PATHOLOGICAL AND BACTERIOLOGICAL INVESTIGATION ON TRAUMATIC INJURIES IN THE CARCASSES OF SLAUGHTERED CAMELS

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ABSTRACT

A total of 569 camel carcasses were examined at Al-Ahsa abattoir for the presence of traumatic injuries. 136 carcasses had injuries in the thigh muscles (77.9%), rump (19.9%), hump (5.1%), thoracic muscles (2.9%) and flank region (2.2%). Most of the injuries were in the form of contusions (81%) but necrosis and suppuration were also observed in the rump and thigh. In three cases, fistulation was occurred in sublumbar muscles. Histologically, contused muscles showed edema and ischaemic necrosis associated with severe haemorrhages. Necrotic muscles showed hyaline degeneration and Zenker's necrosis associated with mild inflammatory cell reaction. Suppurative myositis characterized by marked fibroplasias was seen in the severely affected muscles. Surface swabs taken from the traumatized parts and the corresponding unaffected parts were cultured for aerobic and anaerobic bacteria. The isolated normal microflora identified as : Enterobacter agglomerans, Enterobacter sakazakii, Serratia odorifera, Serratia marcescens, Aeromonas hydrophila, Micrococcus species and Lactobacillus species. The bacterial populations were estimated by higher counts on the injured surfaces as compared to their unaffected surfaces. Some pathogenic bacteria and fungi were recovered from the surface of traumatized parts and identified as Salmonella Arizona, Staphylococcus aureus, Klebsiella pneumoniae, Pasteurella haemolytica, Streptococcus fecalis, Corynebacterium pseudotuberculosis, Candida albicans and aspergillus flavus. The bacterial counts did not exceed 10 CFU/cm^2, but the levels encountered may constitute a potential source of meat spoilage. The pathogenic bacteria and fungi isolated may have a public health significance.

INTRODUCTION

Traumatic lesions can be inflicted on camels during feeding, fighting, transportation, chasing and restraint. Hitting and poking of animals, by owners or animal attendants, using sticks and metal bars may cause serious skin and skeletal injuries which may range from haemorrhagic contusions to phlegmonous inflammation and necrosis. Such injuries may act as a portal of entry for opportunistic organisms which may cause tissue damage and lead to meat spoilage **(Altabari, 2009; Gracey and Collins, 1999; Gregory and Grandin, 1998; Bega-**

novic, 1975; Jerzembec, 1977; McGavin et al., 2001; Wilson, 2005).

The present study describes pathological and bacteriological changes associated with traumatic injuries in camel carcasses at Al-Ahsa abattoir- Eastern region of Saudi Arabia.

MATERIALS AND METHODS

Weekly visits were paid to Al-Ahsa abattoir. Slaughtered camel carcasses were examined carefully for presence of skeletal injuries or any other gross abnormalities. Site of injury and dimensions of injured areas were recorded and lesions were described.

Bacteriological Methods :

Swabs were taken from the traumatized surfaces as well as from the corresponding uninjured parts (controls), after evisceration and before washing and cooling of carcasses, using standard techniques **(Downes and Keith, 2004; Speck, 1984)**. The swabs were preserved in 10 ml peptone water. Ten folded serial dilations were made and cultured in appropriate media using the Dripe Plate Method and incubated aerobically at 30, 37 and 44°C for 48-96 hours. The plates were then read using a colony counter. Smears were made and stained with Gram's stain. Biochemical characteristics of the isolated microorganisms were determined by using API 20E Bio Merieux System for bacterial identification **(Dwightc et al.,2004; Jay et al.,2006; Koneman et al., 1992)**.

Pathological Methods :

Samples from injured tissue were fixed in 10% formalin, processed in paraffin and sections (4µm thick) were prepared and stained with haematoxylin and eosin (HE).

RESULTS

Carcass examinations :

A total of 569 camels of both sexes, about 10-14 year old, were examined. Out of them, 136 (23.9%) carcasses showed traumatic injuries in the thigh, rump, hump, chest and flank regions (Table 1). Most injuries were in the form of contusions which had different shape (round, oval, roughly rectangular and other irregular shapes) appeared edematous and haemorrhagic. Muscle necrosis was observed in the thigh muscles in 7 cases while phlegmonous inflammation was seen in the rump regions of two others (Figures 1-5). The latter extended internally through a fistula to involve the lumbar muscles. One case showed abscesses in iliac lymph nodes, uterus and peritoneal cavity which necessitated total carcass condemnation. The surface area of the contused and necrotic sites can be seen in Table 2. Most contusions, especially in thigh and rump regions had surface area of 50cm^2 or less. The depth of lesions ranged from 1 to 3 cm.

Histopathological findings :

Contused muscles appeared homogenous and strueture less and in many places obscured by extensive haemorrhages. Subcutaneous tissue showed edema and marked haemorrhages. Necrotic muscles showed loss of striations, pyknotic nuclei and some haemorrhages. Inflammatory cell reaction was not a distinct feature. Some sections showed typical Zenkers necrosis. The areas of phlegmonous inflammation showed marked muscle necrosis and fibrosis with extensive inflammatory cell infiltration **(McGavin et al., 2001)**, predomi-

nantly neutrophils (Figures 6 & 7).

