

A CLINICAL STUDY ON OCCURRENCE OF DIVERSE WOUNDS AT HEAD AND NECK REGION OF CAMELS (*Camelus dromedarius*)

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ABSTRACT

The study was conducted on 61 clinical cases of diverse wounds of head and neck region in camels on the basis of their etiology. Highest occurrence was recorded for lacerated nostril (16.40%) followed by lacerated wound of eyelid (13.11%), penetrating wounds at forehead (11.48%), maggot wounds at nostril (11.48%), ulcerative wounds at nostril (9.84%), soft palate injury (8.20%), sub-mandibular abscess (8.20%), penetrating wound at eyeball (6.56%), maggot wound at eye (3.28%), penetrating wound at buccal cavity (1.22%), firing wound at neck (1.22%), supraorbito-buccal fistula (1.64%), conjunctivitis (1.64%), keratorrhesis (1.64%) and lacerated wound at gingiva and lower lip (1.64%). In animals of present study, the early clinical healing was observed in cases where planned surgery was done, especially in cases of penetrating wound of soft palate, buccal cavity, gingiva, lower lip, eyeball, cornea, lacerated nostrils, and eyelids. Careful clinical judgment, early surgical management with gentle handling of tissue, aqua therapy or thorough wound irrigation, effective topical medication and sufficient rest brought quick and better recovery in clinical wounds in the camels.

Key words: Camel, head, neck, wound

Management of wound is a challenge in surgery and needs a judicious approach for healing of such wounds. Wide range of treatments has been recommended for different types of wound in small and large animals and principles of wound management of these species are applied on camels as well. Cross (1917), Chouhan *et al* (1981), Michaels *et al* (1983) and Steckel *et al* (1984) reported management of wounds in different animal breeds. Delayed wound healing in camels is ascribed to many reasons. Singhvi and Bhargava (1971) believed that the prevention and treatment of post-operative wound infection is problematic in camels, and this may be due to poor blood supply and abnormal anatomical disposition of cellular structures. Leese (1927) also reported that there is poor blood supply in certain regions of the camel skin and adnexa such as hump and wither regions. However, Purohit (1990) and Purohit and Chouhan (1992) reported that wound healing in camels is not delayed. Present study is based on a clinical study on occurrence of diverse wounds at head and neck region of camels (*Camelus dromedarius*).

Materials and Methods

In the present study, 61 cases of wound affections were diagnosed in camels (50 male and 11 female). These affections of head and neck region in camel were classified on the basis of anatomical location and their sex wise occurrence and incidence was observed. The etiology, clinical signs and treatment of these cases was done as per standard methods. The animals in present study were sedated with xylazine (0.3mg/kg) intravenously, wherever required.

Results

The diverse wounds recorded in present study are presented in table 1.

Wound at forehead

Penetrating wound at forehead were observed in 7 camels out of which 5 were male and 2 were female camels of different age group. It occurred due to trauma by wooden stick. Clinical examination revealed reddish pink granulating tissue in the

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Table 1. Wound affections of head and neck region in camels

S. No.	Anatomical location	Sex		Total	Incidence (%)
		M	F		
1	Wound at forehead	5	2	7	11.48
2	Supraorbital-buccal fistula	1	-	1	1.64
3	Lacerated wound at eyelid	6	2	8	13.11
4	Wound at eyeball	3	1	4	6.56
5	Conjunctivitis	1	-	1	1.64
6	Keratorrhexis	1	-	1	1.64
7	Maggot wound at eye	1	1	2	3.28
8	Firing wound at face	1	-	1	1.64
9	Buccal fistula	2	-	2	3.28
10	Lacerated wound at nostril	9	1	10	16.40
11	Ulcerative wound at Nostril	4	2	6	9.84
12	Maggot wound at nostril	5	2	7	11.48
13	Soft palate injury	5	-	5	8.20
14	Lacerated wound at gingiva and lower lip	1	-	1	1.64
15	Sub mandibular abscess	5	-	5	8.20
	Total	50	11	61	100

centre surrounded by necrosed irregular skin borders. Wounds dressed with povidone iodine and sulphanimamide powder was applied (Fig 1).

