The Pharma Innovation Journal 2023; 12(6): 3260-3263

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(6): 3260-3263

www.thepharmajournal.com
Received: 03-04-2023
Accepted: 08-05-2023

Sannabeerappa S
MVSc Scholar, Department of Veterinary Surgery and Radiology, Veterinary College, Bengaluru, Karnataka, India

Srinivasa Murthy KM
Associate Professor, Department of Veterinary Surgery and Radiology, Veterinary College, Bengaluru, Karnataka, India

Nagaraja BN
Professor and Head of Department of Veterinary Surgery and Radiology, Veterinary College, Bengaluru, Karnataka, India

Mahesh V
Assistant Professor, Department of Veterinary Surgery and Radiology, Veterinary College, Bengaluru, Karnataka, India

Manjunatha K
Assistant Professor, Department of Veterinary Anatomy and Histology, Veterinary College, Bengaluru, Karnataka, India

Corresponding Author:
Sannabeerappa S
MVSc Scholar, Department of Veterinary Surgery and Radiology, Veterinary College, Bengaluru, Karnataka, India

Evaluation of mini vacuum, close wound drainage system for treatment of aural hematoma in dogs

Sannabeerappa S, Srinivasa Murthy KM, Nagaraja BN, Mahesh V and Manjunatha K

Abstract
The aural hematoma was treated using mini vacuum closed wound drainage system in six clinical cases presented to veterinary college hospital, Bengaluru for a one-year period. The drainage tube was removed between sixth to 10th postoperative day when oozing of exudate was 2 ml or less. The pre-operative and post-operative assessment of physiological, haematological and biochemical parameters showed no statistically significant variations. Postoperatively different parameters like degree of inflammatory signs, oozing of exudate, assessment of wound healing, recurrence of hematoma, and cosmetic appearance were studied. The average time wound healing time was 18 days (14 to 22 days). The cosmetic appearance was excellent without recurrence of aural hematoma in 60th postoperative day. The mini vacuum closed wound drainage system was found to be best treatment technique for aural hematoma because of minimum invasiveness, minimum pain, less time consuming, minimum patient visits to hospital and cost effective with excellent cosmetic healing.

Keywords: Aural hematoma, mini vacuum close wound drainage system, dog, cosmetic appearance

Introduction
In veterinary practice, aural hematoma, is a common illness of external ear of dogs and clinically characterised by exudate accumulation in the concave surface of the pinna, causing uncomfortable pain The most commonly observed predisposing factors included physical trauma, otitis externa, immune-mediated illnesses, allergies, parasites, and foreign bodies. If neglected or treated insufficiently, complications such as improper healing, pinna thickening and contracting like a cauliflower could result, permanently deforming the ear. Numerous surgical techniques, such as hematoma fluid aspiration, combination of hematoma fluid aspiration and dexamethasone infusion, hematoma incision and bandaging, hematoma incision plus ablation suturing, and hematoma incision and placement of indwelling polyethylene infusion tubes, were demonstrated, but they were unable to stop the recurrence and maintain the cosmetic appearance. To overcome the above problems, a new technique, mini vacuum closed drainage system for treatment of aural hematoma gains popularity and provides advantages such as minimally invasive, less painful, easy to perform, less time consuming, gives good cosmetic appearance and needs less frequent dressing.

Materials and Methods
In the present study, mini closed vacuum tube drainage technique for treatment of aural hematoma was undertaken in six clinical cases of dogs to assess the feasibility of technique in dogs.

The instruments used to drain the hematoma were mini closed vacuum wound drainage system, trocar, polyamide suture material (Relyon®, Mco Hospital Aids Pvt Ltd), bandage roll and adhesive bandage (Pro wrap®) (Plate 1) and general surgical set. The animals selected for study was anaesthetised in routine standard procedure. The non-fenestrated end of the 14 FG wound drainage tube was cut and attached to the latex rubber of the drip set and connected to anti reflux valve of the vacuum reservoir bellow (Plate 2).