Bacteriological findings :

The mean mesophilic bacterial counts can be seen in Table 3. The counts on the contused surfaces were about four-fold those on the corresponding uninjured parts, 1.0 x 10 and 2.7 x 10_ bacteria/cm_ respectively. Micrococcus species were the most numerous and were isolated from all sampled surfaces, followed by Lactobacillus, Enterobacter and Serratia species.

Several pathogenic bacteria were also isolated, mainly from the thigh and rump regions. Salmonella, Klebsiella, Staphylococcus, Pasteurella, Proteus and Corynebacterium organisms were only recovered from injured sites while Streptococcus faecalis was isolated from both injured and uninjured surfaces.

The mean counts for yeast and moulds on the contused surfaces (1.7 x 10/cm) were about 18-fold those on the corresponding unaffected parts (0.9 x 10/cm). Candida albicans, Aspergillus flavus and Mucor species were identified.

DISCUSSION

Undue force may be exerted on animals during transportation, especially when loading and unloading or while animals are driven to new premises to which they are not familiar (i.e. animal markets and slaughterhouse). Sticks and occasionally metal bars may be used irresponsibly to drive the animals causing body injury ranging from superficial contusions to deep wounds **(FAO/WHO, 2004)**. These wounds often serve as a portal of entry to microorganisms present on the skin or in the animal environment thus causing disease **(Altabari, 2009; Buxton and fraser, 1977; Hudson, 1996 and ICMSF, 2005)**.

The mesophilic bacteria identified in this study fall within the spectrum of bacteria commonly isolated from carcass surfaces **(Gracey and Collins, 1999 and ICMSF, 2005)**. The mean numbers isolated from the injured parts were considerably higher than those recovered from the corresponding unaffected surfaces. Histologically, the injured tissues showed congestion, edema, degenerative and necrotic changes. Degeneration was also seen in apparently normal tissue contiguous with affected areas. These tissue changes may be associated with physicochemical alterations which would furnish a suitable microenvironment for the multiplication and spread of microorganisms. This constitutes a potential source of meat contamination spoilage. Moreover, some pathogenic bacteria and fungi have been identified which could be of public health significance **(Altabari, 2009 and ICMSF, 2005)**. Economic losses arise from the total condemnation of carcasses on account of multiple injuries and spreading Suppurative infections.

In conclusions, cruelty to animals is disapproved in Islam and condemned by animal welfare organizations all over the world. Veterinary extension service is important in disseminating knowledge among animal owners about proper management and husbandry practices. Suitable battery electrodes could be designed and used safely and effectively instead of sticks and other hard objects to drive camels, and thus avoid unnecessary tissue damage.

Table (1): Incidence and site of traumatic injuries in slaughtered camel carcasses.

Total No.	No. affected (%)	Site of injury and number (%)*							
		Thigh		Rump	Hump	Chest		Flank	
		R	L			R	L	R	L
569	136 (23.9)	56 (41.2)	50 (36.7)	27 (19.9)	7 (5.1)	3 (2.2)	1 (0.7)	3 (2.2)	- (-)
		77.9				2.9		2.2	

11 animals had contusions in left and right thigh.

* % of number affected..

Table (2): Surfaces area (cm^2) of injured sites

Area cm^2	Surface Thigh No. (%)	Rump No. (%)	Site of injury Hump No. (%)	Thorax No. (%)	Flank No. (%)
≥ 50	45 (42.45)	12 (44.44)	1 (14.29)	1 (25.0)	
50 – 100	14 (13.21)	4 (14.81)	1 (14.29)	0 (-)	3 (100%)
101 – 200	14 (13.21)	3 (11.11)	2 (28.57)	2 (50.0)	-
201 – 300	12 (11.32)	2 (7.41)	2 (28.57)	0 (-)	
301 – 400	5 (4.72)	2 (7.41)	0 (-)	0 (-)	
401 – 500	3 (2.83)	1 (3.7)	0 (-)	1 (25.0)	
501 – 600	2 (1.89)	2 (7.41)	0 (-)		
601 – 700	3 (2.83)	0 (-)	0 (-)		
701 – 800	7 (6.60)	0 (-)	1 (14.28)		
801 – 900	1 (0.94)	1 (3.7)	0 (-)		
Total	106 (100%)	27 (100%)	7 (100%)	4 (100%)	3 (100%)

Table 3 : Mean values (10^2) of aerobic mesophilic bacteria/cm^2 and positive bacterial on contused surfaces of camel Carcasses n= 36.

