Trent and Plumb (1991) [19], Kofler (1996) [12], Jackson (1999) [1], Ramanathan (2007) [6], Constant *et al.* (2018) [20] and Phil (2018) [21]. Contrary to our study, a survey over 192 horses affected with septic arthritis, Schneider *et al.* (1992) [22] observed higher incidence in tarso-carpal joint (34%) followed by fetlock (20%), carpus (18%) and stifle (9%) joints. Rohde *et al.* (2000) [13] found high incidence in stifle joint (34.92%). The recent trauma had also been admitted to predispose a joint to infection in foals [15]. Carpal and stifle joints were the most frequently affected joints in young animals, whereas fetlock and tarsal joints in adults [23]. We found traumatic origin of septic arthritis in two calves. These findings were in agreement with Tremaine (2000) [24], Butt (2002) [25], Tashak (2002) [27] and Desrochers (2004) [4]. Highest incidence in carpal joints in the present study could be ascribed to the complete weight bearing against hard floor and possible trauma while lying down and getting up (Verschooten *et al.*, 2000) [28].

In present study, co-morbidities like omphalophlebitis, septicemia, enteritis and respiratory infections were reported in both the groups. Similar findings were also reported by Bailey (1985) [29], Rebhun (1995) [30], Berry (1998) [31], Goodazri *et al.* (2015) [32] and Marchionatti *et al.* (2016) [33]. Thompson (2007) [34] reported various other clinical abnormalities associated with septic arthritis like meningitis,

metastatic iridocyclitis, enteritis, pneumonia and uveitis (Guard, 2008) [35].

In the present study, higher incidence of septic arthritis in neonatal calves was observed, which could be due to unhygienic environment, respiratory, gastro intestinal infections, inadequate feeding of colostrum after birth and failure to disinfect the umbilicus in the immediate postnatal period. Similar findings were also reported by Tashak (2002) [27], Valla and House (2002) [36], Ismail (2007) [37], Ramanathan (2007) [6], Mee (2008) [5] and Naik *et al.* (2011) [38].

Animals of both groups were showing symptoms of high fever, fatigue, inappetance, synovial effusion, lameness, hot and swollen joints with limited range of joint motion, pain on manipulation and flexion of the affected joints, and varying levels of sensitivity (Table. 1 and Fig.3). Similar findings were reported by Bagga *et al.* (2009) [39] Haerdi-Landerer *et al.* (2010) [40], Desrochers and Francoz (2014) [41], Dogan *et al.* (2016) [2], Phil (2018) [21] and Ibrahim (2019) [8]. In most cases it was found that the affected joints were warm to touch, this might be due to increased blood supply and hyperaemia at the affected joint as opined by Palmer and Bertone (1994) [42]. The distension of affected joints due to synovial effusion and peri-articular edema in acute cases reported by Weaver (1997) [43] and Orsini (2002) [44] and thickening and fibrosis of the joint capsule in chronic cases were reported by Butt (2002) [25] and Tashak (2002) [27].

In young animals, angular limb deformities secondary to uneven weight bearing occur rapidly and affected limb will have flexural deformities from chronic pain and muscular atrophy secondary to disuse (Desrochers and Francoz, 2014) [41].

Table 1: Clinical signs observed in all clinical cases of septic arthritis

Sl. No.	Clinical signs	Number of cases
1	swollen and painful joints	28
2	Erythema of the overlying skin	6
3	Open wounds	14
4	Pyrexia	18
5	Pain during flexion and extension	16
6	Inappetence	10
7	Lameness	
	1.Mild	18
	2.Moderate	13
	3.Severe	5
8	Ankylosed joints	4
9	Recumbent	2



Fig 1: Photograph showing different joints affected with septic arthritis. Right carpal joints (B,C,E); Left carpal joint (A); Both left and right carpal joint (D,F)