A blunt incision was made by using trocar at the base of the concave surface of the pinna (Plate 3). A rapid stabbing motion was used to insert a trocar into the base of the hematoma cavity through the skin incision. In order to promote fluid evacuation, the trocar was removed, and a mosquito haemostat was inserted into the hematoma incision. Blood clots were removed after repeatedly flushing with NS using 20 ml syringe (Plate 4). Further the fenestrated portion of a vacuum drainage tube was inserted into the hematoma cavity up to the apex of the pinna.

A purse string suture was applied around. The drainage tube was secured by finger-trap anchoring method (Plate 5) to prevent from slipping. The length of the drainage tube was maintained up to the ventral surface of E-collar. The bellow of reservoir was secured on head over bandage with adhesive tape (Plate 6). The bellow of the reservoir with anti-reflux valve was activated to provide vacuum for draining of hematoma fluid. The E-collar was applied to the neck of dog to prevent the system from self-mutilation. The owner was advised to record the daily collection of hematoma fluid that was collected in the reservoir, for about 10- 15 days. Drainage system was removed if the amount of fluid collected was less than 2 mL day. All the dogs were followed for about two months after surgery.

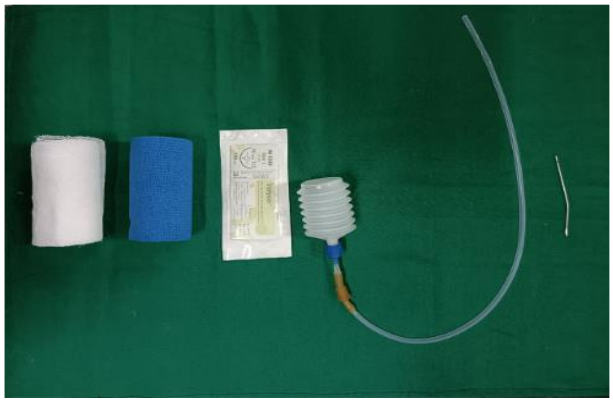

Plate 1: Showing Roller bandage, Vet wrap, Polyamide suture material, mini vacuum wound drainage set and Trocar.

Plate 2: Photograph showing fenestrated of drainage tube attached to the bellow tube through the latex rubber of drip set

Plate 3: Photograph showing making a hole at the base of pinna

Plate 4: Photograph showing flushing of hematoma cavity with normal saline using 20 mL syringe to remove the fibrin/blood clots.

Plate 5: Photograph showing anchoring of drainage tube with Chinese finger trap suture to prevent slipping of drainage tube.

Plate 6: Photograph showing anchoring of vacuum drainage system to head over bandage.

Plate 7: Showing wound healing on 5th postoperative day.

Plate 8: Showing wound healing on 7th postoperative day.

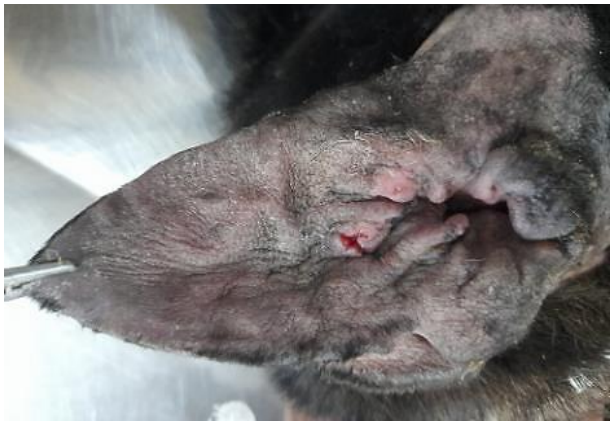

Plate 9: Showing wound healing on 14th postoperative day

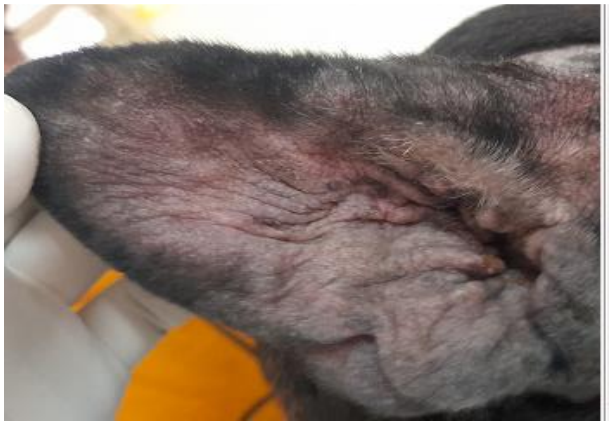

Plate 10: Showing wound healing on 28th postoperative day.