Sampling site	Classification	Aerobic mesophilic bacteria	Salmonella Arizona	Staphylococcus aureus	Klepsiella pneumoniae spp .ozaenae	Pasteurella haemolytica	Streptococcus fecalis	Proteus vulgaris	Corynebacterium Pseudotuberculusis (ovis)	Enterobacter agglomerans	Enterobacter sakazakii	Serraria oderifera	Serratia marcescens	Aeromonas hydaphila	Lactobacillus spp	Micrococcus spp	Yeast and moulds
Thigh	I	220	3.0	0.5	5.0	0.3	2.0	0.1	1.0	2.5	2.0	3.0	1.8	-	3.2	4.4	1.7
	II	12	-	-	-	-	0.8	-	-	0.5	0.4	1.0	0.5	-	7.0	2.0	2.5
Rump	I	130	-	-	0.4	-	0.5	0.5	1.2	2.7	-	-	0.2	1.5	5.0	6.0	30
	II	85	-	-	-	-	0.2	-	-	0.1	-	-	0.1	-	-	5.8	1.7
Flank	I	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-
	II	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0	-
Hump	I	170	-	-	-	-	-	-	1.5	-	-	-	-	-	-	2.0	6.5
	II	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	2.0
Chest	I	27	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	2.0
	II	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1

Legend I control II contusion

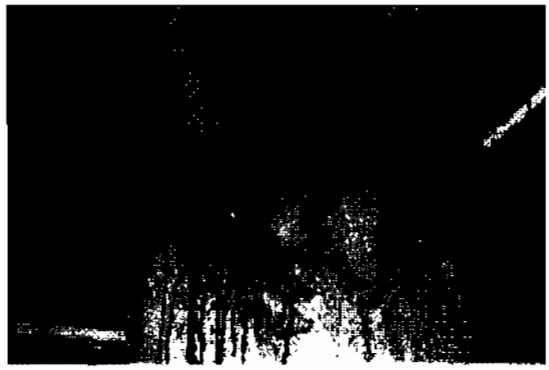

Fig. 1 : Recent haemorrhagic contusion, right thigh.

Fig. 2 : Muscles necrosis and edema, both thights.

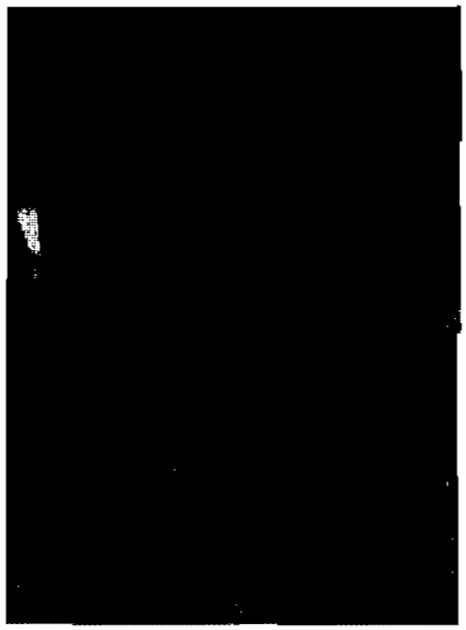

Fig. 3 : Abscess in sacral region.

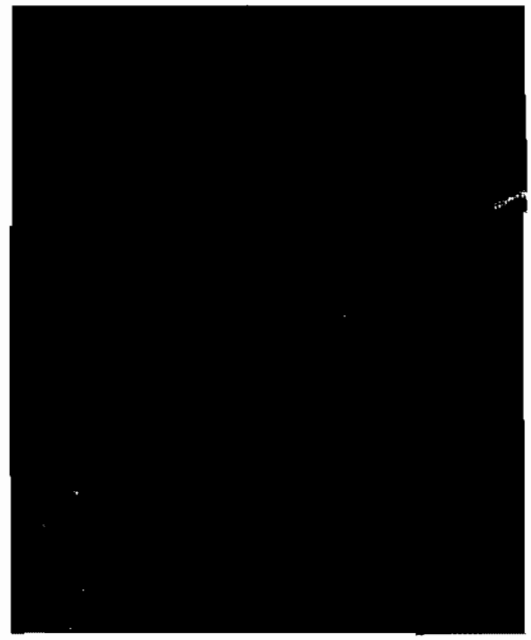

Fig. 4 : Thigh contusions and abscess in lumbo sacral region.

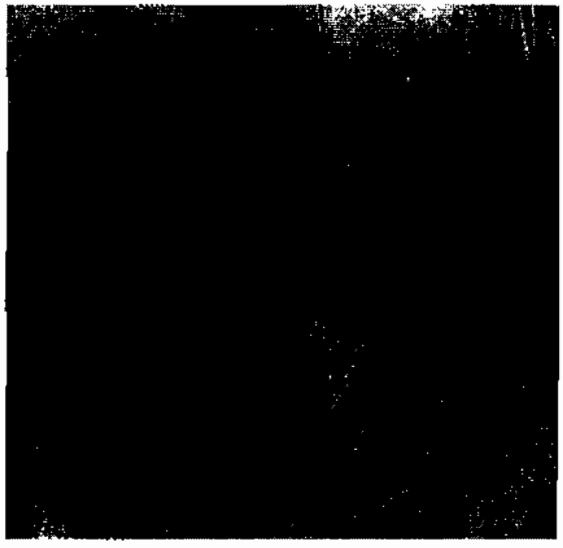

Fig. 5 : Traumatic fat necrosis in hump.

Fig. 6 : Skeletal muscle showing degeneration, edema and haemorrhages. HE x 80.

Fig. 7 : Muscle showing Suppurative myositis. Note necrosis and fibrosis HE x 160.

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