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Outcome of modified surgical treatment of some types of swelling in large ruminants with special reference to anatomical predisposition

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A clinical study conducted on 74 animals affected with umbilical abscess, umbilical hernia, pre-sternal bursitis or olecranon bursitis. Minor modifications were made for different treatment methods and outcome of different surgical interventions were recorded. Results revealed that the gauze is better than plastic tube as a drain for abscess, fabricated sterile mesh is better than mattress suture for closure of hernia ring, surgical excision of pre-sternal bursitis with lateral suture line is better than ventral suture line, ventral incision of the pre-sternal bursa is better than lateral incision, and excision of olecranon bursa with creation of lateral suture line is better than caudal suture line. It is concluded that minor modification of well-known surgical techniques can affect the outcome of surgical interventions.

Key words: Bursa, Hernia, Ruminants, Swelling, Umbilical abscess.

Swelling is a historical topic that has been thoroughly studied over a century. Nevertheless, advances of veterinary surgery are not only establishing new techniques but also creation of minor subtle modifications of well-known traditional ones to shorten healing time, lower the cost of aftercare, and minimize complications, which will improve the skills of veterinary surgeons and positively affect the surgical outcome.

Swelling is defined as any circumscribed over growth or mass projecting from the animal body and it can classified into abscess, hernia, bursitis and cyst. It is well known that the treatment of such conditions is primarily surgical, either by surgical incision or excision according to its nature; however, the success rates, complications, advantages and disadvantages vary greatly among different studies. Umbilical affections include omphalophlebitis, omphaloarteritis, urachal sepsis and umbilical abscess, and the latter is a common soft tissue abscess of the external umbilicus of calves. These affections are treated either by resection of the infected structure or the traditional two-main-steps named maturation and evacuation (Staller *et al*., 1995; Kiliç *et al.,* 2005; Ganga Naik *et al*., 2011). The process of evacuation is usually followed by application of drain, which is mostly gauze immersed in strong antiseptic, otherwise a more recent method included dressing the abscess with Ligasano-polyurethane-soft-foam that has convincing therapeutic effect as wound dressing material for infected wounds (Kofler *et al*., 2004).

Umbilical hernia ensues secondary to failure of the normal closure of the umbilical ring and accompanied by protrusion of abdominal contents into the overlying intact subcutis. Different treatment techniques were adopted for abolishing the hernial ring either by suturing of the ring by interrupted mattress sutures or bridging the hernial defect by fixation of fabricated mesh. However, success rates, complications and advantages varied between the two methods of treatment (Taguchi *et al.,* 1990; Rings, 1995; Seif *et al.,* 2002; Kiliç *et al.,* 2005; Al-Sobayil and Ahmed, 2007; Sutradhar *et al.,* 2009).

Inflammation of bursa is not an uncommon affection in large animals, and it was treated by conservative or invasive methods. Although conservative methods showed high success rates (Tulleners *et al.,* 1985; Smith *et al*., 1989), under field conditions the surgical excision appeared to have a more rapid healing and of lower cost, and was found better than conservative treatment especially in old cases (Ali *et al.,* 2009). The decision of invasive procedures will be easier when the capsule thickness, bursa contents, and the extent of inflammation can be determined by ultra-sonographically (Seyrek-Intas *et al.,* 2005).

As a result of variation of success rates and complications among different studies, we conducted this study to evaluate the effect of minor modifications, of some well-known surgical techniques, on the outcome of treatment of certain types of swellings in large ruminants.

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Materials and Methods

The study was carried out on 74 animals (30 cattle and 46 buffaloes) affected with different types of swelling including umbilical abscess, umbilical herniation, pre-sternal bursitis or olecranon bursitis (Table).

Umbilical abscess was recorded in 12 animals (8 cattle calves and 4 buffalo calves) and they were treated in traditional manner by maturation, incision, evacuation and application of drain. Calves of each species were classified into two groups, one of which was treated by using fenestrated plastic tube as drain (4 cattle calves and 2 buffalo calves) and the other group, of the same numbers, was treated by using gauze as a drain. Aftercare was the same for both groups and it included i.m. injection of tetracycline 20% 1 mL/10 kg b.wt, i.m. AD3E 5 mL for each calf, and periodical flushing of the abscess with diluted povidone iodine 10%. The mean time of healing and obliteration of the abscess cavity was recorded for each group.

Umbilical hernia was recorded in 31 animals (22 cattle calves and 9 buffalo calves) and they were treated either by retro-peritoneal fixation of autoclaved fabricated mesh (18 cattle calves and 6 buffalo calves) or suturing of the hernial ring by sterile silk No. 2 by using interrupted mattress sutures (4 cattle calves and 3 buffalo calves). Following surgery and application of routine aftercare, the incidence of re-herniation and or infection were recorded for each group.

Pre-sternal bursitis was observed in 22 buffalo calves and they were treated either by surgical excision or incision of the bursa. Surgical excision of the bursa was made in 16 calves (7 calves had ventral suture line of the wound, and the 9 calves had lateral suture line); while surgical incision of the bursa was made in six calves (3 with ventral and 3 with lateral incision) followed by application of gauze moistened with Tr. iodine 5% as drain for destruction of secretory membrane. Following surgery, aftercare of the first group included i.m. injection of tetracycline 20% 1 mL/10 kg b.wt, i.m. AD3E 5 mL for each calf, preservation of the animal in clean dry place and finally removal of silk suture after healing. At the same time, the second group was subjected to a similar aftercare with periodical change of the drain till complete obliteration of the cavity. Incidence of wound infection was recorded for the first group and the mean time for healing was recorded for both groups.