Supra-orbital buccal fistula

Penetrating wound at supraorbital region and buccal cavity was observed in 1 male camel. It was caused by the accumulation of dry feed between cheek and molars that caused inflammation and infection leading to supraorbital-buccal fistula. The wound measured 1 cm in diameter located 1-2 inches above the upper eye lid on right side in the supraorbital space communicating with buccal cavity (Fig 2). Saliva along with ingesta was drooling out through the opening. The fistula was debrided and dressed with 5% povidone iodine. Oral cavity was irrigated daily with light potassium permanganate solution. The animal was offered roughages with soft dry leaves with minimum straws. The diameter of fistula reduced remarkably in 2 weeks time and healed in 5 weeks.

Lacerated wound at eyelid

Lacerations occurred due to hooking of the eyelid or its edges by a sharp object or fixtures like hooks, nails, metallic objects of the camel cart was reported in 8 camels (6 male and 2 female). The eyelid margins were divided and the lacerated part or the cut edges of the lid curled downward (Fig 3). The

wound edges were sutured using silk No. 1 under xylazine sedation and healing occurred in 10-15 days (Fig 4). Oedema and inflammation of the eyelid reduced markedly within 48 hours. Post-operatively, topical gentamicin eye drops were used for 5 days and eye was protected with bandage to prevent self inflicted injuries and contamination. Antibiotics and anti-inflammatory drugs were administered parenterally to prevent the secondary infection and inflammation.

Wound at eyeball

Penetrating wound in eyeball occurred due to rupture by external trauma, thorn and wooden stick was diagnosed in 3 male and 1 female camels (Fig 5). These cases were treated under xylazine sedation and auriculopalpebral nerve block and retrobulbar anaesthesia using 2% lignocaine hydrochloride. The eyeball was separated from the tenon's capsule to carry out the enucleation (Fig 6). A thin strip of eyelid margins were removed and the eyelids were apposed by simple interrupted or mattress sutures. Post-operatively, ampicillin-cloxacillin and phenylbutazone were administered parenterally for 5 days to reduce the inflammation and oedema. Gentamicin eye drops were instilled locally for 5 days. Sutures were removed after 10-12 days.

Conjunctivitis

Penetrating wound at conjunctiva due to thorny bushes, foreign bodies etc. was recorded in 1 camel. Conjunctivitis was clinically manifested as swollen and hyperaemic conjunctiva, chemosis, blepharospasm and epiphora. Temporary tarsorrhaphy was done to prevent the external infection or contamination. Post-operatively, ampicillin-cloxacillin, phenylbutazone and triamcinolone were administered parenterally for 5 days to reduce the inflammation and oedema. Topical use of chloramphenicol eye drops after 5th day helped to check secondary infection as well as resolved the corneal opacity.

Keratorrhexis

Penetrating wound at cornea occurred due to rupture of cornea by trauma or perforating ulcer (keratorrhexis) was diagnosed in 1 male camel. Affected eye was irrigated with normal saline solution and cleaned with sterile gauze under xylazine sedation. The ruptured cornea and sclera were sutured using synthetic absorbable polyglycolic acid suture no. 3-0 (Fig 7), while tarsorrhaphy was done using silk suture no 1. Gentamicin eye drops were instilled thrice a day. Streptopenicillin 5 gm,

for 7 days and meloxicam 150 mg, for 3 days were administered parentally. Inj. Gentamicin 2.5 ml were injected subconjunctivally.

Maggot wound at eyes

Maggot wounds occurred due to infestation of skin wounds by flies was noticed in eye of 2 camels (1 male and 1 female). Live maggots were seen in the wounds, with discharge of blood exudates. Maggots were removed manually with the help of turpentine oil. Antiseptic dressing was done with fly repellent and antiseptic ointment or spray. The treatment was repeated at one to two days interval until complete healing. Antibiotics and meloxicam was given intramuscularly for 3-5 days.

Firing wound at face

Firing wounds occurred due to hot iron firing was noticed as an inflamed area on the right face by the owners in 1 male camel (Fig 8). The lesion was painful to touch and the affected side of face showed slight stiffness during mastication. It was 2nd degree burn and underneath the scab, pinkish red healthy granulation tissue was present. The wound was thoroughly irrigated with soap and water. After removing scab wound was dressed with fly repellent and antiseptic ointment and subsequent dressings were done on alternate day. Wound healed completely in 14 days.