Plate 11: Showing wound healing on 45th postoperative day.

Plate 12: Showing wound healing on 60th postoperative day.

Results and Discussion

The physical parameters like rectal temperature, respiration rate and heart rate were within normal range except initial slight rise in rectal temperature due to inflammation occurring inside the hematoma cavity. The authors stated that the minimum trauma required for insertion of the drainage tube, hence minimum manifestation of traumatic stress, surgical stress and inflammatory process occurring at the surgical site. These observations were in accordance with Joyce (1994) [6], Valle *et al.* (2020) [10] and Lahiani and Niebauer (2020) [7] during the treatment of aural hematoma by tube drainage using 100 mL barrel.

The haematological parameters like haemoglobin levels, total erythrocyte count levels, total leukocyte count levels, and platelets count were within normal range. Valle *et al.* (2020) [10] and Reddy and Kumar (2020) [9], found similar results during the treatment of aural hematoma by tube drainage. The authors stated that the minimum trauma caused for insertion of the drainage tube was the reason for nonsignificant change in haemoglobin, total erythrocyte count, total leukocyte count and platelets count. Biochemical parameters like serum creatinine, serum alanine aminotransferase levels, and serum protein levels were also within normal range. Valle *et al.* (2020) [10] and Reddy and Kumar (2020) [9], found similar results during the treatment of aural hematoma by tube drainage. The authors stated that the minimum trauma caused for insertion of the drainage tube was the reason for nonsignificant change in serum creatinine, serum alanine aminotransferase levels, and serum protein levels.

In the present study, 100 mL reservoir bellow with anti-reflux valve was sufficient to collect fluid and ease to empty and rearm it by the owner without any difficulty. The selection and use of proper drains appeared to have an impact on the outcome as well. Additionally, the selection of the negative pressure reservoir was efficient in aspiration of exudate and fast drainage of the exudate from the hematoma cavity. Lahiani, and Niebauer (2020) [7] reported that in the one unsuccessful case, used a valve less 40 mL accordion-type vacuum reservoir; however, the storage capacity of this reservoir was too small, necessitating frequent manipulations for emptying and rearming, and also raised the risk of contamination due to lack of anti-reflux valve. Lahiani and Niebauer (2020) [7] concluded that 100 mL reservoir was preferrable because it was large enough that emptying and re-arming was typically only necessary once at the end of the first week. This was because the fluid volumes produced by

the aural lesions in the first postoperative days range from 15 to 20 mL/day, with volumes decreasing to 1 to 2 mL per day after 1 to 2 weeks. The complete device could then typically be removed after one to two weeks without the need for additional adjustments. In order to lower the possibility of contamination, it was crucial to have a 100-mL reservoir with an anti-reflux valve. Thus, at-home care provided by the pet owner could be as simple as checking the device's overall montage and the fluid levels in the reservoir. Surgical treatment was more frequently used as the first line of treatment for aural hematoma because of the various risks associated with conservative medicinal treatment (Hall *et al*., 2016) [4]. Compressive sutures, compressive dressings, and open drainage through cartilage fenestration of the concave side of the pinna were the principles of surgical methods (Bacon, 2012) [2]. These methods frequently caused discomfort for the patient and could led to issues like recurrence, cosmetically unattractive, pinna deformations, skin irritation, and infection. Delayed in healing could also led to severe scarring and resulted in an unpleasant appearance of pinna (Yool, 2012 and Pavletic, 2015) [11, 8]. Therefore, mini closed continuous vacuum drainage system with an aseptic method that achieved healing solely by compressing and collapsing the cartilage-lined cavity by negative pressure and was truly novel technique (Pavletic, 2015) [8].