Capped elbow was observed in 11 buffaloes and treated by surgical excision of the bursa with creation of caudal (4 animals) or lateral (7 animals) suture line of the wound. Following surgery and application of routine aftercare, incidence of rupture and infection of the wound were recorded for both groups.

Results and Discussion

The results of the study revealed that the abscesses drained by gauze underwent faster healing and obliteration of the abscess cavity (7-9 days, mean 8.17 days) than those drained by plastic tube (10-14 days, mean 12 days). Similar results were obtained with fabricated drains by Kofler *et al*. (2004) who have opined that the porous surface structure of this material caused subtle wound debridement and mechanical stimulation of the wound surface, increasing exudation and decreasing fibrinous adhesions. The pores ensured good drainage, reduced infection, avoided the accumulation of exudate and the following destruction of the wound surface. Moreover, the plastic tube had limited capability of holding the antiseptic for long period. However, the shorter healing time in the present study than that recorded in earlier studies might be due to divergence of the study subject, like relatively younger age group in this study.

Out of the 24 calves suffered from umbilical hernia and treated by retro-peritoneal fixation of autoclaved fabricated mesh, only one cattle calf showed signs of infection at the seat of surgery. The

Table: Number of affected animals and methods of treatment.

Umbilical abscess				**Umbilical hernia**			
Cattle		Buffaloes		Cattle		Buffaloes	
Tube	Gauze	Tube	Gauze	Mesh	Suture	Mesh	Suture
4	4	2	2	18	4	6	3

Pre-sternal bursitis in buffalo calves				**Capped elbow in buffaloes**	
Excision		Incision		Caudal	Lateral
Ventral	Lateral	Ventral	Lateral		
7	9	3	3	4	7

calf responded well to conservative treatment by massive antibiotic injection with removal of two stitches to facilitate drainage. On the other hand, out of the seven calves operated by suturing of the ring, two calves (1 cattle calf and 1 buffalo calf) underwent rupture of the sutured hernial ring and re-herniation, and they were not subjected to further surgery under request of the owners. The high incidence of rupture of the mattress suture in this study agrees with that recorded by Kiliç *et al.* (2005) and Sutradhar *et al.* (2009) and indicates the superiority of using fabricated mesh for bridging the hernia defect, as it predisposed to no tension over the site of herniorrhaphy (Seif *et al.*, 2002). At the same time absence of peritonitis in both groups might be due to the retro-peritoneal approach used in both groups, which is very similar to the closed method of herniorrhaphy described by Sutradhar *et al*. (2009).

With respect to pre-sternal bursitis, most of buffalo calves suffered from pre-sternal bursitis and subjected to surgical excision showed complete healing by the 10th day, by then the silk stitches were removed (Fathy and Radad, 2006). However, four calves with ventral suture line and one with lateral suture line, showed wound infection and abscess formation. They were treated by removing 2 stitches and dressing like abscess, and it required 21-35 days for healing. The single calf with lateral suture line required longer time for healing (35 days) than the other four calves with ventral suture line (21-27 days); and this might be attributed to the position of the abscess opening that interfered with normal evacuation by gravity, unlike in other four calves. The higher incidence of infection in case of ventral or central suture line cases might be due to the higher possibility of contamination by soil during lying down, in contrast to the higher position of lateral suture line that permitted no contact with the ground. However, privilege of lower incidence of infection in lateral suture line technique should be weighed against the difficulty of treatment and the prolonged healing time when infection occurs.

With respect to incision technique, the three calves treated by ventral incision of the bursa and application of drain required 20-22 days for complete healing (mean 21 days), while the other three calves subjected to lateral incision of the bursa required 24-28 days for complete healing (mean 26 days). Delayed healing in the second group might be due to improper drainage of the laterally positioned opening, and indicates the superiority of the first technique.

Despite the wide argument about the efficacy of conservative treatment of bursitis in large animals, it should be tried first before a more invasive surgical excision can be used, as the possibility of infection, healing by second intention or dehiscence may result in unacceptable cosmetic appearance (Tulleners *et al.*, 1985; Smith *et al.*, 1989; Honnas *et al.*, 1995; Fathy and Radad, 2006; Ali *et al.*, 2009). However, in this study, the operated animals were subjected to unsuccessful conservative treatment by veterinarians. The four buffaloes, subjected to surgical excision of the olecranon bursitis with creation of caudal suture line, showed wound infection and slight swelling in one case, and rupture of the suture line in two cases. On the other hand, out of the seven buffaloes operated by surgical excision of the bursa with creation of lateral suture line, only one buffalo showed rupture of the suture line. The higher incidence of complication in case of caudal suture line might be due to the higher tension on surgery site during flexion of the joint, accordingly it is preferred to create the suture line as lateral as possible to minimize the possibility of rupture of stitches and infection. However, surgical treatment was successful and effective for treatment of olecranon bursitis particularly for the chronic proliferative and fibrous form (Fathy and Radad, 2006).

It is concluded that minor modifications of some traditional surgical techniques can improve the outcome of certain surgical techniques, reduce healing time, and lower the cost of treatment.

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