Buccal Fistula

Penetrating wounds at buccal cavity caused due to penetration of cheek by trauma, accumulation of feed between cheeks and molars were observed in 2 male camels in the present study. The wounds were 1-3 cm in diameter found 1-2 inches below the lower eyelid on either right side of cheek (Fig 9). Clinical examination revealed co-occurrence of salivary and buccal fistula together where the stenson's duct was also involved. The saliva leaked through the wound during mastication. The cases of penetrating wound at buccal cavity were treated under xylazine sedation. In one case, where the buccal fistula was 1cm in diameter, it was sutured after debridement. Whereas, in other case, the fistula was 2-3 cm in diameter, it was debrided and two circular rubber pieces of size slightly greater than diameter of fistula were secured one on inner oral mucosal opening and other on outer skin opening of fistula with the help of horizontal mattress sutures passed through outer and inner rubber pieces (Fig 10). The knot was secured on the outer rubber piece. Oral cavity was irrigated daily with light potassium permanganate solution.

The animal was offered roughages with soft dry leaves with minimum straws. The diameter of fistula reduced remarkably in 2 weeks. The fistula was kept clean and dressed with 5% povidone iodine. Healing took place in 3-5 weeks.

Lacerated nostrils

Lacerated nostrils due to hooking or sudden and forceful pulling of nose halters attached to the nose pegs was diagnosed in 9 male and 1 female camels. Laceration extended cranial to the point of embedded nose peg to a variable length of 3 to 5 cm (Fig 11). It was found mostly unilateral and occasionally bilateral. The wound edges were irregular with blood clots in fresh cases. The lacerated nostrils were repaired by vertical mattress sutures applied on skin edges using silk no 1 (Fig 12). Sutures were removed after 10-12 days.

Ulcerative wound at nostril

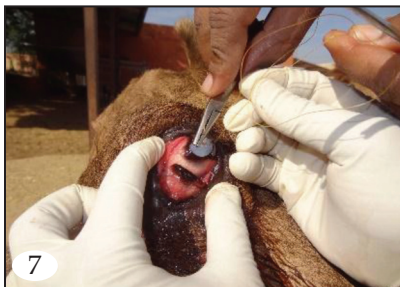
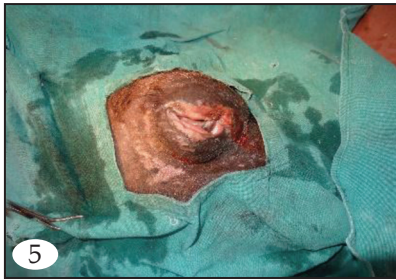
Ulcerative wounds at nostril occurred due to bacterial infection were seen in 4 male and 2 female camels. The wounds varied from small size to large haemorrhagic area with a loss of skin (Fig 13). The cases of ulcerative wound at nostril showed necrosis and bacterial infection at the site. The wounds were thoroughly debrided and after haemostasis dressed with antiseptic and fly repellent ointment. Healing occurred in 15-20 days.

Maggot wound at nostril

Maggot wounds due to infestation of skin wounds by flies were noticed at nostrils in 5 male and 2 female camels. Live maggots were seen in the wounds, with discharge of blood exudate (Fig 14). The animals having maggot wounds at nostrils showed sneezing attempts with frequent head shaking. Turpentine oil swabs were applied for 10 minutes to remove maggots followed by dressing with fly repellent and antiseptic ointment or spray. A yellowish or blood tinged serous discharge was observed in most of the wounds up to 6-7 days. The wound edges were healthy at 8-9 days. The granulation tissue was granular, hyperemic, bright red / reddish pink in colour on 10-12 days. Antibiotics and analgesics were given intramuscularly for 3-5 days.