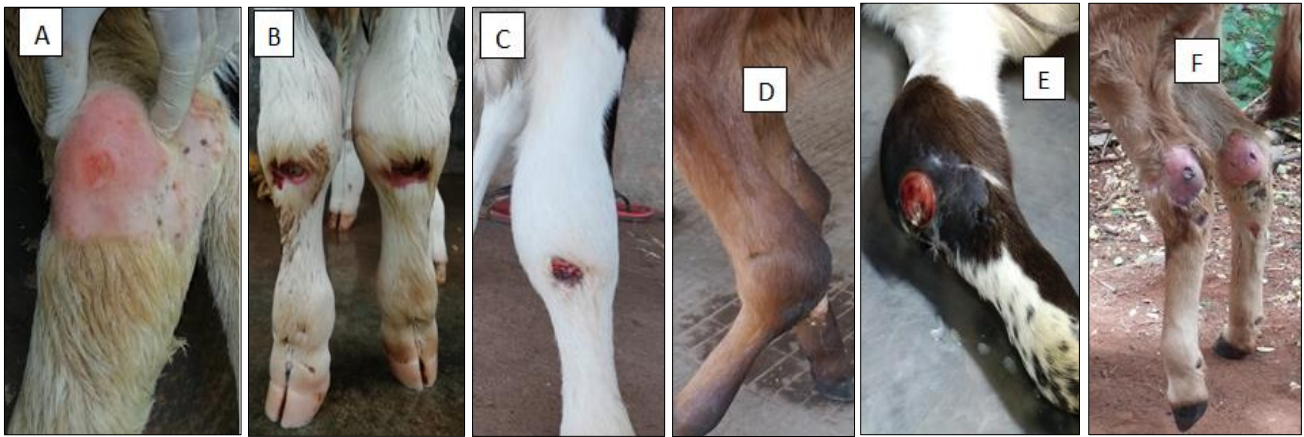


Fig 2: Photograph showing different joints affected with septic arthritis. Right carpal joints (D and E); Left carpal joint (C); Both left and right carpal joints (B); left hock joint (A) and Both left and right hock joints (F).

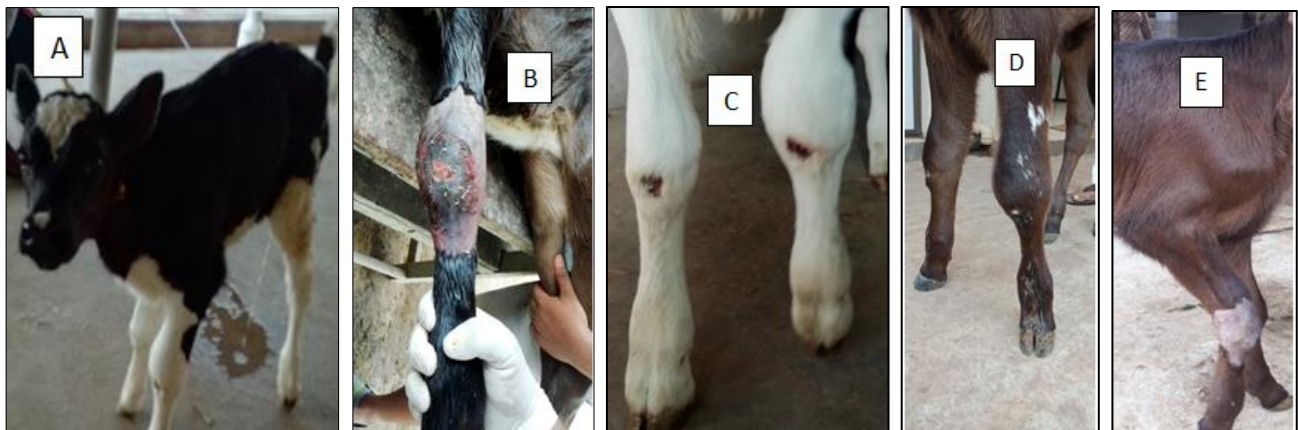


Fig 3: Photographs showing different clinical signs in calves with septic arthritis were swollen joints with open wound (A,B,C,D ; Erythema of skin over the joint (B); partial weight bearing (C and E)

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