In all dogs except in case 3, the procedure described (mini closed vacuum tube drainage system) in the present study had excellent clinical and cosmetic benefits without recurrence (Plate 7) (Plate8) (Plate 9) (Plate 10) (Plate 11) and (Plate 12). All of the dogs were responded favourably to the device and postoperative cares like minimum dressing frequency, ease of maintenance, and good cosmetic outcomes, all contributed to the overall successful outcome. Additionally, it was found that for proper adhesions and appositions between the choncal cartilage and skin, both layers needed to be restored and maintained with light pressure, either by using a cotton pad bandage or with the use of sutures, as stated by Henderson and Horne (2003) [5]. Recurrence of hematoma was observed in one dog on 4th day of the surgical procedure due to blockage of drainage tube by fibrin clots which was managed by flushing of drainage tube by normal saline. Whereas Ahirwar *et al*. (2007) [1] reported that recurrence of aural hematoma in three cases treated with PVC drains two days after removal of the drains. All cases of aural hematoma were recovered very well except one, with excellent cosmetic appearance of pinna but in erect ear dogs the drooling of ear pinna was observed that might be due to damage of the auricular cartilage. The results of our study were similar to findings of Lahiani and Niebauer (2020) [7]. In one instance, fibrosis of the ear pinna along the drainage tube, which might be caused by varied degrees of tissue responses such fibrosis and calcification. Similar findings were recorded by Barraza, (2006) [3].

Conclusion

The mini vacuum closed wound drainage system was found to be the best treatment technique for aural hematoma because of minimum invasiveness, minimum pain, less time-consuming procedure, minimum number of visits to hospital and cost effective with excellent cosmetic look.

References

1. Ahirwar V, Chandrapuria VP, Bhargava MK, Swamy M, Shahi A, Jawre S. A comparative study on the surgical management of canine aural haematoma. Indian Journal of Veterinary Surgery. 2007;28(2):98-100.
2. Bacon NJ. Pinna and external ear canal. In: Veterinary Surgery: Small Animal, Edt. Tobias, K. M. and Johnston, S. A. Edn. 1st., Elsevier Saunders publications, Maryland Heights, MO, USA; c2012. p. 2059- 2077.
3. Barraza ML, Strickland JR, Zepeda H, Taylor JB, Krehbiel CR, Bell GS, *et al*. Gross and histopathological observations of long-term catheterized vessels in experimental sheep. Journal of Veterinary Medicine. A Physiology, Pathology, Clinical Medicine. 2006;53(5):230-238.
4. Hall J, Weir S, Ladlow J. Treatment of canine aural haematoma by UK veterinarians. Journal of small animal practice. 2016;57(7):360-364.
5. Henderson RA, Horne RD. In: Textbook of small animal surgery. Edt. Douglas, S; c2003. p. 1737-1745
6. Joyce JA. Treatment of canine aural hematoma using an indwelling drain and corticosteroids. Journal of Small Animal Practice. 1994;35(7):341-344.
7. Lahiani J, Niebauer GW. On the nature of canine aural haematoma and its treatment with continuous vacuum drainage. Journal of Small Animal Practice. 2020;61(3):195-201.
8. Pavletic MM. Use of laterally placed vacuum drains for management of aural hematomas in five dogs. Journal of Veterinary medicine Association. 2015;246(1):112-117.
9. Reddy GAK, Kumar AA. Surgical management of aural hematoma in dogs. Journal of Pharma Innovation. 2020;9(8):59-60.
10. Valle ACV, Brunell H, Carvalho AC. Treatment of aural hematoma in a dog (*Canis familiaris*) by homeopathy: Case report. Pub. Vet. 2020;14(9):a647.
11. Yool DA. Small animal soft tissue surgery. Edt. Yool, D. A., CABI publications, Oxfordshire. 2012;90(9):295-297.