Soft palate injury

Penetrating wounds at soft palate injured either with its own teeth or by biting of offender camel or by external trauma were recorded in 5 male camels during rutting season. The injured soft palate showed haematoma and oedema in 4



- Fig 1. Penetrating wound at forehead occurred due to external trauma.
 Fig 2. Penetrating wound at supra orbital region and buccal cavity observed in a camel.
 Fig 3. A laceration of upper eyelid occurred due to hooking of the eyelid.
 Fig 4. Lacerated eyelid repaired by nonabsorbable suture.
 Fig 5. Penetrating wound in eyeball occurred by external trauma.
 Fig 6. The eyeball was separated from the Tenon's capsule and removed (enucleation).
 Fig 7. Penetrating wound at cornea (keratorrhaxis). The ruptured cornea and sclera were sutured.
 Fig 8. Firing wound on lateral aspect of face region.
 Fig 9. Penetrating wound at buccal cavity below the lower eyelid on right side of cheek.

cases and abscession in 1 case. The protruded heavy mass of soft palate (Gulla/Dulla) hanged out of the mouth and could not be reposed back into the oral cavity (Fig 15). The injured soft palate required surgical resection. Protruded soft palate was held in hand with towel and was pulled out under xylazine sedation. It was resected close to its attachment with the help of a long handled scissors. The severed edges were cauterised with strong potassium permanganate solution. Haemostasis occurred in couple of minutes. Oral cavity was irrigated daily with light potassium permanganate solution. The animal was offered roughages with soft dry leaves with minimum straws. Antibiotic and analgesic were given for 3-5 days to check secondary infection and inflammation.

Lacerated wound at gingiva and lower lip

Laceration occurred due to forceful pulling of lower lip by rope in 1 male camel at the junction of gingiva and teeth and extended up to adjoining lower lip to a length of 1 to 3 cm (Fig 16). The lacerated wound was sutured using catgut suture no. 2 (Fig 17). Injection oxytetracycline 1500 mg (7 days), phenylbutazone 3000 mg (3 days) and multivitamin 20 ml (5 days) were administered, postoperatively. Sutures were removed after 12 days.

Submandibular Abscess

Suppurative wound at ventral mandibular region were observed in 5 male camels. Clinical examination revealed painful swelling which was soft at the centre. Exploratory puncture revealed

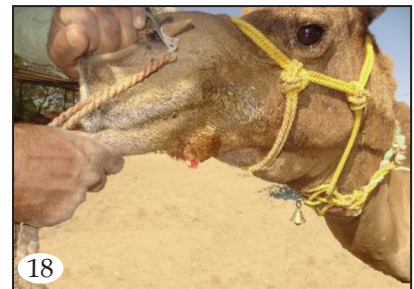


Fig 10. Two circular rubber pieces of size slightly greater than diameter of fistula were secured one on inner oral mucosal opening and other on outer skin opening of fistula.

Fig 11. A laceration of nostril occurred due to forceful pulling of nose halters attached to the nose pegs.

Fig 12. Vertical mattress sutures applied to repair lacerated nostril.

Fig 13. Ulcerative wound at nostril.

Fig 14. Maggot wound of nostril occurred due to infestation of flies, with discharge of blood exudate.

Fig 15. Protruded soft palate (Gulla/Dulla) hanging out of oral cavity.

Fig 16. A laceration occurred due to forceful pulling of lower lip by rope.

Fig 17. Laceration at the junction of gingiva and lowerlip in a camel.

Fig 18. Suppurative wound at ventral mandibular region.

the pus. A crisscross skin incision was given in the centre and abscesses were drained (Fig 18). The cavity of the abscess was irrigated with potassium permanganate solution. Tincture of iodine (2.5%) was applied to destroy the pyogenic membrane. Parenteral administration of antibiotic and analgesic were administered for 3-5 days. Healing took place in two weeks.

Discussion

In animals of present study, the incidence of wound affections of head and neck region was found more in male compared to female camels, because local people usually keep male camels for draft purposes.

The skin of camelids is relatively thicker than that of other species; thus infolding is not a serious problem (Fowler, 1992). The camel dermis is thick and well vascularised such that under the effect of vasodilatory drugs, the incision can cause considerable haemorrhage (Ramadan *et al*, 1986). In present cases, the wound incision caused continuous oozing of blood from the whole cut surface was attributed to the high vascularity of the dermal and subcutaneous tissue of the camel skin.

In extensive contaminated wounds prior to dressings aqua therapy or irrigation with mild potassium permanganate solution appeared to be beneficial in sloughing of devitalised tissue and help in early healing. Similar observations were made

by Singhvi and Bhargava (1971), Purohit (1990) and Gahlot (2000) for wound healing in camels. For minimal disturbance of the old healing or septic wounds in the clinical cases, a period of at least 48 hour interval was given between the treatments. Newman (1974) also observed that daily scrubbing of the infected wound helps to control the infection.

In animals of present study, the management of wounds and abscess was done by providing effective drainage, debridement and irrigation with light potassium permanganate solution. Topical paste formulations have the most desirable characteristics, because of the less number of applications needed during the treatment, a good cicatrisation effect and protection against myiasis (Lozina *et al*, 2007). Cross (1917) also advised thorough cleaning of wound with mild antiseptic solution in camels, then washing with clean water and dressing with weak solution of iodine, boro-iodoform powder, zinc oxide powder or ointment. Purohit and Chouhan (1992) described a detailed study on wound healing in camels by using of neem oil (*Azadirachta indica*), protomine zinc insulin and camel tissue extract.

Soft palate injuries were seen only in adult male camels, particularly during 'rut' season when camel often balloons it. Soft palate was resected from its base under xylazine sedation. Soft palate was grasped with towels and gradually pulled out. It is resected close to its base using metzenbaum scissors. Similar observations were made by Ramadan (1994), Dudi and Gahlot (2003) and Gahlot *et al* (2007).

Lacerated wound across the cornea and sclera were seen occasionally. The condition was usually unilateral and is associated with photophobia, blepharospasm and severe lacrimation. The lacerations of cornea repaired under xylazine sedation, auriculopalpebral nerve block and four point block for fixation of the eyeball. Subconjunctival administration of antibacterial agents for 3-5 days and instillation of eye drops were given. Antibiotics with anti-inflammatory agent were given. Similar observations have been made by Gahlot (2000), Yeruh (2002), Dudi and Gahlot (2003), Denis (2004) and Bishnoi and Gahlot (2004).

Lacerated wound of eyelid and nostrils occurred commonly in the head region in camel. Lacerated skin edges were excised by scalpel. Vertical mattress sutures were applied by using silk. Similar observations and treatment have been adopted by Bishnoi and Gahlot (2004), Gahlot *et al* (2007) and Kumar (2013).

A period of at least 48 hour interval was given between the treatments for minimal disturbance of the old healing or septic wounds or ulcerative wound in the clinical cases (Singhvi and Bhargava, 1971). In animals of present study, majority of camels were sedated with xylazine @ 0.3 mg/kg body weight, intravenously. The surgical intervention was carried out without any struggling. However, Peshin *et al* (2011) studied clinical evaluation of medetomidine hydrochloride (6.0µg/kg) as a sedative in surgical intervention.

Longest healing time observed was in cases of chronic wounds because of the severe infection. Similarly these observations were also supported by Zindoliya (2009). However, Wilson (2005) discussed the principles of early wound management. The wound healing can be positively influenced by dispensing appropriate treatment in the first few hours after injury.

The results of the present investigation revealed that strict asepsis with gentle handling of the tissue and guarding against postoperative contamination and infection gives rise to an ideal healing. In addition, proper surgical interference and management of open granulating wounds with or without cavitation, cleansing, debridement, providing adequate drainage. Thorough irrigation or flushing of wounds with 5% potassium permanganate solution along with proper parental administration of antibiotics and gentle application of different preparation and rest resulted in faster healing.

Careful clinical judgement, early surgical management with gentle handling of tissue, aqua therapy or through wound irrigation, effective topical medication and sufficient rest brings about quick and better recovery in clinical and surgical wounds in camels.

The wound healing can be positively influenced by dispensing appropriate treatment in the first few hours after injury. Positive actions in the early period include haemostasis, meticulous cleansing and debridement of the wound, the use of effective but non-irritating topical applications to disinfect the wound, closure (if indicated) with minimal tension on the suture line and the judicious use of drains (Wilson, 2005).

References

- Bishnoi P and Gahlot TK (2004). Ophthalmic affections in camels (*Camelus dromedarius*). *Veterinary Practitioner* 5(2):89-93.
- Cross HE (1917). *The Camel and Its Disease*. Bailliere. Tindall & Cox, London. (Cited by Shabaan, 1979).

- Chouhan DS, Rathore SS and Gahlot TK (1981). Management of scrotal bite wounds in camel (*Camelus dromedarius*). Indian Journal of Veterinary Surgery 2(2):66-68.
- Denis HM (2004). Equine corneal surgery and transplantation. Veterinary Clinics of North America: Equine Practice 20(2):361-80.
- Dudi PR and Gahlot TK (2003). A survey of ethnoveterinary treatments of common surgical conditions of large ruminants and camels. Journal of Camel Practice and Research 10(2):211-212.
- Fowler ME (1992). Anaesthesia and surgery in camels. Proc, 1st International Camel Conference, Feb. 2-6, Dubai (UAE). pp 341-346.
- Gahlot TK (2000). Selected Topics on Camelids. The Camelid Publishers, Bikaner, India.
- Gahlot TK, Dudi PR, Sharma CK, Bishnoi P and Purohit S (2007). Surgeries of head and neck region of dromedary camel in India. Proc, International Camel Conference. Feb. 16-17, College of Veterinary and Animal Science, Bikaner. pp 69.
- Kumar P (2013). A Clinical study on surgical affections of head and neck region of camels (*Camelus dromedarius*). MVSc Thesis, Rajasthan University of Veterinary and Animal Sciences, Bikaner.
- Leese AS (1927). A Treatise on the One Humped Camel in Health and Disease: Stamford, Haynes and Son.
- Lozina L, Bogado F, Alonso J, Dudik N, Sanchez S, Acosta-de-Perez O (2007). Treatment of superficial injuries in equine work. Revista Veterinaria 18(2):120-123.
- Michaels EB, Hahn EC and Kenyon AJ (1983). Effect of C31G, antimicrobial surfactant on healing of incised guinea pig wounds. American Journal of Veterinary Research 44:1378-1381.
- Newman (1974). Management of contaminated wounds of the extremities. VM/SAC. Veterinary Medicine and Small Animal Clinician 69:1275-1278.
- Peshin PK, Beniwal J, Sharma DK, Kumar A, Sharma CK and Singh S (2011). Clinical evaluation of medetomidine hydrochloride as a sedative and its reversal with atipamizole in camels. Journal of Camelid Science 4:83-84.
- Purohit NR (1990). Experimental and clinical studies on wound healing in camel. PhD Thesis submitted to Rajasthan Agricultural University, Bikaner.
- Purohit NR and Chouhan DS (1992). Wound healing in camels. Proc, 1st International Camel Conference, Feb. 2-6, Dubai (UAE). 365-370.
- Ramadan RO (1994). Surgery and Radiology of the Dromedary Camel. 1st Ed. Al-Jawab Printing Press. Kingdom of Saudi Arabia. pp 68, 74, 210-213, 217,246.
- Ramadan RO, Kock RA and Higgins AJ (1986). Observations on the diagnosis and treatment of surgical conditions in the camel. British Veterinary Journal 142(1):75-89.
- Singhvi NM and Bhargava AK (1971). Complication of wound healing in camels. Journal of The Remount and Veterinary Corps 10:37-40.
- Steckel RR, Page EH, Gedder LA and Vanvleet JF (1984). Electrical stimulation on skin wound healing in the horse. American Journal of Veterinary Research 45:800-803.
- Wilson DA (2005). Principles of early wound management. Veterinary Clinics of North America: Equine Practice 21(1):45-62.
- Yeruh I, van Straten M and Elad D (2002). Entropion, corneal ulcer and corneal haemorrhages in a one-humped camel (*Camelus dromedarius*). Journal of Veterinary Medicine. B, Infectious Diseases and Veterinary Public Health 49(8):409-10.
- Zindoliya H (2009). Clinical studies on surgical affection of skin in camel (*Camelus dromedarius*). MVSc Thesis submitted to Swami Keshwanand Rajasthan Agricultural University, Bikaner.